

FCPAE & AIAM2019

International Conference on Artificial Intelligence and Advanced Manufacturing

2019 人工智能与先进制造国际会议

会议手册

Conference Program



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AUTOMATICA SINTCA



爱尔兰, 都柏林

Dublin, Ireland

2019年10月17-19日 Oct.17-19, 2019

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大会简介

由全欧华人专业协会联合会 (FCPAE) 主办, 爱尔兰华人专业人士协会、国际应用科学与技术协会 (IAAST)、中国科学院海西研究院、FCPAE 上海代表处、湖州师范学院联合承办的第十一届 FCPAE 欧洲论坛暨 2019 人工智能与先进制造国际会议 (AIAM2019) 将于 2019 年 10 月 17 至 19 日 (周四-周六) 在爱尔兰首都都柏林召开。

本届会议以“人工智能与先进制造技术”为主题, 旨在为全世界从事数字化、智能化、绿色化设计、制造、应用的专家、学者及专业技术人员提供一个交流最新研究成果的平台, 并进一步推动全球在人工智能与先进制造领域的发展。

大会将围绕主题征集会议论文, 所有提交至本届会议的论文均会安排严格的同行评审, 接收论文由美国 ACM 出版, 出版后送交 EI Compendex, Scopus 等数据库收录, 遴选的优秀论文将可推荐至 SCI/EI 收录的国际期刊发表。

Conference Introduction

FCPAE2019 & International Conference on Artificial Intelligence and Advanced Manufacturing (AIAM2019) will be held in Dublin, Ireland between October 17 and 19, 2019.

FCPAE Europe Forum was founded by AICF and ASICEF in 2009. Since then, it has been successfully held for ten times in Paris (2009), Copenhagen (2010), Brussels (2011), Vienna (2012), The Hague (2013), Frankfurt (2014), Brussels (2015), Hillerød (2016), Paris (2017), and Helsinki (2018) respectively. It has attracted thousands of participants and become a platform with great influence in Chinese and European government, enterprises, scientific research institutions.

As an academic branch of FCPAE, AIAM2019 aims to bring together researchers and scientists from artificial intelligence and advanced manufacturing, researchers from various application areas to discuss problems and solutions in the area, to identify new issues, and to shape future directions for research. This conference provides opportunities for the delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.

大会组织机构

组织单位

主办单位：全欧华人专业协会联合会（FCPAE）

承办单位：爱尔兰华人专业人士协会

国际应用科学与技术协会（IAAST）

中国科学院海西研究院

FCPAE 上海代表处

湖州师范学院

协办单位：上海大学

成都信息工程大学软件工程学院

《自动化学报》

《信息与控制期刊》

东北大学

西安财经大学

《工程设计学报》

《江苏大学学报（自然版）》

大会主席：周盛宗教授，全欧华人专业协会联合会

学术委员会：联席主席（按英文姓名排序）：

郭毅可教授，英国皇家工程院院士、帝国理工大学教授

张建伟教授，德国汉堡科学院院士、汉堡大学教授

委员（按英文姓名排序）：

陈晓东教授，中国科学院上海高等研究院

傅晓明教授，德国哥廷根大学

何泾沙教授，北京工业大学

胡文军教授，湖州师范学院

蒋林华教授，中国科学院上海高等研究院

李俊教授，中国科学院海西研究院

林海翔教授，荷兰代尔夫特大学

林文雄教授，中国科学院海西研究院

宋梁教授，复旦大学

苏代忠教授，英国诺丁汉特伦特大学

吴兵教授，爱尔兰都柏林工业大学

吴少凡教授，中国科学院海西研究院

张吉教授，之江实验室

技术（组织）委员会主席：蒋林华教授

委员：刘晓玲、邢镔、张倩、叶维彰、刘洪泉、蔡雁岭、余治昊、颜成钢、王嘉

秋

AIAM2019 Organization

Organizer

Federation of Chinese Professional Associations in Europe (FCPAE)

In Association With

Association of Chinese Professionals in Ireland (ACPI)

International Association of Applied Science and Technology (IAAST)

Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences

FCPAE Shanghai Representative Office

Huzhou University

Sponsors

Shanghai University

Chengdu University of Information Technology

IEEE/CAA Journal of Automatica Sinica

Information and Control

Northeastern University

Xi'an University of Posts and Telecommunications

Chinese Journal of Engineering Design

Technical Committee

Chair

Shengzong Zhou, Professor, Federation of Chinese Professional Associations in Europe

Co-Chair

Yike Guo, Professor, Academician of the Royal Academy of Engineering, Imperial College
London

Jianwei Zhang, Professor, Academician of the Hamburg Academy of Sciences, Universität
Hamburg

Members

Xiaodong Chen, Professor, Shanghai Advanced Research Institute, Chinese Academy of Sciences

Xiaoming Fu, Professor, University of Göttingen, Germany

Jingsha He, Professor, Beijing University of Technology

Wenjun Hu, Professor, Huzhou University

Linhua Jiang, Professor, Shanghai Advanced Research Institute, Chinese Academy of Sciences, Huzhou University

Jun Li, Professor, Chinese Academy of Sciences

Haixiang Lin, Professor, Technische Universiteit Delft

Wenxiong Lin, Professor, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences

Liang Song, Professor, Fudan University

Daizhong Su, Nottingham Trent University, UK

Bing Wu, Professor, University College Dublin

Shaofan Wu, Professor, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences

Ji Zhang, Professor, Zhejiang Lab, China

Organizing Committee

Chair

Linhua Jiang, Professor, Shanghai Advanced Research Institute, Chinese Academy of Sciences, Huzhou University

Members

Xiaoling Liu; Bin Xing; Qian Zhang; Wei-Chang Yeh; Hongquan Liu; Yanling Cai; Zhihao Yu; Chenggang Yan; Jiaqiu Wang

组织单位介绍

全欧华人专业协会联合会

全欧华人专业协会联合会(Federation of Chinese Professional Associations in Europe, 缩写FCPAE)于2001年11月21日成立,在德国法兰克福地方法院依法注册,注册号VR 12689。

联合会旨在团结在欧洲的各华侨华人专业协会,维护和保障旅欧华人专业人士的合法权益,丰富生活,为在欧洲的华人华侨和留学生回国创业和回国服务提供交流的平台和合作的机会。联合会聚合了分布在欧洲十余个国家的华人专业协会和机构,以各会会长、理事会和积极分子为核心,通过相互交流,沟通信息,选拔推荐人才和促进产业项目合作,开拓“双赢”道路。在遵守所在国和中国的法规前提下,以业促会,以会推业,促进中欧科技文化交流和产业合作。同时,也通过联合会组织的各种活动,活跃气氛,促进会员间的学术交流。

从成立至今,全欧华人专业人士联合会积极开展与国内的交流活动,五十多次组团回国考察访问,先后建立济南欧亚科技人才创业基地和徐州海外科技人才创业基地,先后在欧洲和国内举办了二十多次国际性学术研讨会,组织了多项公益活动,并分别在巴黎、哥本哈根、布鲁塞尔、维也纳、海牙、法兰克福和布鲁塞尔成功举办了九届《FCPAE 欧洲论坛》,受到欧洲和世界其它国家的政府、企业、研究机构、大学以及欧盟和联合国相关机构的热情关注和直接参与。联合会由成立时的十个会员协会,已发展扩大到现在的六十三个会员协会,他们分别来自德国、英国、法国、荷兰、比利时、瑞典、葡萄牙、瑞士、丹麦、奥地利、爱尔兰、意大利和芬兰等国。各成员协会拥有在欧洲各行各业工作的两万多名华人华侨专业人士。

联合会的组织和机构参照欧盟的形式,主席协会和主席国每年轮换一个国家,所不同的是主席协会和主席国不是按顺序排定轮换,而是在联合会每年的年会上民主选举产生。

爱尔兰华人专业人士协会

爱尔兰华人专业人士协会(ACPI)成立于2004年12月,是一个公益组织,旨在联系爱尔兰

不同学科的华人专业人士、学者和专家。我们的使命是创建爱尔兰最大的华人专业人士社区，为身居爱尔兰的个人和商业成员提供支持，以实现更好的整合，促进商业团体的进步和个人的职业发展。ACPI 定期组织商业论坛、职业发展研讨会和社交等各类活动，涉及签证信息、国内外政策、商业、文化和艺术等多方面内容。

国际应用科学与技术协会

国际应用科学与技术协会(International Association of Applied Science and Technology, IAAST) 于 2010 年在香港注册成立，通过组织国际会议、论坛、研讨会等活动，为来自全球的专家、学者提供一个交流最新学术成果、建立科研合作的机会与平台。

九年来，IAAST 深耕科研服务领域，成功组织国际会议 40 余场，涉及机械、生物医学、管理制造、材料工程、计算机、能源、环境等多个领域；邀请国内外权威专家 500 余人，累计参会人数达 5000 人。为扩大国际会议的影响力，提升学术成果的传播力度，IAAST 与 Springer, Elsevier, IEEE, Taylor and Francis, Hindawi, WIT, ASME 等全球知名出版社建立了长期合作，已累计完成万余篇学术论文的顺利发表。

中国科学院海西研究院

中国科学院福建物质结构研究所（简称福建物构所）由我国著名科学家、教育家卢嘉锡院士于 1960 年创建，是中科院优秀研究所。经过 50 多年发展，获得国家科技三大奖及中科院科技进步特等奖等 230 多项重要科技成果和奖励，已成为在国际上具有重要影响力的结构化学、新材料与器件集成与应用的综合研究基地。

海西院目前共有各类职工 940 多人，其中：中科院院士 5 人(含兼职 3 人)，研究员 100 人，副高 152 人，国家级人才 19 人，国家万人计划 6 人，国家青年拔尖人才 2 人，科技部创新人才推进计划中青年科技创新领军人才 10 人、重点领域创新团队 2 个，国家杰出青年基金获得者 18 人，国家基金委创新群体 2 个，国家百千万人才工程入选者 14 人，中科院高层次人才

45 人，福建省引进人才 37 人，集聚和培养出一支结构合理、创新能力强的科技人才队伍。

现设有化学一级学科博士培养点和无机化学、物理化学、有机化学、凝聚态物理、材料物理与化学、生物化学与分子生物学化等 6 个博士、硕士培养点；生物工程、化学工程、材料工程、光学工程、控制工程 5 个硕士研究生培养点；并设有化学学科、材料科学与工程 2 个博士后流动站。

目前拥有结构化学国家重点实验室、国家光电子晶体材料工程技术研究中心、纳米催化材料与材料国家地方联合工程实验室等 3 个国家级创新平台以及中科院光电材料化学与物理重点实验室、中科院煤制乙二醇及相关技术重点实验室、中科院功能纳米结构设计与组装重点实验室等 10 多个省部级创新平台，形成科学前沿、战略高技术和工程化有机互动的科技创新平台布局。

注重源头创新，瞄准世界科技发展前沿和国家重大需求开展基础研究和应用研究，引领国际结构化学和光电晶体材料学科发展，取得了以“中国牌”BBO、LBO 等一系列光学晶体为代表的一批具有引领国际领先水平的研究成果，使我国成为激光晶体大国和强国，在国际上具有重大影响。面向国民经济主战场，突破行业共性关键技术，支撑经济社会发展，培植了福晶科技股份有限公司、通辽金煤化工有限公司、福建创鑫科技有限公司、青岛海泰光电科技、福建中科华宇、福建中科光芯、福建中科光汇和福建中科芯源等十多家高科技企业。

Introduction to Federation of Chinese Professional Association in Europe

The Federation of Chinese Professional Association in Europe (FCPAE) was established on November 21, 2001 and registered in Frankfurt, Germany. The registration number is 12689. The FCPAE's aims are: to unite the Chinese professional associations in Europe; to maintain and protect the legitimate rights and interests of Chinese professionals in Europe; to provide a platform for them to network and to assist Chinese students who plan to return to China to work or start a business.

To date, the Chinese professional associations and institutions from more than ten countries in Europe have joined FCPAE. Led by key members of the individual associations, FCPAE aims to identify highly skilled Chinese abroad and facilitate industry programs cooperation through communications and mutual information exchange. Under the premise of complying with the laws of the host country and China, FCPAE promotes the Sino-European scientific and technological exchange and industrial cooperation and also organizes various events to promote social and academic exchanges among members. FCPAE is actively engaged in the exchange activities with China.

Since its establishment, more than 50 delegations made their visits to China; Jinan Asia-Europe Science and Technology Talents Entrepreneurship Base and Xuzhou Overseas Science and Technology Talents Entrepreneurship Base were established; and more than 20 international academic seminars and many other events were organized in both Europe and China. FCPAE has held 10 successful Annual European Forums in Paris, Copenhagen, Brussels, Vienna, The Hague, Frankfurt and Helsinki. These forums were excellently received by thousands of participants from local governments, businesses, research institutions, universities around the world. FCPAE has grown rapidly over the years, from only 10 association members to 62 association members, more than 13 European countries and representing over 20,000 Chinese professional members in various fields. The countries of our association members are Germany, the United Kingdom, France, the Netherlands, Belgium, Sweden, Portugal, Switzerland, Denmark, Austria, Ireland, Italy and Finland.

The chair association and its hosting country of the FCPAE is rotated each year through democratic election at the annual meeting of the federation.

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Introduction to the Association of Chinese Professionals in Ireland (ACPI)

Founded in December 2004, the Association of Chinese Professionals in Ireland (ACPI) is a non-for-profit organisation which connects Chinese professionals, scholars and specialists of different disciplines in Ireland. Our mission is to create the largest Chinese professional community that supports both our individual and business members in Ireland for better integration, business and career development. ACPI organises regular events including business forums, career development seminars, information exchange on visa, policies, business, cultural, arts, and social networking events amongst other relevant activities.

Introduction to International Association of Applied Science and Technology

International Association of Applied Science and Technology (IAAST) is a non-profit, non-governmental, international academic organization to promote and communicate research advances and achievements in Applied Science and Technology by providing fast and high quality services for researchers from all kinds of universities, research centers, academic institutes, and other research societies. IAAST brings together science and technology educators, researchers, and professionals to inspire dialogue, share resources, and address the field's challenges. With holding and collaborating with conferences and workshops, IAAST promotes research communications and other academic activities focusing on Applied

Science, Engineering, Physical Science, Social Science, Life Science and Health Science. Meanwhile, IAAST owns scientific journals aiming to provide vehicles to publish original, high quality and unpublished contributions in these areas.

The aims of IAAST are to promote the development and practice of the applied science and technology profession, to advance international co-operation in the field of interest to research, development, and the application in science and human activity, and to further the dissemination and exchange of information on applied science and technology. Meanwhile, IAASET inspires and influences global science community through organizing conferences, workshops, seminars, and publishing high quality international journals.

Introduction to Haixi Institutes of CAS

Fujian Institute of Research on the Structure of Matter (FJIRSM) was founded in 1960 by LU Jiayi, famous scientist, educator and member of the Chinese Academy of Sciences (CAS). The institute is an influential, comprehensive research base in structural chemistry and new crystal materials.

Since the launch of the CAS Knowledge Innovation Program in 2001, FJIRSM has focused on structural chemistry, energy catalysis, nanomaterials, crystal engineering, photoelectric materials, laser technology integration and applications, electronic information, advanced manufacturing and power engineering. It emphasizes research, technological innovation and industrialization in a mutually supportive way.

FJIRSM employs 533 people, including 415 S&T professionals and 58 support personnel. The institute's staff includes two CAS members, one member of The Third World Academy of Sciences, 81 professors or equivalently ranked engineers, and 96 associate professors or the equivalent. In addition, 15 researchers are supported by the National Science Fund for Distinguished Young Scholars. A total of 289 employees now work in innovation-related posts.

Since its establishment, FJIRSM has recorded 230 major achievements in basic research, high-tech innovation or project industrialization. The institute has won 26 key awards including six National Science and Technology Awards, four CAS Technology Advancement Special Awards and two National Technology Invention Awards.

FJIRSM is among the first institutions in China approved to grant Ph.D and master's degrees. It offers Ph.D. programs in chemistry, condensed matter physics, material physics and chemistry, and biochemistry and molecular biology. It offers master's programs in material engineering, bioengineering, optical engineering, and chemical engineering. It also has a postdoctoral program in chemistry.

In June 2010, CAS signed an agreement with the Fujian Provincial Government and Fuzhou Municipality to jointly build the Haixi Institutes of CAS. FJIRSM became the core of the new organization. In the future, the Haixi Institutes will include three new institutes devoted respectively to material engineering, advanced manufacturing technology integration and power engineering, as well as a cross-strait S&T cooperation center. These organizations will respectively focus on new materials, laser devices, automobile dynamics, and academic

exchange between Taiwan and China's Mainland.

FJIRSM has excellent research facilities. Since 2001, the institute has invested 85.8 million yuan in equipment. Currently, the institute has about 4,900 pieces of research equipment with a total value of more than 100 million yuan.

The Chinese Journal of Structural Chemistry (catalogued by SCI, in both Chinese and English versions) is a monthly journal published by FJIRSM. It has an impact factor of 0.548. The institute's library has more than 45,000 books and more than 13 million articles from more than 400 periodicals including electronic versions.

大会主席 Conference Chair



周盛宗

1982年7月在北京大学获学士学位，1985年4月在中科院计算所获硕士学位，1994年9月在德国萨尔州立大学获博士学位。从2001年起担任全欧华人专业协会联合会执行主席和中国留德学者计算机学会主席。从2003年起担任中国科学技术协会海智专家，作为海外特邀代表参加中国科学技术协会第七次和第八次全国代表大会。主要从事计算机软件与理论、软件工程和计算机应用技术方面的研究，尤其是有关软件开发方法、信息系统、虚拟制造、虚拟现实、三维打印等领域的先进技术的研究。

Shengzong Zhou

In 1982, he graduated from Peking University, and then got his master degree from Institute of Computing Technology, Chinese Academy of Sciences in 1985. In 1994, he got his doctor degree from University of Salford, Germany. Since 2001, he has been the executive chairman of Federation of Chinese Professional Associations in Europe (FCPAE) and chairman of Computer Society of Chinese Scholars in Germany. Since 2003, he has been serving as an overseas expert of China Association for Science and Technology, and participated in the seventh and eighth national congress of China Association for Science and Technology as an overseas guest. He is mainly engaged in computer software and theory, software engineering and computer application technology research, especially related to software development methods, information systems, virtual manufacturing, virtual reality, 3d printing and other fields of advanced technology research.

特邀嘉宾 Keynote Speakers



郭毅可

英国皇家工程院院士，欧洲科学院院士，英国帝国理工学院数据科学研究所所长，上海大学计算机学院院长

1980年至1987年在清华大学计算机系计算机专业就学，是首批清华硕博联读生。1987年被公派至英国留学，1994年博士毕业于英国帝国理工学院计算机系，获科学博士学位。2002年成为帝国理工学院计算机系最年轻的计算机科学教授，2014年创建帝国理工数据科学研究所并被任命为所长。2015年4月起，担任上海大学计算机工程与科学学院院长。

研究领域：分布式数据挖掘，在网格计算、云计算、传感器网络和生命科学领域中的数据科学

Yike Guo

Academician of the Royal Academy of Engineering, UK, Academician of the Academy of Europe, Director of the Institute of Data Science of Imperial College London, Dean of the School of Computer Engineering and Science of Shanghai University.

From 1980 to 1987, he studied at the Computer Science Department of Tsinghua University, and was the first batch of students who took successive master-doctor program of Tsinghua University. In 1987, he was sent to study in the UK. In 1994, he graduated from the Computer Science Department of Imperial College London with a Ph.D. In 2002, he became the youngest professor of computer science at the Computer Science Department of Imperial College London. In 2014, he founded the Institute of Data Science of Imperial College London and was appointed director. Since April 2015, he has served as dean of the School of Computer Engineering and Science of Shanghai University.

Research field: Distributed data mining, data science in grid computing, cloud computing, sensor networks, and life sciences.



张建伟,

德国汉堡科学院院士，德国汉堡大学教授，多模态技术研究所所长。

1986年清华大学计算机系学士第一名毕业，1989年获清华大学计算机系硕士(人工智能)学位，1994年获德国卡尔斯鲁厄大学计算机系博士(机器人)学位。发表三百余篇论文专著，多次获得国际会议最佳论文奖，拥有四十余项发明专利。担任多个国际智能机器人及智能控制会议的大会主席、数家国际企业顾问、国务院侨办及中国侨联专家海外咨询委员、德国清华校友会会长、德中企业家联合会会长、北德华人华侨联合会会长。

研究领域：智能感知、机器学习、自主规划、多传感信息融合、智能机器人、多模态人机交互

Jianwei Zhang

Academician of the Hamburg Academy of Sciences, Professor of the University of Hamburg, Germany, Director of the Multimodal Technology Institute

In 1986, he graduated from the Department of Computer Science of Tsinghua University with a bachelor's degree. He obtained a master's degree (Artificial Intelligence) from Tsinghua University in 1989 and a Ph.D. (Robot) degree from the Department of Computer Science of Karlsruhe University in Germany in 1994. He has published more than 300 monographs, won many best paper awards in international conferences, and has more than forty invention patents. He is the chairman of several conferences of international intelligent robots and intelligent control, the consultant of several international business companies, the president of the German Tsinghua Alumni Association, and the president of the German-Chinese Entrepreneurs Association.

Research field: Intellisense, machine learning, self-planning, multi-sensor information fusion, intelligent robots, multimodal human-computer interaction.



傅晓明

德国哥廷根大学终身教授，中国教育部、清华大学计算机系长江学者讲座教授，美国UCLA富布莱特学者讲座教授，国际电气与电子工程师学会（IEEE）高级会员

1994年毕业于东北大学，获学士学位，1997年获东北大学计算机应用专业硕士学位，2000年获清华大学计算机系统结构专业博士学位。2000年底担任德国柏林工业大学研究员。2002年起任教德国哥廷根大学，创建计算机网络研究实验室，兼任数学与计算机科学学院学术院长、国际办公室主任等职。2007年（33岁）成为哥廷根大学建校270年历史上的第一位华人终身教授（时为全校最年轻的教授），也是德国历史上由中国博士获聘终身教授职位的第一人。他曾担任IEEE ICNP 2013、ACM ICN 2016等国际学术会议总主席，以及Green ICN、Mobile Cloud、Clean Sky及ICN 2020等多个欧盟大型科研项目的总负责人、首席科学家。

研究领域：互联网、移动计算、云计算、大数据及社会网络

Xiaoming Fu

Tenured professor of University of Göttingen, Germany, Professor of Changjiang Scholars of Department of Computer Science of Tsinghua University, Senior Member of Institute of Electrical and Electronics Engineers (IEEE).

He graduated from Northeastern University in 1994 with a bachelor's degree. He obtained a master's degree in computer application from Northeastern University in 1997 and a Ph.D. in computer system structure from Tsinghua University in 2000. At the end of 2000, he was a researcher at the Technical University of Berlin, Germany. Since 2002, he has taught at the University of Göttingen, Germany, and has established a computer network research laboratory. He was also the academic dean of the School of Mathematics and Computer Science and the director of the International Office. In 2007, he became the first Chinese tenured professor in the 270-year history of the University of Göttingen (when he was the youngest professor in the school), and the first person in the history of Germany who was hired as a tenured professor by Chinese doctors. He has served as the general chairman of IEEE ICNP 2013, ACM ICN 2016 and other international academic conferences, as well as the chief executive and chief scientist of several large-scale EU scientific research projects such as Green ICN, Mobile Cloud, Clean Sky and ICN 2020.

Research field: Internet, mobile computing, cloud computing, big data and social networks.



何泾沙

北京工业大学教授, 博士生导师、北京市特聘教授、湖北 “楚天学者 计划” 主讲教授。毕业于美国马里兰大学, 先后任职于美国IBM Corp. (资深计算机科学家)、MCI Communications Corp. (高级工程师)、GRIC Communications, Inc. (首席工程师) 等, 先后获取美国发明专利12项。2003年通过北京市高层次人才项目引进到北京工业大学任教授。截止2017年3月, 在国内外学术期刊和国际会议上共发表论文261篇, 其中已被SCI收录21篇, EI/ISTP收录184篇, 获中国发明专利58项, 主持了包括国家自然科学基金项目、863课题等30余项。

研究领域: 计算机网络、信息安全、3D打印、大数据与云计算安全、数字取证

Jingsha He

Professor of Beijing University of Technology & Leading Professor for "Chutian Scholar Program" of Hubei Province

Graduated from University of Maryland, he has worked in IBM Corp., MCI Communications Corp., GRIC Communications, Inc., etc. in America, and got 15 American patents for invention. In 2003, he was introduced to Beijing University of Technology. At present, he has published 261 papers in international journals and conference proceedings, and got 58 Chinese patents for invention, presided over more than 30 projects as well, such as National Natural Science Foundation of China, 863 project, etc.

Research field: Computer networks, information safety, 3D printing, big data and cloud computing security, digital forensics.



林海翔

荷兰 Delft 理工大学教授，浙江理工大学“金沙学者讲座教授”

1979 年考入清华大学，1979 年赴荷兰代尔夫特理工大学留学，在荷兰代尔夫特理工大学分别获得学士、硕士和博士学位。林海翔教授是并行分布计算与数据建模仿真领域知名学者。他承担了欧洲、荷兰 10 多项科研项目，发表研究论文 100 多篇。担任多个国际学术期刊编委、学术会议程序委员会主席/副主席，曾担任全欧华人专业协会联合会主席、荷兰华人学者工程师协会主席，曾获荷兰女皇勋章；担任中国科学院大学、山东大学、广西大学访问（客座）教授。

研究领域：高性能计算、并行分布算法、大规模复杂系统建模与仿真

Haixiang Lin

Professor of Delft University of Technology, Netherlands, “Professor of Jinsha Scholars” of Zhejiang University of Technology.

He was admitted to Tsinghua University in 1979. He went to Delft University of Technology in the Netherlands in 1979 and obtained bachelor's, master's and doctoral degrees from Delft University of Technology. He is a well-known scholar in the field of parallel distributed computing and data modeling and simulation. He has undertaken more than 10 research projects in Europe and the Netherlands, and published more than 100 research papers. He has served as the editorial board member of several international academic journals, chairman/deputy chairman of the academic conference program committee, former chairman of the Federation of Chinese Professional Associations in Europe, chairman of Vereniging van Chinese Wetenschappers en Ingenieurs in Nederland, and visiting professor of the University of Chinese Academy of Sciences, Shandong University, and Guangxi University.

Research field: High performance computing, parallel distribution algorithms, large-scale complex system modeling and simulation.



吴少凡

中国科学院海西研究院研究员，博士生导师

1998年获厦门大学材料化学学士学位，2003年获中科院福建物构所凝聚态物理硕士学位，2006年获中科院福建物构所物理化学博士学位。作为第一完成人，获得福建省科技进步奖二等奖（2004年度）、石油和化学化工协会科技进步奖一等奖（2005年度）；作为第三完成人，获国家科技进步奖二等奖（2011年度）、福建省科技进步奖一等奖2项（2007、2000年度）；获福建青年科技奖（2005年度）、福建运盛青年科技奖（2005年度）和中国石化协会青年科技突出贡献奖称号（2009年度），2011年度获得福州市杰出科技人员称号。

研究领域：激光与非线性光学晶体、闪烁晶体与闪烁陶瓷等新型功能材料。

Shaofan Wu

Researcher of Haixi Research Institute of Chinese Academy of Sciences, Doctoral Supervisor
In 1998, he obtained a bachelor's degree in material chemistry from Xiamen University. He obtained a master's degree in 2003 and a Ph.D. in 2006 from the Fujian Institute of Physical Structure, Chinese Academy of Sciences. As the first person to be completed, he won the second prize of Fujian Science and Technology Progress Award (2004), the first prize of the Science and Technology Progress Award of the Petroleum and Chemical Industry Association (2005). As the third finisher, he won the second prize of National Science and Technology Progress Award (2011), 2 first prizes of Fujian Science and Technology Progress Award (2007, 2000); What's more, he has also won Fujian Youth Science and Technology Award (2005), Fujian Yunsheng Youth Science and Technology Award (2005), and Sinopec National Youth Science and Technology Outstanding Contribution Award (2009). And in 2011, he was awarded the title of Outstanding Science and Technology Personnel in Fuzhou.

Research field: New functional materials such as lasers and nonlinear optical crystals, scintillation crystals and scintillation ceramics.



Daizhong Su

英国诺丁汉特伦特大学教授，先进设计与制造工程中心主任

作为欧洲委员 H2020 计划下的 CIRCf4Life 项目协调员，DaizhongSu 教授负责协调 17 个国际团队的工作，该项目预算为 730 万欧元。此外，DaizhongSu 教授还担任国际机械与机器科学促进联合会(IFToMM) 齿轮传动技术委员会主席，International Journal of Design Engineering 期刊主编，以及先进设计于制造国际会议的创始人、主席。长期以来，他主持了多项国内外合作研究项目，如欧盟 FP7 EcoCost, 欧盟 FP7 cycLED, 欧盟 FP7 AgitatorCBM, 欧亚 IT&C, 英国研究理事会以及中国自然科学基金。

研究领域：一体化设计制造、可持续生产、循环经济、机械传动。

Daizhong Su

Professor of Design Engineering, Head of Advanced Design and Manufacturing Engineering Centre, Nottingham Trent University. His major international commitments include the coordinator of CIRCf4Life project supported by the European Commission H2020 programme, consisting of 17 international teams with project budget 7.3 million Euros; chairman of Gearing and Transmission Technical Committee of International Federation for the Promotion of Mechanism and Machine Science (IFToMM); Editor in Chief, the International Journal of Design Engineering; and founder and chairman of International Conferences on Advanced Design and Manufacture. He has conducted various national and international collaborative research projects, including EU FP7 EcoCost, EU FP7 cycLED, EU FP7 AgitatorCBM, as well as other projects supported by EU Eco-innovation, EU-Asia Link, EU-Asia IT&C, UK Construction iNET, UK Research Councils, UK EMDA, China MoST and Natural Science Foundation.

Research field: Integrated design and manufacture, sustainable production, circular economy, mechanical transmission.



徐军华

新加坡南洋理工大学 (NTU) -法国原子能委员会(CEA)联合实验室研究员

2013年12月获得欧盟玛丽居里博士奖学金，2018年获得芬兰赫尔辛基大学博士学位，2018年9月到2019年3月，在赫尔辛基大学开展博士后研究，2019年3月至今新加坡南洋理工大学研究员。目前已经发表学术论文10余篇，其中6篇影响因子大于5，申请并授权发明专利三项，科研成果曾被赫尔辛基大学新闻和中央电视台专题报道。曾参加第九届国际核化学赫尔辛基会议，2016国际离子交换剑桥大学会议等，并担任2018年第十届欧洲论坛担任大会主席。此外，受邀多个国际期刊审稿人，包括 Chemical Engineering Journal, materials 以及 Nuclear Science and Techniques 等。

研究领域： 废旧智能制造产品的回收和利用

Junhua Xu

Researcher of Joint laboratory of French Atomic Energy Commission, Nanyang Technological University, Singapore. Junhua Xu got Marie Curie International Incoming Fellowships in 2013, and got the doctorate from University of Helsinki, Finland. And then he started post-doctoral research in University of Helsinki. Till 2019, he held the position of researcher in Nanyang Technological University, Singapore. He has published more than 10 papers in international journals, and obtained 3 patents for invention. He was the president of FCPAE Europa Forum in 2018. In addition, he was a reviewer for many journals, such as Chemical Engineering Journal, Material, and Nuclear Science and Techniques, etc.

Research field: recycling and utilization of waste intelligent manufacturing products.



李俊

中国科学院海西研究院研究员，福建省机器人智能控制工程技术研究中心主任

2009年在德国维尔茨堡大学获信息及计算机科学硕士学位，2012年在慕尼黑大学（LMU）机器人人工智能实验室（COTESYS）获得博士学位，同年开始在德国马尔堡大学从事博士后研究，之后留校任职并从事相关研究。留德期间先后承担和参与了多项德国（DFG）及欧盟范围内多项企业相关研发项目，归国后入选福建省第五批百人计划、中科院海西研究院引进优秀海外高层次人才、泉州市引进高层次创新百人、晋江市优秀人才，主持国家十三五重点研发计划子课题、福建省科技重大专项及多项企业委托项目，参与国家科技支撑计划、多项省市各级政府重点科技计划、中科院先导计划A类及STS计划等多个项目。发表专著2部，专业论文16篇，申请及授权专利36件（PCT国际专利1件），软件著作权3项。

研究领域：自适应控制、认知系统建模、人机交互、神经网络、机器人控制技术等。

Jun Li

Researcher of Haixi Research Institute of Chinese Academy of Sciences

He obtained a master degree in information and computer science of University of Wuerzburg in 2009, and obtained a doctorate in University of Munich in 2012. In the same year, he began his post-doctoral research at the University of Marburg in Germany. During his stay in Germany, he undertook and participated in a number of research and development projects, including German (DFG) and European Union Projects. After returning to China, he was selected into the fifth batch of "Hundred Talents Plan" of Fujian province. And as an overseas high-level talent was introduced by Haixi Research Institute of Chinese Academy of Sciences. He has published 2 monographs and 16 papers in international journals, and obtained 36 patents for invention and 3 software copyrights.

Research field: self-adaptation control, cognitive system modeling, man-machine interaction, neural network, robot control technology.

会议信息 Conference Information

会议时间 Dates

2019年10月17日-19日

October 17th-19th, 2019

欢迎晚宴 Welcome dinner

日期/Date	时间/Time	地点/Location
2019年10月17日下午 Oct. 17 th , 2019	18:00-21:00	皇家海军酒店 Royal Marine Hotel

交通路线 Transportation

都柏林机场→皇家海军酒店 Dublin Airport to Royal Marine Hotel	<p>提供往返都柏林机场的长途汽车服务，约需40分钟，Marine Road为站点。</p> <p>您可以直接从位于都柏林机场的机场抵达站的公司代表处购买机票，或者您可以在任何一站登机时从司机那里购买车票。</p> <p>都柏林机场大巴机场站位于1号航站楼和2号航站楼的抵达大厅外。</p> <p>A coach service is available from Marine Road, to/from Dublin Airport, taking approx. 40 minutes.</p> <p>You can buy a ticket directly from a company representative at the airport arrivals stop at Dublin airport or alternatively you can purchase one from the driver when boarding the Aircoach at any of the stops.</p> <p>The Aircoach Dublin Airport stop is located just outside the Arrivals Halls at both Terminal 1 and Terminal 2.</p>
都柏林火车站→皇家海军酒店 Dublin Railway Station to Royal Marine Hotel	<p>DART在高峰时段每5分钟运行一次，白天每20分钟从都柏林到DúnLaoghaire。旅程可欣赏到South East Coast海岸的壮丽景色。</p> <p>爱尔兰铁路公司是国家铁路服务公司，在全国各地提供定期服务。</p> <p>DART与Connolly车站的爱尔兰铁路相连，与LUAS电车服务一样。</p> <p>The DART runs every 5 minutes during rush hour periods and every 20 mins during the day from Dublin to Dún Laoghaire.</p> <p>The journey offers stunning views of the South East Coast.</p> <p>Irish Rail is the national rail service and operates a regular service throughout the country. The DART links up with Irish</p>

	Rail at Connolly Station, as it does with The LUAS tram service.
都柏林巴士圣三一学院站 →皇家海军酒店 Dublin bus Trinity College Stop to Royal Marine Hotel	DúnLaoghaire由都柏林巴士提供服务。终点位于DART站。午夜至凌晨3点，圣三一学院每小时都会提供Nightlink服务。 可乘坐巴士 - 7,7a, 8,45a, 46a, 59,75,111 夜间线路 - 路线L通过Blackrock 夜间线路 - 通过Stillorgan路线K。 Dún Laoghaire is serviced by Dublin Bus. The terminus is located at the DART station. Nightlink services run every hour on the hour from Trinity College between midnight and 3am. Buses – 7, 7a, 8, 45a, 46a, 59, 75, 111 Nightlink – Route L via Blackrock Nightlink – Route K via Stillorgan

会议语言 Language

大会交流语言为英文和中文

The official language of AIAM2019 are English and Chinese.

住宿安排 Accommodation

考虑到酒店接待能力，参会学者建议入住**Royal Marine Hotel (MARINE ROAD, DUN LAOGHAIRE, DUBLIN, A96 K063, IRELAND TEL. +353 1 230 0030)** 或**Haddington House (距Royal Marine Hotel 700米左右)**

本届会议会务组已与酒店签订协议，入住可享受协议价140欧/晚。如需预定房间，可联系会务组刘老师 (aiam@iaast.cn, 电话: 18003862371)

All foreign participants will be recommended to live in **Royal Marine Hotel (MARINE ROAD, DUN LAOGHAIRE, DUBLIN, A96 K063, IRELAND TEL. +353 1 230 0030)** or **Haddington House (walk about 700 meters to Royal Marine Hotel)** .

会议重要活动 Important Events

开幕式 Open Ceremony

时间：2019年10月18日上午9:00-9:40

地点：皇家海军酒店

Time: 9:00-9:40 a.m., Oct.18th, 2019

Venue: Royal Marine Hotel

交流晚宴 Dinner Party

时间：2019年10月18日晚上17:30-21:00

地点：皇家海军酒店

Time: 17:30-21:00 p.m., Oct. 18th, 2019

Venue: Royal Marine Hotel

参观活动 Visit Activities

时间：2019年10月19日下午14:00-17:00

地点1：鲍尔斯考特庄园和园林

地点2：Kildare Village Outlet

Time: 14:00-17:00 p.m., Oct. 19th, 2019

Option 1: Powerscourt House & Gardens, Co Wicklow

Option 2: Kildare Village Outlet

学术交流须知 Scientific Information

学术报告顺序

学术交流将按照大会最终日程册进行，请发言的代表注意自己的发言日期和时间并提前做好准备。

Order of presentation will be arranged based on **Final Conference Program of AIAM2019**, so delegates who give a presentation should prepare your speech in advance.

幻灯片 PPT

请做报告嘉宾于**2019年10月10日之前**将准备好的中英文PPT发送至会务组邮箱 aiam@iaast.cn，若涉及研究成果保密，请至少提前发送报告概要至会务组。

All delegates who give a presentation should send PPT in English version (key notes in Chinese is necessary) before October 10, 2019 to aiam@iaast.cn

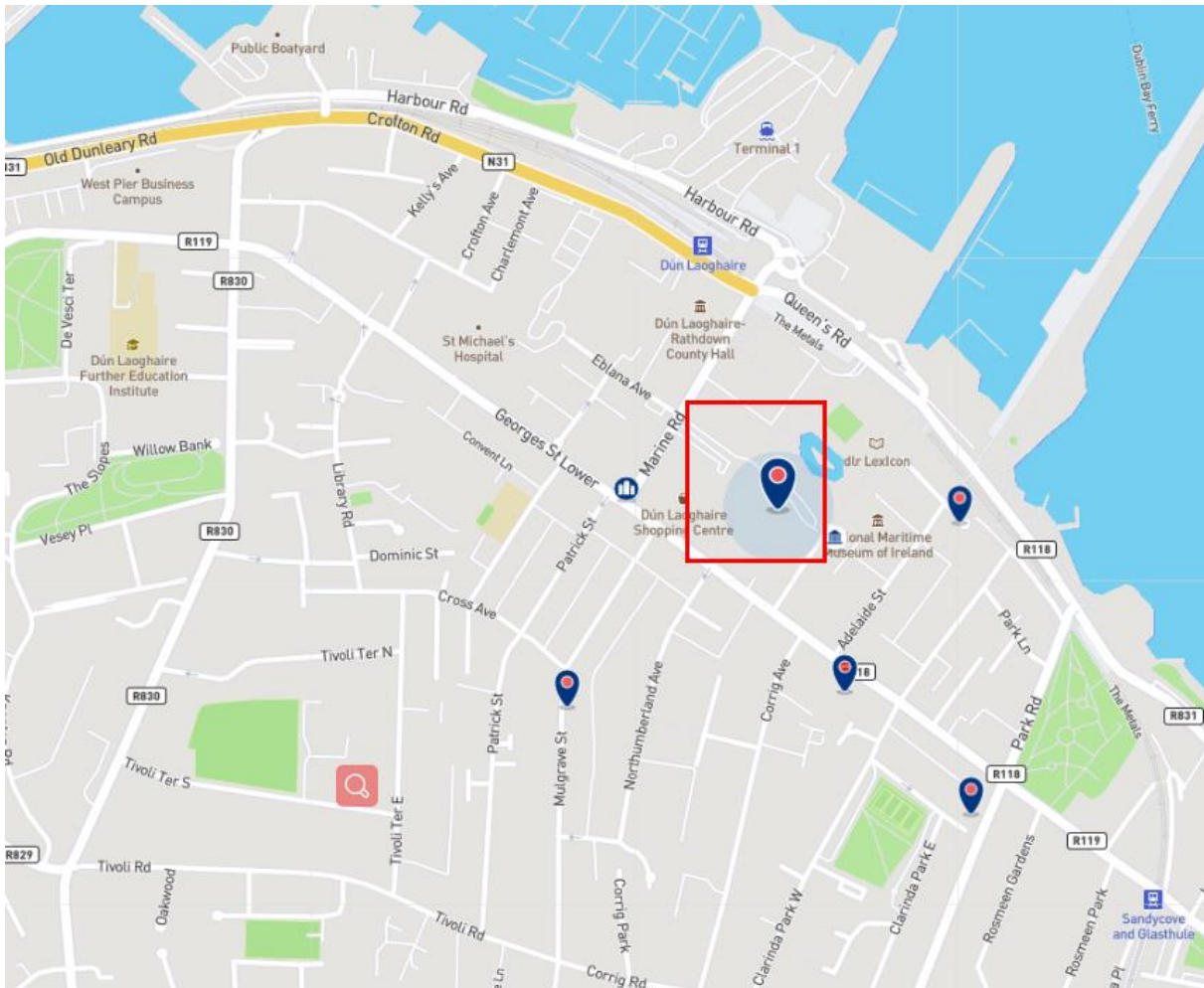
会议地点 Venue

皇家海军酒店

地址：MARINE ROAD, DUN LAOGHAIRE, DUBLIN, A96 K063, IRELAND

Royal Marine Hotel

Address: MARINE ROAD, DUN LAOGHAIRE, DUBLIN, A96 K063, IRELAND



会议日程

FCPAE & AIAM2019 会议日程		
日期	时间	事项
10月17日周四	18:00-21:00	欢迎晚宴
10月18日周五	9:00-9:30	嘉宾入场
	9:30-10:30	会议开幕式
	10:30-12:15	主讲报告
	13:15-17:00	主题论坛：教育多元化
		主题论坛：科技创新
		2019 人工智能与先进制造国际会议 (AIAM2019)
17:30-21:10	交流晚宴：欧洲论坛茅台之夜	
10月19日周六	8:30-9:10	嘉宾入场 & 会议回顾
	9:10-10:00	主题演讲
	10:00-10:30	欧洲创新创业大赛获奖项目路演
	10:30-11:00	主题演讲
	11:00-11:20	2019 年欧洲华人十大科技领军人才颁奖仪式
	11:20-11:40	结束致辞
	11:40-13:30	受邀嘉宾中国大使馆接待会
	14:00-17:00	参观活动：1, 鲍尔斯考特庄园 & 园林; 2, Kildare Village Outlet

Conference Schedule

FCPAE & AIAM2019 Conference Schedule				
Date	Time	Item	Location	
Oct.17, 2019 Thursday	18:00-21:00	Welcome dinner	Royal Marine Hotel	
	9:00-9:30	Arrival	Royal Marine Hotel	
9:30-9:40	Opening remarks			
9:30-9:50	Welcome remarks			
9:50-10:00	Welcome remarks			
Keynote speech				
10:00-10:45	VIP speakers			
10:45-11:00	Tea break			
Oct.18, 2019 Friday	11:00-12:15	Keynote speech		
	12:15-13:15	Lunch		
	13:15-17:00	Track 1: Education		Royal Marine Hotel
		Track 2: Science & Technology Innovation		
		Track 3: International Conference on Artificial Intelligence and Advanced Manufacturing (AIAM2019)		
		Track 4: FCPAE Annual meeting	Royal Marine Hotel	
	17:00-21:10	Moutai Gala Evening	Royal Marine Hotel	
	Keynotes and closing ceremony			
Oct.19, 2019 Saturday	8:30-9:00	Arrival	Royal Marine Hotel	
	9:00-9:10	Recaos and agenda		
	9:10-10:45	Keynote speech		
	10:45-11:00	Tea break		
	11:00-11:20	2019 Top 10 leading Chinese Talents for Science and Technology in Europe		
	11:20-11:40	Forum closing speech		
	14:00-17:00	Visiting activities: Powersourt House & Gardens, Co Wicklow Kildare Village Outlet		

论文索引 Article Index

No.	ID No.	Title
1	AM19294	Robot Collision Detection New Method: Modified Nonlinear Disturbance Observer by Neural Networks
	Authors	Tian Xu, Jizhuang Fan, Qianqian Fang, Yanhe Zhu and Jie Zhao
	Affiliation	State Key Laboratory of Robotics and System Harbin Institute of Technology Harbin, Heilongjiang, 15000, China
<p>Abstract: Collision detection is the core issue in physical human–robot interaction and many detection methods based-on robot dynamics model have been proposed recently. However, model uncertainties, especially complicated friction, seriously affect the collision detection performance of these methods. In this paper, a nonlinear disturbance observer (NDO) originally proposed for friction estimation is the first time to be introduced for the robot collision detection. For proving the collision detection performance of NDO better than the classical generalized momentum observer (GMO), their detection sensitivity, robustness and external torque estimation accuracy are compared and analyzed. Then, in order to eliminate the effects of friction uncertainties on collision detection results, a modified nonlinear disturbance observer (MNDO) by neural networks is proposed to improve the collision detection performance. For verifying the effectiveness of the algorithm, simulations and experiments are conducted in 6-dof robot and two single joint platforms, respectively. Finally, the results show our proposed algorithm is correct and effective.</p>		
2	AM19287	A Research Method of Fishing Vessel Safety Based on AHP and Fuzzy Comprehensive Evaluation
	Authors	Yuling Li, Wei He*, Qinxia Xu
	Affiliation	School of Economics and management, Minjiang University, Fujian, China; Marine Intelligent Ship Engineering Research Center of Fujian Province Colleges and Universities, Minjiang University, Fuzhou 350108, China
<p>Abstract: Fishing vessel safety accidents often occur, and the causes are various. If there is a clear understanding of the causes of these frequent accidents, the risk of accidents will be reduced. In this paper, the weights of various safety indicators of fishing vessels are calculated by the combination of AHP and cluster analysis methods. The fuzzy comprehensive evaluation method is used to evaluate the safety of fishing vessels, and the safety status of fishing vessels in Fuzhou is used as a case study to verify. The survey data of fishing boat accidents in Fuzhou City, Fujian Province, and the collection of accident data of fishing boats in other coastal cities, collating and analyzing the data, and obtaining the possible risk factors in the fishing production process of fishing vessels, refer to the relevant literature on the factors affecting the safety of fishing vessels and based on the information obtained from field research, the safety evaluation index system of Fuzhou City was constructed. The weights of each index were calculated by using the analytic hierarchy process and the cluster analysis method. Then, the fuzzy comprehensive evaluation method was used to evaluate the safety of a fishing boat. In addition, in the process of writing this article, I have contributed my own strength in the early stage of data collection, data analysis and modeling analysis.</p>		
3	AM19288	Recognition of Static Obstacles with Curve Features

	Authors	Yi Liu, Fuzhao Wang,Zhiqiang Si
	Affiliation	Army Academy of Armored Forces,BengBu, China Unit 75733,QingYuan,China
<p>Abstract: Recognition of stationary obstacles based on curve features is an important method of obstacle recognition for unmanned vehicle using three-dimensional lidar. Firstly, binary processing of point cloud data collected by three-dimensional lidar is carried out. Then, Kalman filter tracking method is used to extract static obstacles. Finally, Hough transform is used to extract obstacles with curve characteristics. Experiments show that this method is simple and effective for extracting static obstacles with curve characteristics.</p>		
4	AM19289	A Method for Determining the Location of Unmanned Vehicles in Matched Maps
	Authors	Fuzhao Wang, Liu Yi, Zhiqiang Si
	Affiliation	Army Academy of Armored Forces,BengBu, China Unit 75733,QingYuan, China
<p>Abstract: In this paper, a matchable road map is used to determine the specific location of unmanned vehicle in the road. Firstly, the matching map is established according to the characteristic obstacles of point cloud data processing. Then, the data collected by lidar are processed and matched with the matching map to determine the specific location of unmanned vehicle in the road. The experiment locates the coordinate points of 1705 positions. The accuracy of mid-positioning reaches 93.37%, which shows that the method is simple and reliable.</p>		
5	AM19299	Adaptive Model-updated Correlation Filters for Real-time Visual Tracking
	Authors	Qiujie Dong,Xuedong He,Haiyan Ge,Qin Liu,Aifu Han,Shengzong Zhou
	Affiliation	Chinese Academy of Sciences ,Fujian Institute of Research on the Structure of Matter Fuzhou, China; North University of China,College of Big Data,Taiyuan, China; Shandong University of Technology,College of Electrical and Electronic Engineering, Zibo, China;
<p>Abstract: The Correlation Filters has excellent performance in the field of visual tracking. However, most of the model-updated methods adopt the linear interpolation with a fixed learning rate. Although the tracked object information can be retained in a period of time, it is easy to learn the background information into the model due to a fixed learning rate. In this paper, a new adaptive Model-updated method is proposed. Firstly, the similarity metric method is used to construct the confidence function, and then the high confidence prediction image frame is used to construct the discriminant dataset. Finally, the adaptive learning rate is computed according to the confidence value of the predicted image. Perform an adaptive update of the model. The experimental results show that the proposed algorithm can be well embedded in the correlation filters tracker. The proposed method is embedded in the KCF and Staple algorithms and tested on three challenging benchmark datasets OTB2013, OTB100 and TC128, and the tracking performance is improved.</p>		
6	AM19303	Application of "Artificial Intelligence and Big Data" in Sports Rehabilitation for Chinese Judicial Administrative Drug Addicts
	Authors	Dong-Ming JIA,Cun-Feng YUAN,Song GUO,Zu-Zhen JIANG, Ding XU, Da-An WANG
	Affiliation	Affiliation Zhejiang Police Vocational College, Hangzhou, China; Drug Rehabilitation Administration, Chinese Ministry of Justice Beijing, China; Zhejiang GongChen Isolation Detoxification Rehab, Hangzhou, China; Drug Detoxification and Rehabilitation Research Center,The Central Institute for

		Correctional Police,Baoding, China; Shanghai Drug Rehabilitation Administration, Shanghai, China; Hainan Tropical Ocean University,Sanya, China
<p>Abstract: Under the background of "Wisdom Drug Rehabilitation", we introduced "Artificial Intelligence and Big Data" into "exercise rehabilitation" work of drug addicts in judicial administrative system. It is a practical innovation of drug treatment in China. This article will elaborate this innovation of the construction and application of "Exercise Rehabilitation" intelligence platform system. This system will improve mental status, alleviate physical and psychological symptoms, ensure safety in places, lighten the burden of professional police officers, make rapid analysis, make accurate decisions and improve the integrity rate of the addict.</p>		
7	AM19304	Leveraging Multiple Implicit Feedback for Personalized Recommendation with Neural Network
	Authors	Hongfa Wen,Linhua Jiang,Xin Liu*,Yaoqi Sun,Chenggang Yan, Jiyong Zhang, Haibing Yin
	Affiliation	School of Automation, Hangzhou Dianzi University, Hangzhou, P.R. China; Information Science and Technology Research, Shanghai Advanced Research Institute, Chinese Academy of Sciences, Shanghai, P.R. China; School of Communication Engineering, Hangzhou Dianzi University, Hangzhou, P.R. China.
<p>Abstract: In recent years, deep neural networks have been widely applied on recommender systems. Most research efforts are put on modeling the side information such as textual information, contextual information and social network information, but the core part, i.e., interaction relationship between users and items are relatively less explored by neural networks, in particular, when multiple types of implicit feedbacks, e.g., click, browsing, add-to-cart, etc. are available in the system. In this paper, we propose an end-to-end learning framework, which systematically and comprehensively models multiple implicit feedback between users and items. Firstly, for each type of implicit feedback, we apply matrix factorization and Multi-Layer Perception (MLP) to capture both linearity and nonlinearity of user-item interactions. Then we fuse the effects of multiple implicit feedback through neural networks to boost the quality of recommendation. Experiments on Alibaba real production dataset with over two million interactions demonstrate the effectiveness of proposed approaches, which achieve superior performance compared with state-of-the-art methods.</p>		
8	AM19305	Application of refinements on Faster-RCNN in the screening of diabetic foot Wagner grades
	Authors	"Aifu Han*,Sunjie Yan*,Yongze Zhang,Pinchao Huang,Yanting Liu, Qiuji Dong, Shengzong Zhou
	Affiliation	Chinese Academy of Sciences, Fujian Institute of Research on the Structure of Matter, Fuzhou, China; North University of China, College of Big Data, Taiyuan, China; Department of Endocrinology, the First Affiliated Hospital of Fujian Medical University, Fuzhou, China; Diabetes Research Institute of Fujian Province, Fuzhou, China;
<p>Abstract: Diabetic foot (DF) is one of the most serious and costly chronic complications of diabetes, and there are countless cases of amputation or even death due to diabetic foot. The application of deep learning-based in the field of medical imaging is an emerging field, and more and more researchers are engaged in this. Because of the different stages of the onset of diabetic foot ulcer (DFU), the ulcer epidermis exhibits distinct color and texture differences, which provides the possibility of identifying these ulcer grades for visual symbol-based computer vision algorithms. In this paper, a Faster-RCNN based</p>		

on ResNet-50 backbone network is proposed as the detector meta-architecture to realize the detection and localization of DF Wagner grades. In order to build a deep learning model, we collected 2,688 DF data samples. During the training, we adopted a bag of tricks. Our experiment results demonstrate that by stacking all these tweaks, refinements on Faster-RCNN models reach a mean average precision (mAP) of 92.31% in the diabetic foot datasets.

9	AM19307	Embossed Characters Enhancement Based on Convolutional Neural Network
	Authors	Wei Hu ^{1st} , Yijing Su ^{1st} , Jun Li*
	Affiliation	Qaunzhou Institute of Equipment Manufacturing Haixi Institute Chinese Academic of Science Fujian, China

Abstract: Embossed characters are widely used in manufacturing to record product information. It is of great value to recognize embossed characters both effectively and efficiently. Different from conventional Optical Character Recognition (OCR), image enhancement is an essential step in identifying embossed characters. Most of the published algorithms use handcrafted enhancement scheme to segment embossed characters from a background which does not robust to variations. In this paper, we proposed a Convolutional Neural Network (CNN) based enhancement algorithm to improve the contrast between embossed characters and background. After the step, conventional OCR algorithms can be directly applied to the enhanced image. An experiment is carried out on soles with embossed characters. The results show that the algorithm can effectively improve the contrast between embossed characters and background in real-time.

10	AM19325	Research on Cutting Performance and Parameter Optimization of CVD Diamond Thick Film Tools Based on AdvantEdge FEM
	Authors	Haohao Shi, Feng Chen, Yidan Zhou*
	Affiliation	School of Mechanical Engineering Nantong University Nantong, Jiangsu, 226019, China

Abstract: CVD diamond thick film tools have excellent superiority in machining accuracy, efficiency and tool lives because of high hardness, good wear resistance and super chemical stability. However, for some reasons, the cutting performance of CVD diamond thick film tools cannot be fully utilized in practical application. In order to improve this situation, the orthogonal test method was used to investigate the effects of tool geometry parameters and cutting parameters on the cutting performance of CVD diamond thick film tools based on AdvantEdge FEM. Cutting force and tool tip temperature were used as the evaluation index of tool performance to comprehensively optimize the tool geometry parameters and cutting parameters by matrix analysis method. The results show that the order of significant influence of each factor on tool performance evaluation index from high to low is cutting depth, feed, cutting speed, tool nose radius and relief angle. Under the certain cutting conditions, CVD diamond thick film tools can show better cutting performance when the relief angle is 15°, the tool nose radius is 0.8 mm, the cutting speed is 90 m/min, the feed is 0.05 mm/r and the cutting depth is 0.05 mm.

11	AM19326	WeChat Rumor Analysis and Governance Based on Big Data
	Authors	Lihong Zhang*, Peng Zhang, Juan Wang, Shuangshi Zhang, Wei He
	Affiliation	China People's Police University Langfang Hebei, China

Abstract: Based on the 200 rumor hot lists in recent three years, which were refuted by WeChat platform rumor filter, this paper conducted qualitative and quantitative analysis on the word frequency distribution,

<p>theme characteristics and hot categories of rumors, and proposed the rumor governance strategy based on big data thinking. The research results help us to grasp the mechanism and rules of rumor generation and propagation under the background of new media, and the proposed rumor governance strategies can also provide guidance for the online rumor regulatory authorities.</p>		
12	AM19328	Feature Collection and Selection in Malware Classification
	Authors	Yunting Guo, Wenqing Fan
	Affiliation	School of Computer Science and Cybersecurity Communication University of China Beijing, China
<p>Abstract: In order to make up for the shortcomings of signature-based traditional classification methods, the supervised learning algorithms of machine learning and deep learning are gradually applied to malware detection and classification. Based on the Windows malware classification problem, we firstly introduce the collection techniques of different features. Then we discuss the impact of the different features from malware behavior selected on classification results. The results show that the fine-grained features are usually better than coarse-grained features, multi-features are better than single features under certain circumstances. Besides, the collection and training costs of static features are smaller than dynamic features. Finally, considering the factors of training time, complexity of feature collection and classification accuracy, we present our own views on the features that should be applied to malware classification issues in different situations.</p>		
13	AM19343	Application of Microvalve Based on Computer Control in Biological Chemical and Medical
	Authors	Mingyu Huang*, Lei Zheng, Huali Zhang, Shaobing Xue, Hongjun Ni
	Affiliation	School of Mechanical Engineering Nantong University Nantong, Jiangsu, 226019, China
<p>Abstract: Microvalve is one of the important components of microfluidic chip, and plays an important role in the opening and closing of microchannel. There are many types of microvalves, each microvalve has different characteristics, and the application occasions are also different. Microvalve based on computer program control are more integrated and automated in biological, chemical and medical diagnosis. This paper mainly studies microvalves for biological, chemical analysis and medical diagnosis. It introduces the structural characteristics, working principle and application in biological, chemical and medical diagnosis of hydrogel microvalves, air-bubble microvalves, external pneumatic microvalves and solenoid valves. Finally, the application of microvalve in biological chemical and medical diagnosis is summarized.</p>		
14	AM19330	Sleep Disorder Classification Method based on Logistic Regression with Apnea-ECG Dataset
	Authors	Liangming Cai, Chunqiang Chen, Xiaoling, Xiong Yang, Shurui Lin, Jiefeng Huang, Jinping Jiang, Rituparna Datta, Min Du*, Haiyan Jiang*, Minchen Zhu, Jingshan Huang
	Affiliation	College of Physics and Information Engineering, Fuzhou University, Fuzhou, China; Zhicheng College, University of South Alabama, HaiXi Institutes, Chinese Academy of Science, Fuzhou, China; Zhicheng College, Fuzhou University, Fuzhou, China; Department of Respiratory Medicine, First Affiliated Hospital of Fujian Medical University, Fuzhou, China; College of Electrical Engineering & Automation, Fuzhou University, Fuzhou, China; School of Computing, University of South Alabama,

		Mobile, USA; Provincial Key Laboratory of Eco-industrial Green Technology,Wuyi College,Wuyishan, China; College of Mathematics and Computer Science,Fuzhou University,Fuzhou, China; Zhicheng College, Fuzhou University,Fuzhou, China;
<p>Abstract: Adequate sleep is significant for human to actively pursue daily activity. On the other hand, insomnia is directly proportional to aging and health deterioration. Sleep disorder classification is important for medical scientists as well as machine learning researchers. In the paper, we have developed a sleep disorder classification method for Electrocardiogram (ECG) data. The data set have two labels; sleep disorder or not, which can be categorized as binary output. As a result, logistic regression is used as classification technique. For initial experimentation, an existing data set is used. The data set consists of every 10 second data up to 6000 seconds for 35 patients. We have used 70% data for training, and 30% data for testing purpose. Our results from logistic regression show that the logistic regression method is efficient to detect sleep disorders. The prediction result is found to be 59%. The future research in this direction would be to take data from hospitals and use our developed algorithm for sleep disorder classification and prediction.</p>		
15	AM19329	Three-dimensional Modeling and Rapid Prototyping of the Sake Bottle Based on Reverse Engineering
	Authors	Shuaishuai Lv,Kaifeng Du,Hongjun Ni*,Xingxing Wang,Yu Zhu,Yi Lu,Hai Gu, Yuanyuan Xu,
	Affiliation	School of Mechanical Engineering,Nantong University,Nantong, Jiangsu, 226019, China; School of Mechanical Engineering Jiangsu Key Laboratory of 3D Printing Equipment and Application Technology,Nantong Institute of Technology,Nantong, Jiangsu, 226002, China.
<p>Abstract: Sake bottle was analyzed and improved based on reverse engineering and rapid prototyping technology. According to the structural characteristics of the selected sake bottle, the digital information of the model was collected by means of a three-dimensional laser scanner. Combined with the idea of reverse design, the space surface and entity model of the sake bottle were reconstructed based on Imageware and Solidworks software. Eventually, we used rapid prototyping technology to export entity of the sake bottle model. The combination of reverse engineering and rapid prototyping technology simplifies the process of product optimization and effectively shortens the design and the development cycle of the product.</p>		
16	AM19333	Three-Dimension Model and Rapid Prototyping of Car Interior Handle Based on Reverse Engineering
	Authors	Hongjun Ni,Weijia Tang,Shuaishuai Lv,Yu Zhu,Xingxing Wang*,Kaixuan Wang, Tiancheng Huang,Jianhua Sun
	Affiliation	School of Mechanical Engineering,Nantong University,Nantong, Jiangsu, China; School of Mechanical Engineering Jiangsu Key Laboratory of 3D Printing Equipment and Application Technology,Nantong Institute of Technology,Nantong, Jiangsu, China.
<p>Abstract: The reverse engineering and rapid prototyping technology are used to analyze and improve the car interior handle. Digital information of the selected car interior handle are collected and sorted by hand-held laser scanner due to its structural characteristics. By the reverse design idea, the reconstruction of the inner handle surface and the 3D solid modeling are completed based on Imageware and SolidWorks software Finally, the car interior handle is obtained through rapid prototyping technology. The application of reverse engineering and rapid prototyping technology can greatly shorten the design</p>		

and development cycle and effectively improve the design efficiency of products.		
17	AM19341	Study on Parametric Design and 3D Printing of Bone Gypsum Replacement Plastic Parts
	Authors	Xingxing Wang, Yuxiang Zhou, Hongjun Ni, Shuaishuai Lv, Yu Zhu, Bin Li, Jie Zhang, Zijin Wang
	Affiliation	School of Mechanical Engineering Nantong University, Nantong, Jiangsu, China; School of Mechanical Engineering Jiangsu Key Laboratory of 3D Printing Equipment and Application Technology, Nantong Institute of Technology, Nantong, Jiangsu, China.
<p>Abstract: Bone wound plaster substitutes is used as an example of single-piece small-volume plastic parts, in order to improve the disadvantages of heavy, water-resistant and difficult-to-disassemble gypsum products. The point cloud data of the bone injury gypsum substitute was obtained by means of three-coordinate measurement. The key dimension parameters of the bone wound gypsum substitute were extracted by Imageware software. And the design parameters of the bone injury gypsum substitute were determined. Based on Solid Works software, the parametric design of the bone injury gypsum substitute is completed to form a three-dimensional shape and complete the virtual assembly. Emerging parametric design and 3D printing technology is used to design and manufacture bone-stained plaster replacement product. This technology has practical value and reference for both medical and manufacturing industries.</p>		
18	AM19342	Data Dimensionality Reduction Method Combining Intra-class and Inter-class Distance
	Authors	Suzhi Zhang*, Penghui Li, Xiaoni Chen, Qiang Cai
	Affiliation	Zhengzhou University of Light Industry, School of Computer and Communication Engineering, Zhengzhou, China; Beijing Technology and Business University, Beijing Key Laboratory of Big Data Technology for Food Safety Beijing, China.
<p>Abstract: Traditional principal component analysis method has the problems of low computational efficiency and large memory consumption when faces high-dimension data. After the information entropy is introduced, although it reduces the memory and running time, but it cannot meet the requirements of the actual classification effect. In order to extract low-dimensional features with good discrimination ability, the idea of intra-class and inter-class distance is introduced, the principal component analysis data dimension reduction algorithm based on intra-class and inter-class distance is proposed. In this algorithm, firstly, the entropy of attribute information is calculated, and then the threshold value of information entropy is compared to it, which to realize the feature screening of data matrix. Then, the improved PCA algorithm based on the ideas of intra-class distance maximization and inter-class distance minimization is used to reduce the dimension of data. Finally, the data after dimension reduction is classified by KNN and SVM algorithms. Compared with the PCA, principal component analysis based on information entropy (E-PCA) and LDA algorithms, the experimental results show that the proposed algorithm can not only improve the result of dimension reduction, but also significantly improve the discrimination performance of low-dimensional data after dimension reduction.</p>		
19	AM19350	Research on License Plate Location in Different Scenes
	Authors	Ya Chen*, Suyun Luo
	Affiliation	School of Mechanical & Automotive Engineering, Shanghai University of Engineering Science, Shanghai 201620, China
<p>Abstract: There are many license plate location methods, but the factors affecting the extraction of</p>		

license plate information are different in different scenarios. Current research has not systematically classified the scenarios applicable to the license plate location method according to the actual situation. In order to locate the license plate accurately and quickly in different environments. This paper makes experiments, comparisons and analyses on the location effects of different license plate location algorithms in different situations, and obtains the applicable scenarios of each license plate location algorithm: the color segmentation algorithm is suitable for the case of high brightness, the Canny operator edge detection method for license plate location is suitable for the case of noise, and the combination of blind deconvolution, morphology and texture feature analysis. License Plate Recognition and Location Algorithms are suitable for the situation of motion blur, noise and other interference factors.

20	AM19356	Phenomenological Layer Structure of an Intelligent Agent for IoT
	Authors	Francesco Rago
	Affiliation	Megatris Comp. LLC Cupertino, Ca

Abstract: The main components in the study of multi-agent systems in the field of IoT are intelligent agents and contexts. From the viewpoint of each agent, the primary objective is to choose actions that maximize the agent's future utility. The choice of a correct action depends on a process of complex data collection from context. Using a neuroscience model we consider the receptory field to slice the context area and to group the appropriate sensors. To permit the phenomenological analysis and consequent cognitive evaluation, we have applied Bellmund and Doeller's model of hippocampus identifying two types of cells: the map cells and the grid cells. The first linked to the positional aspects and the second to cognitive aspects. This paper describes only the phenomenological layer architecture. From a scientific point of view there is a novel fusion between fluent calculus and neural network ensemble. Such net are used to associate to situations' fluent the appropriate schema of actions.

21	AM19361	The hardware research of ultrasonic ranging system based on variable emission wavelength
	Authors	Hongli TAI,Huan ZHANG
	Affiliation	Department of information engineering Sichuan Staff University of science and technology Chengdu, China

Abstract: As the smaller environmental impact, ultrasonic technology is widely used in measurement, automotive, medical, chemical, aerospace, mechanical, exploration, biological, food and other fields, especially in the detection distance. The reason why intelligent autonomous mobile robot can move autonomously is that it has obstacle avoidance or positioning system in robot system. The effective detection distance of ultrasonic wave is between 5-10m, which is usually used in short distance measurement. The robot uses ultrasonic technology in detecting the distance of obstacles. In view of this, this paper introduces a MCU control receiver and transmitter ultrasonic range finder, which based on a fully integrated high-speed, high-performance hybrid signal processing system. In this paper, the hardware design of ultrasonic range finder is discussed in detail, and the solution to the temperature drift of ultrasonic wave is given. Finally, the rangefinder is mounted on the robot for practical testing. The test data show that the Ultrasonic distance measurement finder described in this paper has good ranging performance, and it can meet the requirements of robot rangefinder.

22	AM19413	<i>Design of Hierarchical Monitoring System for Crop Growth Environment Based on Arduino Yún Development Platform</i>
	Authors	Meili Liu,Caizhong Zhang

	Affiliation	School of Mechanical and Electronic Engineering, Shandong Agricultural and Engineering University, Jinan City, Shandong Province, China; School of Visual Communication Design, Shandong University of Art and Design, Jinan City, Shandong Province, China
<p>Abstract: Based on the scientific and technological plan of Shandong Province and the vocational education reform project of Shandong Province, this paper carefully designed a hierarchical monitoring system for crop growth environment based on Arduino Yún development platform after analyzing the current development of agricultural equipment in China. The system uses DHT11 temperature and humidity sensor, GY-30 light intensity sensor and MG811 carbon dioxide concentration sensor to collect environmental information, which is designed from three aspects: sensing layer, transmission layer and application layer to realize intelligent control of the environment inside the agricultural greenhouse. The cost of agricultural production and the labor intensity of employees will increase the quantity and quality of agricultural products and achieve the goal of automation and intelligence of agricultural production.</p>		
23	AM19417	Research and Design of Grinding Equipment for Wind Turbine Blades Closing Root
	Authors	Miaomiao Zhang, Jinliang Li
	Affiliation	School of Mechatronics Engineering Zibo vocational college Zibo City Shandong province, China
<p>Abstract: The paper mainly analyzed and studied the grinding equipment for the root closing mold of 68.6 wind turbine blades. The grinding mechanism was designed and tested according to the shape, size and field working conditions of wind turbine blades. Through analysis and calculation, the straight-line walking scheme was obtained to ensure the rationality of the structure. Base on analyses of grinding theory, the grinding wheel which affects the grinding surface accuracy was analyzed. Finally, its size was determined by testing. The research and design of equipment would improve the efficiency of wind turbine blade production, and produce enormous economic and social benefits.</p>		
24	AM19421	Multi-level Module Identification Method for Directed Complex Network
	Authors	Zou Qingyu*, AL-KHAWLANI FAWAZ HUSSEIN SALEH ALI
	Affiliation	College of Electrical and Information Engineering Beihua University, Jilin, China
<p>Abstract: Module identification of directed complex networks is an important research content in the field of complex networks. In the past, complex network overlapping module recognition algorithms based on node feature attributes could not effectively identify overlapping modules in a directed network. This paper designs a multi-level directed complex network overlapping module identification algorithm. The algorithm is divided into two levels. The low-level algorithm calculates the similarity of edges and edges based on the edge feature, and the high-level algorithm calculates the feature values of the edge based on the distribution characteristics of the triples. Then we convert the directed node network into an undirected weight edge network. Next, the edge network is clustered to identify the overlapping module structure. In this paper, the algorithm is applied to the transcriptional regulation networks. The experimental results show that the algorithm can accurately identify the overlapping module structure in the directed complex network.</p>		
25	AM19384	T-Shaped Professionals: Music Computer Technologies and Music Education
	Authors	Irina B. Gorbunova
	Affiliation	Full. Univ. Prof., Dr., Head of the Educational and Methodical Laboratory Music Computer Technologies at the Herzen State Pedagogical University of Russia, St. Petersburg.

Abstract: The high-tech educational environment requires searching for new approaches and fundamentally new systems of education. At present, the innovative systems in music pedagogy are closely connected with using music computer technologies (MCT) - an effective contemporary means of improving the quality of teaching music at all levels of the educational process. It should also be noted that the MCT is an indispensable tool of the educational process in the promotion of musical art among various social groups, as well as a unique technology for the implementation of an inclusive pedagogical process in the training of people with disabilities. The author emphasizes the need to change the content of music education associated with the use of digital educational resources and the formation of a new type of specialist i. e. T-shaped professional. The author considers the MCT and network technologies as a means of forming the competence of contemporary musicians in the field of information technology. Some researchers identify specialists in the field of MCT as T-shaped specialists that are specialists of a new generation with deep knowledge in their core area and additional knowledge in related fields. This paper outlines aspects of the approach in modern education that prepare the students to be T-shaped professionals in contemporary education with using MCT.

26	AM19399	Mathematical modeling of musical creative process
	Authors	Irina B. Gorbunova, Sergey V. Chibirev,
	Affiliation	Music Computer Technologies Laboratory, Herzen State Pedagogical University of Russia, 48 Embankment the Moika River, Saint Petersburg, Russia

Abstract: The aim of this study is to work out the formalized approach to mathematical and algorithmic modeling of subject areas that are difficult to formalize, such as creative processes, music or any sort of arts, data sequences of unknown logic, biological and social processes etc. For investigation following methodologies has been chosen: statistical analysis, data structure analysis, analysis of formal expert result evaluation and data screening. Music creative process has been chosen as the subject, since it typical difficult-to-formalize subject area. The authors have developed a method to construct models in subject areas difficult to formalize, applying it to create a model of musical creativity based on the structural analysis of musical texts, the cyclical structuring of statistical data, and the structural analysis of statistical information. This approach allows creating texts that satisfy the previously obtained or manually-provided parameters. This article considers applying mathematical modeling to write music scores. The musical scores in the MIDI (Musical Instrument Digital Interface) format are viewed as abstract text created by analyzing statistical parameters with the subsequent modeling of musical creativity as per the obtained data. The fundamental scientific problem that the research deals with is developing a method to construct models of difficult-to-formalize subject areas that can be represented as abstract texts. This is based on the statistical analysis of texts, the cyclical structuring of statistical data, and structural analysis of statistical information. The specific fundamental task developed within this problem is applying the method to create a model of musical creativity, which allows the research to analyze and synthesize musical texts that satisfy the previously obtained or manually-provided generalized statistical parameters.

27	AM19382	The Fusion of Two NN Architectures for the Improvement of Image Classification
	Authors	Tatiana Jaworska
	Affiliation	Systems Research Institute Polish Academy of Sciences Warsaw, Poland

Abstract: Content-Based Image Retrieval (CBIR) systems require image classification. This paper presents an application of neural net-works (NN) to image segment classification for our CBIR system.

A new NN architecture which connects a convolutional NN (CNN) with a shallow NN is proposed in order to improve the classification results. This amelioration is necessary due to the shortage of image samples to train a CNN separately. Thanks to the fusion of CNN and shallow NN (SNN) a 5-11% improvement has been obtained.

28	AM19427	AI Empowers the Application of Industry Safety Intellectualization
	Authors	Kai Tang,Xiaohua Luo,Lifeng Sun,Yuan Xu,Chao Fang*
	Affiliation	Department of Engineering Physics,Tsinghua University,Beijing, China; Ningbo OE&N Safety Technology Co., Ltd. Ningbo, China; CNNC High Energy Equipment (Tianjin) Co., Ltd. Tianjin, China; School of Social Sciences,Tsinghua University, Beijing, China; Lab for High Technology,Tsinghua University,Beijing, China

Abstract: Data of safety production accidents show that people's unsafe behavior is the major and direct cause of accidents. The unsafe behavior is mainly caused by the decline of physiological function, insufficient risk assessment, negative understanding, insufficient safety knowledge, wrong management orientation and blind complacency, which is difficult to supervise and control for human uncertainty. Safety Intellectualization, which combines and optimizes space, equipment, facilities, systems and services according to scenarios and business logic, utilizes data value of big data mining and intelligently recognizes and processes images and voices to support innovative management models and applications, and provides safety technology support for smart factories and intelligent manufacturing. Through continuous optimization of Artificial Intelligent model and network, the recognition accuracy of unsafe behavior can reach more than 91.2%, which has commercial application value.

29	AM19424	The Research of Forecasting Model of Automobile Parts Recycling Cost Based on Data Intelligence
	Authors	Bo Fan,Yueshun Cai
	Affiliation	School of Information Science and Technology,Southwest Jiaotong University, National Engineering Laboratory of Industrial Big-Data Application Technology, CASIC, ChengDu China.

Abstract: In view of the problem of reducing the cost control of the used parts in the after-sales service cost analysis process of the automobile enterprises, the multi-dimensional intelligent analysis of the used business data is carried out by extracting and cleaning the relevant business data resources of the used parts. This paper proposes a method based on data intelligence for cost forecasting, which assists enterprises in mining valuable information and knowledge contained in used parts data, making the used parts business data intelligent and realizing the value-added of used parts data. The management of used parts recycling is an important value link for automotive enterprises to reduce costs and increase efficiency, and is the key to building a reverse supply chain coordination architecture and achieving circular economy. There are many factors influencing the cost of recycling used parts, and too much interference will affect the forecasting effect. Therefore, before establishing the corresponding used parts recovery cost prediction model, the data should be decomposed into a stable time series, so that the prediction results are more accurate. This paper compares several typical prediction algorithms, uses the theory of empirical mode decomposition to preprocess the business data of used parts data, then builds the ARMA model, selects the ARMA model parameters through the AIC information criterion, and designs the supplier's used parts recycling cost prediction model. And the model is validated using the used piece business data piece data to predict the cost of the supplier's used parts recovery and provide support for the actual business system.

30	AM19425	Investigation of Formability of Metal Thin-Walled Tubes Based on the Tube
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		Hydroforming
	Authors	Xiangwen Fan,Jianwei Liu*,Xinqi Yao,Jiahao Feng
	Affiliation	Guilin University of Electronic Technology,College of Mechanical and Electrical Engineering,China, Guilin

Abstract: Tube hydroforming is one of the most popular forming technologies in achieving lightweight and integration of tubes and reducing wasting of resources. To better to study the technology, combined with the research progress of scholars at home and abroad, the formability of metal thin-walled tubes under hydraulic bulging is comprehensively and systematically discussed and summarized. In this paper, the forming process and formability of metal thin-walled tubes under spontaneous bulging, hydroforming with radical crushing and liquid impact forming are analyzed in detail, and the development prospects of various forming technologies are expounded respectively. Through the analysis and summary of the formability of tube hydroforming in recent years, it provides a useful reference for the development of tube hydroforming technology.

31	AM19422	Artificial Intelligence Aspects in Developed E-Material Formatting Application
	Authors	Kristine Mackare,Anita Jansone
	Affiliation	Faculty of Science and Engineering,Liepaja University,Liepaja, Latvia

Abstract: Despite technology and screen use benefits in education providing and supporting, lots of users are having complains after long screen reading. It is based on the slower evolution of humans' perception system and reading paradigms to new reading conditions. Followed new public health problems of nowadays related to screen-reading, and users' needs are thought of new content-presentation improvement is need. Methodology: Literature research of AI approaches, app prototype descriptive analysis, and simple comparison analysis of app and theoretical AI approaches. Results: Newly developed application prototype for e-material formatting is created to improve screen-reading abilities and comfort and improve learning processes. The app works by using several AI approaches and elements: machine learning, perceptron, decision tree graphs, rule-based system, classification, and deep learning. The app collects data and analyses them based on the training database. After, app categorises data by decision tree method. Finally, it decides for formatting recommendation to suggest and make appropriate document formatting. The app receives users' feedback after use. Conclusions: The app uses all collected data for the deep learning process to improve personalised recommendations to create the user-centred design. Currently, it is a narrow range use app designed for e-study use on MOOC type platforms for user group without specific limitations or disabilities. The app is with several level formatting possibilities, including deeply personalised formatting. That create and provide more effective e-materials as it increases visual perception, legibility, readability, reading comprehension, and memorability of content. It is a learner-oriented education methodology with an AI approach.

32	AM19302	Mining Classification Rules for HIV-1 Protease Cleavage Sites Using Simplified Swarm Optimization
	Authors	Alice Yeh,Wei-Chang Yeh
	Affiliation	BASIS Independent Silicon Valley,San Jose, CA, United States of America; Department of Industrial Engineering and Engineering Management,National Tsing Hua University, Hsinchu, Taiwan, Republic of China

Abstract: HIV-1 protease is a crucial enzyme in the HIV life cycle and serves to cleave the polyprotein that is involved in the formation of mature viruses. Due to its sensitivity and important function in virion creation, predicting cleavage classification can aid in the development of HIV-1 protease inhibitors that can improve antiretroviral therapy. Currently available methods are less effective at maintaining high

prediction accuracy and consistency when applied to data with class bias and can be simplified and optimized. A prediction method that focused solely on sequential data was proposed and used in this study. A simplified swarm optimization (SSO) algorithm was applied to classifying HIV-1 protease cleavage data, which consisted of octamers that would be cleaved between the fourth and fifth amino acid, and orthogonal array testing was incorporated to improve efficiency. The prediction accuracy was assessed by applying the SSO algorithm to datasets found in the UCI Machine Learning Repository. Our experimental results show that SSO is an effective predictor of HIV-1 protease cleavage, exhibiting prediction accuracy that compared favorably to existing methods for both data with little class bias and data that contains class bias. Additionally, our prediction accuracy results suggest that the use of physicochemical features, as opposed to solely sequential features, does not improve performance.

33	AM19426	Multi-grain and Multi-direct Impact Simulation on ABAQUS and Experimental Analysis of Single Crystal Germanium Surface Polishing
	Authors	Zhiyi Leng*,Xiaojing Yang
	Affiliation	Department of Engineering and Technology,Dalian Maple Leaf College of Technology,Dalian, China; Faculty of Mechanical and Electrical Engineering, Kunming University of Science and Technology, Kunming, China.

Abstract: Single crystal germanium has good physical and chemical property, but it is difficult to be processed. It had been found that plastic deformation of brittle materials could be produced in a small range by using two-phase flow processing technology, which could make the surface of single crystal germanium effective processed. Temporarily, the simulation studies of multi-gain impaction during processing had been focused on one direct impaction, which lack of multi-direct impaction analysis. The paper based on Hrosovsky's theory of grain impact abrasion, used ABAQUS FEM software to establish a multi-grain and multi-direct impaction model to simulate the polishing process, and designed experiment to validate the availability of simulation. After analyzed the results of experiment and the simulation found that, the grains' multi-direct impaction has negative effects that should be avoided during the processing. The experiment validated the availability of simulation model, also, found the deficiency of the model. The paper provides a new research idea in two phrase flow polishing process.

34	AM19433	Personalized prognosis of oncosurgical patients using standard tool Microsoft Access
	Authors	Yuri D. Udalov,Irina V. Vasilyeva,Alexander V. Gordienko
	Affiliation	Deputy Director General for the medical unit, Research Center - Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency,Moscow, Russia; The Central Organization Methodical Department,State Research Center - Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency,Moscow, Russia; Head of the Department and Clinic of Hospital Therapy S.M. Kirov Military Medical Academy, St. Petersburg.

Abstract: The most common treatment for oncological diseases is the using of surgical treatments. Despite successful methods of surgical treatment, the problem of a personalized prediction of the outcome of hospitalization is an important and fundamental problem in the treatment of anoncosurgical patient with five or more concomitant diseases. This is due to the fact that at present the choice of an unified approach to the decision to conduct a planned surgical intervention in the case of oncological pathology with appropriate recommendations puts the physician before a difficult choice of treatment tactics for each case separately. There are many prognostic models, both implemented and not implemented in the form of various computer and mobile applications that allowedphysician to assess

the severity of the patient's condition and predict the outcome of treatment. Therefore, to support the physician of a medical decision, simple and accessible tools are needed, allowing divide patients according to individual selection of the treatment regimen. Nevertheless, the introduction of specific models for predicting therapeutic measures (for example, surgical intervention) in patients, in particular elderly patients, in clinical practice often remains at the level of basic research and is used only in a few clinics related to that studies. The purpose of our work is to implement a decision rule as the Microsoft Access software, which allowed ranking patients with oncological diseases by the probability of lethal outcome before surgical intervention. The software implementation methodology was implemented using elements of the standard Access database. The result of our research was the implementation of a decision rule in the form of Microsoft Access software Oncoprognosis 1.0, which allows physician to rank oncosurgical patients according to the likelihood of death in oncology.

35	AM19431	Fixture Layout Optimization Based on Hybrid Algorithm of Gaot and Rbf-Nn for Sheet Metal Parts
	Authors	Zhenhai Ma, Yanfeng Xing, Min Hu
	Affiliation	Pan Asia Technical Automotive Center Co., Ltd, Shanghai, China; Shanghai University of Engineering Science, Shanghai, China

Abstract: For auto-body, fixture layout is very important to gravity deformation and dimensional variation of sheet metal assemblies. Conventionally, the satisfying fixture layouts can be generated by global optimization algorithms, such as genetic algorithm (GA), particle swarm optimization (PSO) and social radiation algorithm (SRA), etc. However, it is very difficult to generate the global optimal solution because the combinations of fixture layouts are enormous and the gravity deformation must be calculated by finite element analysis for sheet metal parts. Therefore, this paper proposes a hybrid algorithm of GAOT (genetic algorithm in optimization toolbox in MATLAB) and RBF-NN (Radial basis function - neural network) to generate the global optimal fixture layouts. In this paper, the fixture locators are selected from a much smaller candidate pool based on filtering methods. The objective function is the gravity deformation of all measurement operations. A hybrid algorithm of GAOT and RBF-NN is used to optimize fixture locating scheme based on MATLAB macro commands of 3DCS, whose optimization process is fully automated. A case of bracket is applied to demonstrate the proposed method in this paper. The results show that the proposed hybrid algorithm can generate better optimal solutions than the current optimization methods.

36	AM19353	FPD: A New Algorithm for Iris Matching and Evaluation Based on Frequency-modulated Phase Difference
	Authors	Linhua Jiang, Xiaoli Li, Wenjun Hu, Yunliang Jiang, Wei Long*, Fei Yin, Tao Feng, Dongfang Zhao*
	Affiliation	School of Information Engineering, Huzhou University, Huzhou, Zhejiang, China; School of Marine Sciences, Ningbo University, Ningbo, Zhejiang, China; Thinker Agricultural Machinery Co., LTD. Huzhou, Zhejiang, China; Department of Computer Science, University of California, Davis, USA

Abstract: Iris recognition is one of the most widely used biometric technologies because of its high reliability and accuracy. While iris recognition usually comprises multiple phases, this paper focuses on two key procedures: iris matching and evaluation. The state-of-the-art of both steps, i.e., Daugman's matching and evaluation algorithms, rely on Hamming Distance. In this paper, we propose a more efficient algorithm based on Frequency-modulated Phase Difference (FPD) in Fourier space. Because FPD is frequency-aware, it effectively detects iris texture landing within particular frequency ranges and

<p>significantly improves the matching efficiency. Experiments are carried out on multiple images database showing that FPD is 2.6X faster than Daugman's method while preserving the latter's high accuracy.</p>		
37	AM19471	On-line Piercing Process Monitoring Based on Vibration Signals
	Authors	Cheng ZHOU
	Affiliation	Department of Data Center and Network Research,China Academy of Industrial Internet,Beijing, China
<p>Abstract: This paper focuses on developing an in-line monitoring technique to classify the piercing head conditions in the seamless tube piercing process. An advanced in-line imaging system is deployed in real time to capture the vibration of steel bars during the piercing process. The Vibration signal, that extracted from in-line images, can be used to analyze the relationship between damping values of the process and piercing head conditions. Specifically, a time series model is built based on the vibration signal to obtain the process damping value, which can be treated as a feature to infer the piercing head condition in real time. Finally, a statistical control chart is established based on the extracted features to distinguish different piercing head conditions. The case study shows that the proposed methodology can satisfy the accuracy requirements for abnormal piercing head condition detection.</p>		
38	AM19436	Advanced Integrated Manufacture by Application of Sustainable Technology through Product Lifecycle: a Circular Economy Approach
	Authors	Daizhong Su,You Wu,Zijian Chai
	Affiliation	Advanced Design and Manufacturing Engineering Centre, School of Architecture, Design and the Built Environment,Nottingham Trent University,Nottingham, UK
<p>Abstract: An approach has been developed for sustainable integrated manufacture, covering the whole product development process from material acquisition till the product end of life treatment, which is part of the CIRC4Life project supported by the European Commission's Horizon 2020 programme. The approach consists of three new circular economy business models (CEBMs) including Co-creation of products/services, Sustainable consumption and Collaborative recycling/reuse. The CEBMs are supported by an eco-point approach, information and communication technologies, traceability techniques, online data mining, and other enable techniques/methods. In this paper, the overview and three new CEBMs are presented, followed by a case study of domestic lighting products, illustrating how the approach is implemented in an industrial application.</p>		
39	AM19340	Research of Drug Types Based on Raman Spectroscopy and PCA-KNN Algorithm
	Authors	Linhua Jiang,Lu Gao,Liangquan Jia*,Wenjun Hu,Yuliang Jiang,Jun Shen
	Affiliation	School of Information Engineering,Huzhou University,Huzhou, Zhe Jiang, China; The Third Research Institute of Ministry of Public Security, Shanghai, China
<p>Abstract: As the number of synthetic drug abusers in China rising, problems and phenomena were encountered in practical use. A rapid and convenient method for the identification of methcathinone and ephedrine was needed. In this paper, Ion mobility spectrometry (IMS) and Raman spectroscopy were used in combination to characterize methcathinone and ephedrine from different sources. We use spectral data fusion combined with Principal Components Analysis (PCA) and K-Nearest Neighbors (KNN) algorithm to identify the two types of drugs. The experimental data show that the fusion data compared to the single spectral data were used to identify and effectively improve the recognition rate and accuracy for the identification of drugs. The results from this study demonstrated that the Raman-IMS combined with PCA-KNN model can used as a safe, rapid and reliable analysis method for identification of drugs.</p>		

40	AM19315	The Application of Artificial Intelligence in Financial Compliance Management
	Authors	Raghad Al-Shabandar,Gaye Lightbody,Fiona Browne,Jun Liu,Haiying Wang, Huiru Zheng
	Affiliation	Artificial Intelligence Team,Datactics,Belfast, N. Ireland; School of Computing Ulster University, ordanstown, N. Ireland; School of Computing,Ulster University, Jordanstown, N. Ireland
<p>Abstract: The global financial crisis of 2008 has led to the increased scrutiny of governance and conduct of financial services firms. A key component of monitoring conduct within this area is Financial Services Compliance Management. Financial institutions need to adhere to legislation such as the European MiFID II and GDPR through to anti-money laundering compliance. A recent report by Thomson Reuters in 2018 has found through a survey with 800 financial firms that 66% of firms expect the cost of senior compliance staff to increase, up from 60% of firms in 2017, indicating a continuing growth in spending on compliance. Effective solutions need to be in place to mitigate these increasing costs while enhancing the compliance workflow. Doing this would provide a market edge. Artificial intelligence (AI) and machine learning (ML) have been gaining traction within the compliance management domain from both regulators and financial institutions in areas such as trade and market surveillance to regulatory compliance assurance. These areas share a commonality in terms of the volume of data to monitor often in real-time and from disparate sources both structured and unstructured with an emphasis on ensuring data quality and handling underlying bias in data. In this paper, an overview of the key use case areas of AI and ML in the compliance management domain will be provided. Detailed analysis on the application of specific AI solutions such as natural language processing, data discovery and generative modelling is introduced.</p>		
41	AM19435	Unmanned Plant Control and Optimisation by Real-time Deep Neural Networks for Power Saving
	Authors	Yaqing Luo,Jin Zhang,Gaoyong Luo
	Affiliation	Department of Mathematics,London School of Economics and Political Science London, UK; Department for Continuing Education,University of Oxford,Oxford, UK; School of Physics and Electronics Engineering,Guangzhou University, Guangzhou, China
<p>Abstract: Compressed air is essential to a wide range of industries and highly specialised applications where it is a particularly critical resource, such as medical gas systems. However, current control system of unmanned medical compressed air plant mostly using fixed speed compressors is operated inefficiently and without optimisation in terms of power saving. This paper investigates the complexity of unmanned plant control and proposes performance optimisation by an intelligent compressed air system with the integration of advanced communication technology and artificial intelligence (AI), where a new energy-efficient and reliable operation of unmanned plant is developed and implemented by applying intelligent control to provide optimum performance. A deep neural network (DNN) using multilayer perceptron (MLP) model is thus derived and used to train and identify network coefficients for minimizing energy consumption. Experimental results demonstrate that the intelligent control and optimisation by real-time deep neural network can achieve maximum power efficiency leading to a satisfactory solution to unmanned plant.</p>		
42	AM19360	AI Cloud-Based Smart Manufacturing and 3D Printing Techniques for Future In-House Production
	Authors	Mohammed Saeed Jawad,Marija Bezbradica,Martin Crane,Mohammed Khalil

		Alijel
	Affiliation	FICT faculty, Senior Lecturer, Limkokwing University, cyberjaya, Malaysia; School of Computing, Senior Lecturer, Dublin, Ireland; Director, SCI-SYS Research Centre, Senior Lecturer, Dublin City University, Dublin, Ireland; FICT Faculty, Lecturer, Limkokwing University, Cyberjaya, Malaysia
<p>Abstract: Smart manufacturing and 3D printing have gain considerable interests recently both for academic researches and industrial developments. Smart manufacturing is integrator of different IT technologies and digital smart solutions aiming to achieve the digital transformations over traditional manufacturing processes. This paper is mainly investigating the accelerated advancements of the enablers' technologies to achieve the optimization in smart manufacturing. The expected future continuous development is highlighted and aligned with the proposal of In-house smart manufacturing to support nation families to be more productive and for national economic growth.</p>		
43	AM19387	Teaching E-learning for Visually Impaired Students
	Authors	Theresa Lobo, Graça Guedes, Nuno Sá Leal
	Affiliation	Unidcom, IADE, Universidade Europeia, Lisboa, Portugal; Centro de Ciência e Tecnologia Têxtil, Universidade do Minho, Guimarães, Portugal
<p>Abstract: This project describes the development of an available e-learning design project for teaching innovative IT network program to visually impaired students. The program contains a virtual classroom, accessible learning materials, a remote computer laboratory, and delivery of the learning materials by teachers with vision disabilities [1]. Additional teaching aids, as Windows Mixed Reality and Microsoft HoloLens transform abstract concepts into 3D experiences in the classroom, enabling students to investigate more deeply, see more clearly, and learn by doing. [2]. This paper explains the development of an available e-learning environment to bring advanced IT network program. Estimate results shows that visually impaired students situated both locally and distantly got equivalent grades, as the sighted students, because of additional time to comprehend and experiment via the virtual classroom and remote computer laboratory.</p>		
44	AM19432	From Modeling to Technologization of Conscious Phenomena Based on Understanding
	Authors	Maxim Polyakov, Igor Khanin, Nikolai Bormatenko
	Affiliation	Maxim Polyakov, Managing Company, Noosphere Ventures Inc. USA, Menlo Park, USA; Department of space Informatics, Dnipropetrovsk National University, Dnipropetrovsk, Ukraine; Nikolai Bormatenko, MS-Ukraine, Noosphere Ventures Inc. USA, Dnipropetrovsk, Ukraine
<p>Abstract: This paper briefly substantiates the necessity and possibility of transitioning from the empirical ways of cognition, relying on analogues, and the heuristic one, using guesses (intuition) and associative (imitative), to the methods, approaching to natural-science, i.e., based on productive abstractions (paradigms), capable of regularizing the accumulated experience of spontaneous formalization of conscious phenomena, and forming logical paradigm for optimization of the existing practices and development of fundamentally new ones.</p>		
45	AM19476	An assembly sequence planning method based on discrete difference genetic algorithm
	Authors	Qinghua Wu, Xuejun Zhang*, Shan Guan
	Affiliation	School of Mechanical Engineering, Northeast Electric Power University, Jilin, China
<p>Abstract: The assembly sequence of products directly affects the assembly quality and assembly cost</p>		

of products. Artificial planning assembly sequence can no longer meet the increasingly complex requirements of assembly. More and more intelligent algorithms are applied to the field of sequence planning. In order to improve product assembly efficiency, the paper proposes an assembly sequence planning method based on the discrete difference genetic algorithm. Differential evolution algorithm is a heuristic search algorithm that can be programmed with real numbers and has a simple structure and is easy to implement. According to the characteristics of assembly sequence planning, the operations of variation, crossover and mutation were redefined, and the fitness function model with the feasibility, stability, assembly direction change times and assembly tool change times as the evaluation index was established. The algorithm is analyzed by the vise assembly example. The feasibility and stability of the algorithm are verified. The comparison with genetic algorithm proves: the method is more efficient; the convergence speed is faster; the quality and quantity dependence of the initial population is smaller.

46	AM19478	Motor Imagery Recognition of Upper Limb Single Joint Based on BCI Technology
	Authors	Shan Guan, Hang Zhao*, Fuwang Wang
	Affiliation	School of Mechanical Engineering, Northeast Electric Power University, Jilin, China

Abstract: In the study of brain-computer interface (BCI) technology, it is difficult to distinguish and recognize electroencephalogram (EEG) signals induced by motor imagery in different movements of the same joint. In order to improve the recognition rate of upper limb shoulder dichotomous motion imagination by BCI system, 50Hz notch filter and de-baseline drift processing are used to remove power frequency interference, and common average reference (CAR) method is used to preprocess the collected EEG data. Secondly, EEG data collected from four electrode channels, FC5, F3, F4 and FC6, are extracted by common spatial pattern (CSP). Finally, the twin support vector machine (TWSVM) is used to recognize the motion imagination state. The experimental results show that the recognition accuracy of upper limb shoulder motion imagination reaches 85.29%. Compared with other methods, the recognition rate is higher.

47	AM19295	Option Pricing under Jump Diffusion Process
	Authors	Wei-Guo Zhang , Yong-Jun Liu
	Affiliation	School of Business Administration, South China University of Technology Guangzhou, 510641, P.R. China

Abstract: In this paper, the analytical pricing formulas are obtained for European vulnerable options with jump-diffusion processes on the underlying asset prices, firm value, and debt of a counterparty firm. The numerical calculation results show that applying jumps to model sudden events in the underlying asset prices, firm value, and firm debt is necessary and can more accurately capture vulnerable option prices compared with other models. In addition, compared with the vulnerable options value in the model without jumps proposed by Klein (1996), our model is more appropriate in many business situations.

48	AM19296	Evolutionary Game Theory based Research on the Relationship between Market Supervision and Quality Development
	Authors	HU Yang ^{1,2} , HU Bo-ya ³ , TANG Kuan-hao, LIU Ming-zhui ³
	Affiliation	(1. Key Laboratory of Quality Infrastructure Efficacy Research, AQSIQ, Beijing 100028, China; 2. AVIC China Aero-polytechnology Establishment, Beijing 100028, China; 3. School of Safety and Environmental Engineering, Capital University of Economics and Business, Beijing 100070, China; 4. Donlinks School of Economics and Management, University of Science and Technology Beijing, Beijing 100083, China)

Abstract: While China has been transforming into a new stage of high-quality development,

improvements of market regulation is in need simultaneously. In order to meet the requirements, this paper focuses on the regulation behaviors which highly related to the quality level. The paper builds an evolutionary game model between governments and producers, based on the classification of their respective payoffs, as producers facing choice of “provide high quality products” or “provide low quality products”, and governments for “enhance regulation” or “maintain the status”. On top of that, according to the equilibrium and numerical analysis, the paper discusses the influence of fine, tariff rate and demand environment to the dynamic trend. The results indicate that either high fine for low quality products or social quality demand of average-above level would promote producers to provide high quality products. Meanwhile, general tax policies impact on producers indirectly. The results could offer theoretical basis for chinese market regulation improvements.

49	AM19297	The Use of Technology in Corpus Linguistics
	Authors	Sharipova Aziza Abdumanapovna
	Affiliation	Tashkent University of Information Technologies named after Mukhammad al-Khwarizmi, Foreign Languages Department, Phd candidate Yunusabad, Badamzar str. 8-51, Uzbekistan, Yunusabad, Amir Timur str. 108

Abstract: Corpus linguistics can be termed as the study of language founded on evidence derived from corpora. While “corpora” is a general word defining the use of corpus software in the extraction of patterns derived from corpus. It revolves around unfolding occurrences of a phrase or word within the corpus as well as accounting on its occurrence frequency in comparison to others. This paper explores the application of technological advances within corpus linguistics as a new avenue within research and pedagogy. There have been a couple of studies that was captured and utilized methodologies and insights within the subject which at the end have revived theoretical intelligence of corpus within the writing field. However, many gaps have been left unserved mostly on its application on the teaching area as well as its feasibility. To this end, it’s of consensus that the modern world demands an innovative industry in all areas of concern and thus makes this rationale more researchable. This is a qualitative research design that involves a vast array of techniques that captures: open-ended interviews, observations and a grounded survey meant to expound on this topic in order to add more literature on linguistics.

50	AM19298	PROFESSIONAL COMPETENCE OF A FOREIGN LANGUAGE TEACHER IN A TECHNICAL UNIVERSITY
	Authors	ATASHIKOVA NILUFAR ANARMATOVNA
	Affiliation	Tashkent University of Information Technologies named after Muhammad al-Khwarizmi Foreign languages department Yunusabad, Yangi Shahar str. 13-59-80 Uzbekistan, Yunusabad, Amir Timur str. 108

Abstract: The article is devoted to the problem of professional competence of a foreign language teacher in a technical university. The author has developed a model of professional competence based on the analysis of the conditions of a teacher's activity. A conclusion has been made about the importance of a professional component in the competence structure.

51	AM19312	Image dehazing via Structural Patch Decomposition Image Fusion
	Authors	Yin Gao ¹ , Yijing Su ^{1*} , Hongyun Li ² , Jun Li ^{1*}
	Affiliation	1.Quanzhou Institute of Equipment Manufacturing, CAS, Quanzhou, China; 2.Quanzhou Institute of Technology, Quanzhou, China

Abstract: In this paper, we present a new image dehazing method via Structural Patch Decomposition Image Fusion, which does not rely on the accuracies of global atmospheric light and transmission map. Instead of estimating the exact global atmospheric and the transmission separately as most previous methods, our method directly constructs initial dehazing images with different exposure through the histogram analysis and multi-level filter to improve the visual dehazing effect. Experimental results show that this method outperforms state-of-the-art haze removal methods in terms of both efficiency and the dehazing visual effect.

52	AM19324	Brainify: An Application for Reasoning Through Play
	Authors	Marisol Elorriagaa, Mario Edelmiro Antunezb*
	Affiliation	a1Facultad Regional Delta, Universidad Tecnológica Nacional, San Martín 1171 CP(2804) Campana, Argentina

Abstract: This work aims to contribute in a simple and positive way with everybody directly and indirectly is involved in an educational process by, offering notions about the importance of playing accompanied by methodological concepts, advantages and features for the teaching and the implementation of games with educational content; besides the interest of keeping them for their formative process as powerful elements in intellectual, ethical and physical education © 2016 The Authors. Published by Elsevier Ltd. Peer-review under responsibility of the organizing committee of the 13th Global Congress on Manufacturing and Management.

53	AM19327	Classification Rule Mining Algorithm Combining Intuitionistic Fuzzy Rough Sets and Genetic Algorithm
	Authors	ZHANG Chuanchao*
	Affiliation	ZHANG Chuanchao is with School of Information Engineering, Wuhan University of Technology, Wuhan 430070, P.R.China; Aviation Industry Corporation of China, Ltd., Beijing, 100028, P.R.China.

Abstract: In view of the intuitionistic fuzziness, redundancy, completeness, interaction and correlation of large-scale intuitionistic fuzzy information system classification rule base, the definitions and measurement index of completeness, interaction and compatibility describing the whole rule base are proposed in this paper. Based on the principle of genetic algorithm, a multi-objective optimization model and mining algorithm of intuitionistic fuzzy-rough classification rule base is constructed. Based on optimization principle of genetic algorithm, the population size of data sample is optimized and the optimal population sample is obtained, which reduces the size, configuration, generation time and storage space of the rule base. A threshold control mechanism is used to evaluate the completeness, interaction and correlation of rule population and improves the robustness and flexibility of sample population optimization and rule base generation. The algorithm is verified by the simulation of aircraft health data sets. The optimization efficiency of algorithm combining intuitionistic fuzzy-rough sets and genetic algorithms is 54.14%. The optimized intuitionistic fuzzyrough rule base can keep the 100% correct rate of diagnosis, while the accuracy and speed of diagnosis are accelerated. The algorithm is validated by similar mature and effective algorithms in accuracy, time complexity and has good robustness and adaptability to different size large-scale fuzzy information system.

54	AM19332	E-Commerce User Composite Type Recognition Based on Multi-Network Modularity Degree
	Authors	Qian Xiao dong, Li Min
	Affiliation	(School of Economics and Management, Lan Zhou JiaoTong University, Lan Zhou 730070, China)

Abstract: According to the diversity of user characteristics, users are often a mixture of multiple roles. However, existing studies rarely involve user composite types, which is detrimental to e-commerce operators' comprehensive understanding of customers. In order to provide a quantitative basis for the personalized marketing of e-commerce operators, this paper uses multi-slice network modularity to identify the user's composite type through community division. According to the attributes of network nodes, this paper extends the general modularity concept to the multi-slice network that is suitable for multiscale, while evading the influence of subjective factors on community-based quality assessment, making community division more consistent with network reality. Using CNMM algorithm (CNM algorithm for multi-slice networks) for multi-slice networks complex network community recognition to get the user's composite type division. Firstly, build the node similarity matrix based on user access sequences. Secondly, this paper improves the Jaro–Winkler distance algorithm from redefining the number of matching, editing cost, and editing rules, and uses this algorithm to calculate the user access sequence similarity matrix. Thirdly, build the multi-user complex networks, and build the multi-slice networks nodes connection matrix. Then, defining the CNMM algorithm which is based on the CNM algorithm from constructing node connection matrix and redefining auxiliary vectors and , multi-slice network community partition results are obtained based on the modularity applicable to multi-slice networks. Finally, the user composite type are obtained. The user network conforms to the characteristics of the small-world model and scale-free features, with the typical form of a complex network. Using CNM algorithm can effectively identify the composite types of e-commerce users.

55	AM19334	Research on bounded confidence model of word of mouth communication based on correlation degree
	Authors	Qian Xiao dong, Liu Xing
	Affiliation	(School of Economics and Management, Lan Zhou Jiao Tong University, Lan Zhou 730070, China)

Abstract: Aiming at the phenomenon of ignoring the impact of individual psychological effect on the dissemination of opinion in current research, a novelty network opinion evolution model with user behavior was proposed according to correlation among users and users to opinions and the degree of active research. The results of this study indicate that the model and empirical model can effectively simulate the view of updating and convergence in complex networks. Higher correlation values between users and users to opinion have an obvious impact on convergence of information. Reasonable user network activity to views has a certain role on promoting information spreading.

56	AM19335	Compared to wireless deployment in areas with different environments
	Authors	Inaam Abbas Hieder
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Abstract: In the mobile phone system, it is highly desirable to estimate the loss of the track not only to improve performance but also to achieve an accurate estimate of financial feasibility, the inaccurate estimate of track loss either leads to performance degradation or increased cost. Various models have been introduced to accurately estimate the path loss. One of these models is the Okomura / Hata model, which is recommended for estimating path loss in cellular systems that use micro cells. This system is suitable for use in a variety of environments. This study examines the comparison of path loss models for statistical analysis derived from experimental data collected in urban and suburban areas at frequencies of 150-1500 MHz's The results of the measurements were used to develop path loss models in urban and suburban areas. The results showed that Pathloss increases in urban areas respectively.

57	AM19336	An extended RLS type algorithm based on a non-linear function of the error
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	Authors	L.F. Coelho Amaral ¹ , M. Vinicius Lopes ² , A. K. Barros ²
	Affiliation	¹ Federal University of Maranhão, department of Mathematics, São Luís, Maranhão, Brazil ² Federal University of Maranhão, department of Electrical Engineering, São Luís, Maranhão, Brazil
<p>Abstract: Over the last few years, extended recursive and kernelized algorithms were one of the most promising in terms of tracking signals of state-space models in non-stationary environments. In this work, we intend to propose an EX-RLS (Extended Recursive Least Squares) algorithm based on a non-linear sum function of the error. The simulations were made in the problem by tracking a non-linear Rayleigh fading multipath channel. The results showed that the proposed algorithm exhibits a superior signal tracking capability than the kernelized extended recursive type versions.</p>		
58	AM19337	A combined method for detecting seven segment digit detection on medical devices
	Authors	Saranya Kanjaruek, Noppakun Boonsim
	Affiliation	Faculty of Applied Science and Engineering, Khon Kaen University, Nong Khai, Thailand
<p>Abstract: Bio-metric data are created by a diversity of medical devices. Manual recording of bio-metric data from medical devices can be a time-consuming task. Seven segment digit is normally presented on medical devices for example blood pressure monitors, glucose meters and digital weight scales, etc. Computer image processing is utilized to automatically analyze seven segment digit from medical devices for collecting large data sets of bio-metric data. The objective of this work is to detect seven segment digit screen from medical devices. The proposed method begins with seven segment screen detection using a deep learning technique. Afterwards, a variety of image processing techniques and parameters are applied to locate the seven segment digit positions. Experimental results were reported with an accuracy (F-measure) of 94 % utilizing 200 seven segment digit images.</p>		
59	AM19339	APPROXIMATE METHOD FOR SOLVING THE PROBLEMS OF HEAT AND MASS TRANSFER DURING FREEZING OF MOISTURE IN CRYOLITHOZONEN ROCKS
	Authors	V.I. Popov
	Affiliation	Chersky Institute of Mining of the North. SB RAS, Yakutsk
<p>Abstract: A method for solving problems of heat and mass transfer with phase transformation (freezing and thawing) is proposed. The method is based on the splitting procedure for the physical processes of the original problem of heat and mass transfer with phase transformation. As such, the processes of diffusive transfer of heat, moisture, and soluble salts between the nodes of the grid partition and the redistribution processes in the nodal regions considered as isolated systems are chosen. The developed computational algorithm makes it possible, when integrating into the software packages of solving nonlinear heat equation, to calculate complex processes with phase transformation. Its independence from spatial parameters (at the stage of phase transformations) allows, within the framework of a unified methodological approach, to be applied both to processes with a narrow temperature spectrum of a phase transition zone (a task of the Stefan type) and to a wide zone in accordance with the form of the phase equilibrium equation and multidimensional. Testing on self-similar and numerical solutions shows satisfactory (with an accuracy of up to 2%) compliance. This can provide good prospects for further practical use.</p>		
60	AM19346	Structural design and simulation analysis of faucet based on reverse engineering
	Authors	Mingyu Huang*, Chenxi Yan, Zhong Xie, Chongshi Shi, Hongjun Ni

	Affiliation	School of Mechanical Engineering, Nantong University, Nantong, Jiangsu, 226019, China
<p>Abstract: In order for the faucet to meet the needs of individualization, diversification and high quality, its structure must be optimized. Based on reverse engineering technology, this study reversely reconstructed and improved the faucet structure through Geomagic and SolidWorks software. The fluid dynamics simulation was then performed based on the improved model. The results show that the structure of the faucet is reasonable and can meet the requirements of uniform distribution of flow field and pressure field. When the angle of the water outlet is 95°, the structure of the flow channel is relatively more stable. At the same time, reverse engineering can greatly reduce the product development cycle, with high efficiency and feasibility.</p>		
61	AM19347	Emotion valence quantification system using musically evoked frontal theta asymmetry
	Authors	Avinash L. Tandle
	Affiliation	NMIMS University Mumbai India
<p>Abstract: Affective computing requires a sound algorithm that can distinguish, evaluate, process and simulate human affects. In this article, we propose frontal theta asymmetry algorithm using various assessing attributes of machine learning to validate the model to form portable, versatile EEG based system for diverse clinical and non-clinical applications.</p>		
62	AM19351	Fuzzy Logic based Routing of Optimizing the Performance of Video on Demand Services over Mobile Ad-Hoc Networks
	Authors	1Sadiq Ghalib, 2Anurag Baghel
	Affiliation	Department of Electronics & Communications Engineering, Gautam Buddha University, Greater Noida, India; Department of Computer Science and Engineering, Gautam Buddha University, Greater Noida, India
<p>Abstract: The dynamic nature of parameters impacting quality of service of real time utilizations denotes that Video on Demand services in Mobile Ad Hoc Networks (Mobi_VoD) is dealing with a remarkable degree of doubt. The following research paper proposed a new routing protocol called Fuzzy Modified AODV protocol (FMAODV) to improve the quality of service for the mobile VoD system applications (normal Mobi_VoD architecture approach). The protocol can improve the QoS by selecting the best throughput from the communication links. Fuzzy inference scheme is used for computing the throughput rate of the link using link parameters latency and packet loss so that the best link between the origin and the target nodes is constructed. Simulation is used to evaluate and compare the performance of proposed system approach with conventional Mobi_VoD system method. The outcome of the simulation proves that the suggested system approach is quite optimized and hence performs better than the conventional Mobi_VoD system (AODV routing protocol) in terms of QoS parameters like average control overhead, packet delivery ratio, network throughput, average end-to-end delay, and energy spent.</p>		
63	AM19352	A Unified OCR Framework for Detection and Recognition of Expression and Text
	Authors	Tuanji Gong, Xuanxia Yao
	Affiliation	School of Computer & Communication Engineering, University of Science and Technology Beijing, Beijing, China
<p>Abstract: Optical character recognition (OCR) has been a continuous active research topic and applied in many fields. Although scanned document image recognition has attained a high accuracy, however it still faces many challenge problems in many conditions, such as handwritten Chinese recognition, mixture of printed and handwritten Chinese characters, mathematical expression, chemical equations .</p>		

In traditional OCR, features selection plays an important role for recognition accuracy, while feature extractions are taken by hand and time-consuming. In this paper, we propose a unified framework to detect and recognize text or math expression, as well as printed or handwritten character. The framework consists of three stages. The first stage called DCN(Detection & classification network), which based on SSD model, detects and classifies not only mathematical expression and text but also handwritten character and printed character. The second stage consists of various text recognition and ME recognition models and the final stage merges multiple outputs of the second stage into a whole text. Experimental results show that our framework achieves a relative 10% improvement in mixture of text and ME image as well as handwritten and printed character.

64	AM19354	Research Hotspots and Development Trends of AI in Education A Study Based on Knowledge Map and Co-word Analysis
	Authors	ZHANG Fan,Lu Xiuqin
	Affiliation	Zhejiang University of Technology,Zhejiang Hangzhou; Zhejiang University of Technology,Anhui Bozhou

Abstract: With the gradual deepening of AI in manufacturing, medical, financial, transportation, environmental and other industries, the application of AI in the field of education has also attracted the attention of scholars. In this paper, By using visualization analysis software Citespace , taking the relevant literature collected from CNKI database as the research object, and using knowledge map and co-word analysis method, reveals the current research status of AI in the field of education from research hotspots and research frontiers. The results show that the research hotspots of AI in the field of education focus on robot, AI technology, education reform, personnel training, intelligence education, teacher development and so on. The development trend has developed rapidly from the embryonic stage to the golden stage. According to the research results, the author believes that future research needs to expand the diversity of AI research in the field of education, promote the combination of AI theory and practice in the field of education, and pay attention to the protection of privacy data.

65	AM19355	Research on Test System of Comprehensive Transmission Performance of Wide- range Gears*
	Authors	FU Yimeng ¹ ZHOU Xiaojun ¹ ZHUO Yaobin ^{1,2} LV Haoliang ¹
	Affiliation	State Key Laboratory of Fluid Power Transmission and Control, Zhejiang University, Hangzhou 310027; College of Technology, Lishui University, Lishui 323000

Abstract: A comprehensive transmission performance test system for wide- range gears is developed. The test system can carry out various types of performance tests for parallel and vertical gears under quasi-static and dynamic conditions. The test object, working range, test items, working principle, structural composition, control test principle and test software are described. Finite element model of spiral bevel gear transmission system suitable for quasi-static loading tooth surface contact analysis is established and load contact analysis is carried out; The test system is built, and test of tooth surface contact area, bending stress of tooth root and transmission error of gear pair are carried out, the experimental results are in good consistency with the finite element simulation results. The experimental system developed in this paper can obtain the performance parameters of gear transmission in the whole working field, which will provide a comprehensive experimental basis for theoretical analysis, optimal design, manufacturing and assembly of gear transmission.

66	AM19357	Stream processing for health care data to predict the probability of stroke using Apache Spark
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	Authors	Udhayakumar S,Jananee V
	Affiliation	Assistant Professor(SS),Department of Computer Science and Engineering, Rajalakshmi Engineering College,Thandalam,Chennai,TamilNadu,India

Abstract: In these days' data mining performs an essential position for prediction of diseases in medical industry. Consistent with the sector fitness Company, heart disease and stroke are the world's biggest killers. Stroke is a existence threatening illnesses that has been ranked third leading cause of loss of life in states and in growing international locations. A stroke is a neurological disorder that takes vicinity while a brain cells die, due to oxygen and nutrient deficiency. This challenge facilitates to predict the stroke possibility with the usage of the given data of patients. This project is implemented using Spark. Apache Spark is a cluster computing platform designed to be speedy and enormously available. It offers easy APIs in Python, Java, Scala and Sql. It is a type of classification problem and there are lot of algorithms to remedy classification issues. Classification algorithms are used while the outputs are restrained to a limited set of values, and additionally we use decision tree algorithm. Decision tree is one of the crucial technique for handling high dimensional statistics. It looks like a tree structure. It's far very simple and smooth manner for managing information set. Much work has been done to predict the life threatening sicknesses by the usage of decision tree and proved to be more efficient. The information set holds medical measurements (instance: high blood pressure, coronary heart sickness, age, records of ailment) for a number of sufferers, in addition to records about whether each affected person had a stroke. We need this technique to accurately predict stroke threat for destiny patients based totally at the clinical measurements.

67	AM19358	Development of a New System for Handwriting Information Collection
	Authors	Zengwu Sun,Haiqin Lv
	Affiliation	College of Medical Information Engineering, Shandong First Medical University & Shandong Academy of Medical Sciences,Taian, China; The Second Affiliated Hospital of Shandong First Medical University,Shandong First Medical University & Shandong Academy of Medical Sciences,Taian, China

Abstract: The useable information of most Pen User Interfaces are mainly pen point trajectories and pressure. However the handwriting is created dynamically and during the handwriting, velocity, acceleration and force are changing. Actually when pen points do relative paper motion, the motion between pen points and papers contains three-dimension force vector, the position of pen points and velocities, etc. If Pen User Interface could not only acquire trajectories of pen points but also obtain the contact force and the verities of force direction, researchers could extract more abundant personalized features. Based on an innovative force information acquisition, F-Pad2, this study designs a new handwriting information collection system which offers pen.

68	AM19359	Research on Image-based Subgrade Settlement Monitoring System Based on DSP
	Authors	Min Yong-zhi, Ren Wei-zhuo, Tao Jia, Guo Wei
	Affiliation	(1 School of Automation and Electrical Engineering, Lanzhou Jiaotong University, Lanzhou 730070, China; 2 Gansu Province Artificial Intelligence and Graphic Image Processing Engineering Research Center, Lanzhou 730070, China)

Abstract: The key technology of the image roadbed settlement monitoring system is the measurement of the spot centering accuracy. In view of the traditional spot centering technology, there is a large error in the relative deflection of the target surface and the camera. Developed a DSP-based roadbed settlement monitoring system. First, the settlement monitoring system includes spot centering, Image

algorithm processing, data transmission, wireless transmission of four subsystems; Secondly, the center position of the subgrade surface sedimentation spot is realized by DM642 embedded image processing and BIOS kernel; Finally, a Gaussian fitting-local centroid method is proposed to coarsely locate the center of the spot by Gaussian fitting. The local center of gravity method is used to further accurately locate the center of the laser spot and verify it on the DSP. The subgrade settlement monitoring system has been verified by laboratory and engineered, and its accuracy and stability meet the requirements of high railway foundation settlement monitoring. Long-term, remote automatic monitoring of road surface settlement is achieved;

69	AM19362	Optimized Clustering based on Semantic Similarity of Components for Short Text
	Authors	Wensong LIU, Feng LIN, Zhuqing HU, Jinghui ZHANG
	Affiliation	State Grid of Electrical Power Research Institute, Nanjing, China

Abstract: Short text is usually made up of several words and one sentence at most. Considering sparse features and complicated expressions, the similarity measurement and the clustering of the texts may not work well. The semantic clustering for short text is studied. Firstly, according to the analysis of the dependency syntax structure, the event component and modified components are extracted. Then, the semantic similarity of the texts is analyzed with the component as the basic unit. The strategy is that the text would be similar when not only the event component but also the modified components are similar. Further, considering the proposed semantic similarity may lead to increased topics, which means various cluster shape, indefinite cluster number, and increased noise point for the cluster, the density peak clustering is selected, and a regression parameter is designed to improve the cluster number and the noise. Based on the public data set, the proposed semantic clustering is tested: purity P is 96% and F measure is 71.97%. The proposed method has been used in the electrical power industry and is worth promoting.

70	AM19363	Morphological Neural Network Model of Implicit Learning
	Authors	Naiqin Feng ^{a,b,*} , Bin Sun ^{a,*}
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Abstract: Implicit learning, which involves the fundamental issue of human potential development, has been a hot and difficult topic for many years. Traditional artificial neural networks can simulate implicit learning, but there are some shortcomings. This paper analyses the existing problems of implicit learning simulation research, puts forward the idea of using morphological associative memory networks to study implicit learning. Through simulation experiments, theoretical analysis and discussion, a morphological neural network model of implicit learning is established, and compared with the previous artificial neural network model of implicit learning, some guiding conclusions are drawn. The research shows that the implicit learning model based on morphological neural networks is superior to the implicit learning model based on traditional neural networks in automaticity, comprehension, abstraction and fault tolerance. Therefore, morphological neural network model will play a very important role in future implicit learning research, and bring new inspiration to reveal the neural mechanism of implicit learning, and make its own unique contribution.

71	AM19364	Research on Practical Teaching Reform of HRM Specialty under AI Background
	Authors	Wang Tian, Lin Jianbang [*]
	Affiliation	South China Business College of Guangdong University of Foreign Studies, Guangzhou, China; Nanfang College of Sun Yet-sen University, Guangzhou, China

Abstract: The rise and rapid development of AI have brought great challenges to human resources management, and also put forward higher requirements for the practical teaching of human resources management specialty. The teaching design of the curriculum group of human resources management specialty should focus on cultivating students' practical ability, take innovative teaching ideas and teaching ideas of professional teachers as the guidance, break the traditional teaching methods and adapt to the new teaching methods of AI era. Therefore, in the practice teaching research of human resources management specialty, the teaching design of AI-driven curriculum group of human resources management specialty is put forward, and the interaction between AI and HRM is deeply analyzed to solve the problem of "emphasizing theory while neglecting practice" in HRM specialty education.

72	AM19374	SFSG: Spark based Frequent SubGraph Mining
	Authors	Fathimabi Shaik1, R.B.V. Subramanyam2, and DVLN Somayajulu3
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Abstract: To propose a Frequent Subgraph Mining algorithm using an in-memory cluster framework Spark. The proposed algorithm uses one scan of the graph database to mine frequent subgraphs. Determining frequent subgraphs by using graph index for both MapReduce and Spark is proposed in chapter 4. Frequent subgraphs are mined from a large graph database is a challenging task. This work shows how frequent subgraph mining can get benefits from graph index. In this thesis, MapReduce based frequent subgraph mining algorithm was proposed. This algorithm uses two step approach. The first step is Integrated Graph Index Creation and the second step is Frequent subgraph mining. During the first step, it creates an Integrated graph index (IGI) for each partition. It distributes the graphs to number of machines. Structure based partition is used to divide the graphs into number of machines. Each partition is given as input to one mapper and each machine creates an Integrated Graph Index file for that partition of graphs. Each mapper will create one Integrated Graph Index. To find the edge with the highest frequency in the IGI, simultaneously depth first traversal as a starting edge for the simultaneous depth-first traversal. It constructs an edge table to keep the set of distinct edges in the IGI. In the second step, the Integrated graph index is used by all the mappers to mine subgraphs and reducer find a final set of frequent subgraphs. MRFSG-IG is designed to mine frequent subgraphs by using only one MapReduce round. An algorithm is designed to find frequent subgraphs using spark. In this work, first graph datasets are loaded from HDFS into the spark RDDs. Then iteratively, it uses k frequent subgraph to generate k+1 frequent subgraphs. This approach makes good use of the cluster memory. There is a 40 10

73	AM19378	The Use of Artificial Neural Network (ANN) for the Prediction of Temperature during the Milling Operation of Ti6Al4V Milling
	Authors	Fwamba, J.C.1, Daniyan, I. A.2 Thabadira, I.1, Desai, D. D.1, Phokobye, S. N.3 and Mrausi S. S.3
	Affiliation	1Department of Mechanical & Mechatronics Engineering, Tshwane University of Technology, Pretoria, South Africa; 2Department of Industrial Engineering, Tshwane University of Technology, Pretoria, South Africa; 3Institute of Advanced Tooling, Tshwane University of Technology, Shoshanguve, South Africa.

Abstract: Temperature is an important factor, which determines the degree of machinability and performance of both the cutting tool and the work piece material. In this study, both the numerical and physical experimentation was carried to determine the values of temperature during the milling operation

of Ti6Al4V. The physical experiments were carried out using a DMU80monoBLOCK Deckel Maho 5-axis CNC milling machine with a maximum spindle speed of 18000 rpm, at a feed rate of 30000 mm/rev. A carbide-cutting insert (RCKT1204MO-PM S40T) was used for the machining operation. A professional infrared video thermometer with LCD display and camera function (MT 696) with infrared temperature range of -50-1000°C, was employed for the temperature measurement. The numerical experiment was carried out using the Response Surface Methodology (RSM) for the combination of the process parameters while the Artificial Neural Network (ANN) with sigmoid hidden neurons and linear output neurons was employed for the prediction of the values of temperature. The network is trained with Levenberg-Marquardt backpropagation algorithm. The high degree of agreement between the values of temperature from the physical experimentation and the predicted temperature using ANN indicates that the developed network is highly suitable for predictive purpose.

74	AM19380	Faster Anomaly Detection in Streaming Data via Statistical Learning: Improving on Twitter's State of the Art
	Authors	1st Caitriona M Ryan, 2nd Andrew Parnell, 3rd Catherine Mahoney
	Affiliation	1,2 Maynooth University, Ireland,I-Form / Hamilton Institute;Maynooth, Ireland; 3 University College Dublin, Ireland,Dublin, Ireland

Abstract: The detection of anomalies in real time is paramount to maintain performance and efficiency across a wide range of applications including web services and smart manufacturing. This paper presents a novel algorithm to detect anomalies in streaming time series data via statistical learning. We adapt the generalised extreme studentised deviate test [1] to streaming data by using a sliding window approach. This is made computationally feasible by recursive updates of the Grubbs test statistic [2]. Moreover, a priority queue [3] is employed to reduce memory requirements, where subsets of the required data streaming window are maintained in the algorithm rather than the full list. Our method is statistically principled. It is suitable for streaming data and it outperforms the AnomalyDetection software package, recently released by Twitter Inc. (Twitter) [4] and used by multiple teams at Twitter as their state of the art on a daily basis [5]. The methodology is demonstrated using an example of unlabelled data from the Twitter AnomalyDetection GitHub repository and using a real manufacturing example with labelled anomalies.

75	AM19381	TEACHING OF THE ARCHITECTURE AND MODELING PROJECT ASSOCIATED WITH GEOMETRIC REPRESENTATION SYSTEMS
	Authors	XAVIER, Ivan Silvio de Lima NUNES, Denise Vianna
	Affiliation	School of Architecture and Urbanism of Fluminense Federal University; School of Architecture and Urbanism of Fluminense Federal University and Ibmec-RJ.

Abstract: This work presents a method of teaching architectural design, which relies on knowledge and techniques derived from geometric representation systems. The process is developed in three phases - contextualization, spatialization and materialization. Through the theoretical basis and the practice of constructing reduced models, used both for the study of form and structure, and for the visualization of orthogonal representations in the horizontal and vertical planes, students develop creativity, expand their repertoire and deepen their knowledge of the geometric and structural systems, and are thus able to present more complex, grounded and well articulated design solutions with the structural system adopted. Student projects acquire constructability and quality.

76	AM19385	Music Computer Technologies: The Instrument of New Poetics for Formation of Virtual Values
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<p>Abstract: The progression of science and the arts nowadays has been largely influenced our understanding of the universum around us, and been formed a novel instrumentarium, including a virtual "organum" for its comprehension. In this context, virtuality could act as a new ontological hypothesis of artistic reality. Moreover, the tendencies of virtualization of artistic phonographic contexture can be considered as a specific characteristic of an aesthetical landscape, which in its evolution, gradually departing from such original basic values inherent in it as the orderliness of the whole system, the immanence of the means and mechanisms for its functioning, the idea of the presuppositional unpreconditional givenness of artistic creativity as a phenomenon itself. The process of implementation of integration of information and artistic means of education in the system of professional education with the use of contemporary music computer technologies as one of the tools in the formation of information educational environment.</p>		
77	AM19386	Musical Semantic as a Way to Intelligent Information System Applicable in Computer Music and Music Education
	Authors	Irina B. Gorbunova, Mikhail S. Zalivadny
	Affiliation	Full. Univ. Prof., Dr., Head of the Educational and Methodical Laboratory Music Computer Technologies at the Herzen State Pedagogical University of Russia, St. Petersburg; PhD in Art History, Senior Researcher of the St. Petersburg State Conservatoire named after N.A. Rimsky-Korsakov, St. Petersburg, Russia
<p>Abstract: The integrative model for semantic space of music proposed by the authors originated as a generalization of some analogous theoretical results obtained earlier by other researchers. The considered theoretical ideas and generalizations are remarkable as a basis for the precise study of various components of the system of musical thinking, including its synaesthetic area. The last of these aspects is important in the modeling of synesthesia as a special case of virtual reality by means of computer technology and, thus, the use of music as a source of such realities. The authors of the article touch upon also some aspects of application of mathematical approaches to music in the sphere of musical education.</p>		
78	AM19388	Monitoring of Various Parameters and Disease Control of Banana Crop (Banntex) using Wireless Sensor Networks: A Case Study
	Authors	Miss. Lina Desai, Dr. R.P. Singh
	Affiliation	Assistant Professor, Electronics and Telecommunication D.Y.Patil College of Engg., Akurdi Pune Professor, SSSUTMS Sri Satya Sai University of Technology & Medical Sciences, Sehore , MP, India
<p>Abstract: In India 60 percent of total cultivated land is fully dependent on rain and if it is less than average rain fall then there is significant reduction in the overall agricultural production and it leads heavy losses to farmers and ultimately it affects the overall gross domestic production of India. Due to advancement of new technology like Internet of Things (IoT), Sensors development and Improved Wireless Sensor</p>		

Networks, we can design and developed precision Agriculture systems in which various sensors are used to measure the different parameters like change in weather, temperature, humidity, moisture changes in soil, soil quality, fertility of soil, various weeds, level of water, magnesium and nitrite content in soil, ground water quality, crop growth, pest detection, crop on line monitoring, animal intrusion into the field and so on. IoT along with wireless sensor networks have been used to design and develop precision agriculture monitoring system. Based on the measured parameters this system can be used to control and automate the farming processes. This precision system empowers farmers to keep updated, early detection and control of diseases, increase productivity and improved quality of farming with minimum manual tasks. Authors have carried out a detailed literature review on various approaches of precision monitoring system using Internet of Things (IoT). Authors are conducting a research on the design and implementation of precision agriculture system for monitoring different parameters and early detection of diseases and control of Banana Crops (Banntex) System which will result to increase the productivity and quality of Banana products.

79	AM19394	Complex Annotation of ALUs using Text Annotation Structure(TAS): the case of arabic syntactic analyzer
	Authors	Azeddine Rhazi,Kais Haddar
	Affiliation	FLSH, Marrakech UCAM,Morocco MIRACL,University of Sfax-Tunisia

Abstract: The structural syntactic analysis of various Arabic texts have demonstrated that the great majority of unknown units are the more agglutinated forms that must be analyzed as a sequence of ALUs (e.g.as : ف+س+ي+كفي+ك+هم (Mesfar.2008&2010)and (Ghezail 2016). In order to reduce the number of ambiguous forms and improve text complex annotation using TAS (Text Annotation Structure) (Silberztein2007&2016), it was decided to model various texts constraints of ALUs(affixes, agglutinated words, simple words, continuous and discontinuous expressions) that occur with high frequency: Named Entities units (Word form with no vowel : ألف (alf), the ambiguity triggered by the lack of vowels: أَلَف (allafa) = to write a book / أَلِف (alifa) = intimacy an love/ أَلْف (alfun)= thousand/ أَلِف (alif) = definite article Discontinuous Expressions ضَرَبَ بِهِ عُرْضَ الْحَائِطِ (daraba bihi urda alhaaiti) = to neglect) which has about 21 senses.

As produced by Arabic multiword expressions (MWEs), the semantic ambiguity respected by NooJ ambiguous annotations require a separate analysis of MWEs to avoid context ambiguities that offer to TAS to represent more than one annotation at a given location in the text (Silberztein 2007).

The appropriate examples used in the study, show the importance of segmentation (POS tagging) for each form, and the useful technique of chunking processes to improve Arabic TAS with accordance to semantic predicates / arguments (dependancy tree, syntax tree and parse tree).

We attempt in this paper to present a unified annotation method for structural Arabic texts, and our main goal is to redraft new hypothesis in order to highlight the Arabic Syntatctic Analyzer at the original way and converted syntatctical level in relation to local grammar and the analysis function of MWEs.

The paper is organized as follows: in introduction we describe Arabic ALUs (Named Entities and discontinuous expressions) and provide a summary of previous related research .section 2 gives a brief description of the corpus used in this study. Section3 presents the TAS approach used in our experiments (preprocessing graphs) and the approach is tested and evaluated in its relevant sub-section in section4, we discuss the results of experiments in section 5. Finally we conclude.

80	AM19411	Linguistic Descriptions of Airport Evaluation Data for Recommendation Strategies
	Authors	Betul DUNDAR,Diyar AKAY, Suat OZDEMIR

	Affiliation	Department of Information Technology, Ministry of National Education, Ankara, TURKEY; Department of Industrial Engineering, Gazi University, Ankara, TURKEY; Department of Computer Engineering, Gazi University, Ankara, TURKEY
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Abstract: In this paper, linguistic summarization is used to summarize airport evaluations and passengers attributes. The relations between the airport features and the personal information of passengers are represented by Type-I and Type-II fuzzy quantified sentences. The linguistic summaries are generated considering two types of fuzzy sets (triangular or trapezoidal) with 3, 5 or 7 linguistic labels as well as using 3 types of quantifiers (“most”, “about half” or “a few”). The degree of truth of generated summaries is calculated with both scalar cardinality and fuzzy cardinality in order to assess the quality of the summaries. The proposed system is evaluated using an airport survey dataset. The extracted simple and interpretable linguistic summaries reveal numerous useful ideas for airlines and passengers when considering an airport.

81	AM19412	Vibration characteristics of Single-walled Carbon Nanotubes Based on Nonlocal Flügge Shell Model: A Numerical Study
	Authors	Muzamal Hussaina*, Muhammad Nawaz Naeemb
	Affiliation	aResearch scholar, Department of Mathematics, Govt. College University Faisalabad, 38040, Faisalabad, Pakistan; bDean of Physical Sciences and Engineering Department of Mathematics, Govt. College University Faisalabad, 38040, Faisalabad, Pakistan.

Abstract: Since the discovery of CNTs, has become very important and interest of research due to considerable observation and research publications every year. CNTs have a variety of uses and applications in potential looking fields. In present study, the nonlocal Flügge shell model with clamped-clamped and clamped-free end conditions is utilized for the vibration analysis of armchair and chiral single-walled carbon nanotubes (SWCNTs). The governing equation is discretized with nonlocal equation from Flügge shell model using wave propagation approach is used. The behavior of different nonlocal parameters is considered to find the vibrational frequency of SWCNTs. It is exhibited that the effect of frequencies against aspect ratio by varying the bending rigidity. It has been investigated that by increasing the nonlocal parameter decreases the frequencies and on increasing the aspect ratio increases the frequencies for both the tubes. The results generated using computer software MATLAB to furnish the evidence regarding applicability of present model and also verified by available published literature.

82	AM19414	Decision-driven Model for Building IoT Architecture
	Authors	Cezary Orłowski, Adam Czarnecki, Tomasz Sitek, Artur Ziółkowski
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Abstract: The subject of the article is the presentation of the model of Internet of Things (IoT) system architecture construction taking into account the process of managing the production of these systems. The starting point is the current four-stage model of IoT architecture. The article proposes adding the fifth stage—management of the IoT system construction process taking into account the creation of three additional layers. The approach proposed in this article creates conditions for the construction of three scenarios of architectural processes guided by network development decisions. As part of the first of them, the stage of management processes complements the four stages of building architecture. In the second scenario, management processes aggregate the four given stages. The third scenario is also considered, in which management processes are defined as the fifth layer and then the four layers of the ontology model is built as part of the management process and the process is developed.

83	AM19416	Is the content of the SADC countries' parliamentary websites compliant with the IPU guidelines? A content and web-link analysis
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<p>Abstract: Parliaments, like any other organisations, are exploiting advances in Information and Communication Technologies (ICTs) to support and modernise their functions. Being central institutions in governance and democracy in any given country, it is imperative that parliamentary websites facilitate public participation in governance. The public must also be able to use the website to fully communicate, engage in parliamentary processes, and improve their participation in public affairs and their contribution to democracy. The extent to which websites facilitate e-parliament and e-democracy cannot be overemphasized. This study evaluated the Southern African Development Community (SADC) countries' parliamentary websites for content compliance in line with IPU guidelines for website design. Fourteen websites belonging to countries in the SADC region were evaluated using a content analysis approach, which was informed by the IPU guidelines in order to investigate whether the parliamentary websites are compliant. The emphasis was on content: general information about parliament; legislation, budget, and oversight activities; tools used for finding, receiving, and viewing information, as well as those used in the communication and dialogue with citizens. We also probed design issues centering on usability, accessibility, and the language used. Although most SADC countries' parliamentary websites comply with the IPU guidelines, the degree of compliance varies from country to country. There is need for SADC countries and parliaments to revisit the IPU guidelines with a view to align the contents on the websites to IPU standards.</p>		
84	AM19418	On the Fault Diagnosis of Mechanical Drawings with Deep Learning
	Authors	Hao Hua,*, Yu Huang, Juan Cao
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<p>Abstract: Fault diagnosis is vital in engineering drawings of mechanical parts. Traditionally, fault detection is performed manually on CAD software, which requires expert knowledge and heavy labor. In order to make fault detection easier for nonexperts as well as improve the efficiency and accuracy of the detection process, this paper proposes a generic approach coupling object detection and image recognition methods to analyze engineering drawings in image format. For both of object detection and image recognition methods, deep learning models with different backbone networks are applied and tested independently. In this work, detecting surface roughness symbol is used as the study case and the results show that a combination of Faster-RCNN and SSD with ResNet 50 and ResNet101 as backbone network achieves the best performance under our evaluation metrics.</p>		
85	AM19428	Overlapping Community Detection based on Core Seed Selection
	Authors	Hui Li, *Yun Hu, Shu Zhang, Zuojian Zhou
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<p>Abstract: The discovery of community structure is the basis of understanding the topology structure and social function of the network. This paper proposes a novel overlapping community detection algorithm based on seed node selection. The algorithm first determines the community core by calculating the</p>		

influence degree of the node and the similarity between the node and the community, then expands the overlapping community through the fitness function, and finally merges the communities with more node repetition rates. The proposed algorithm is verified by artificial network and real network. The experimental results show that compared with the traditional community discovery method, the algorithm is superior to many existing overlapping community discovery algorithms in terms of community discovery quality and computational efficiency.

86	AM19429	“0” and “O” Recognition based on Deep Learning
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Abstract: The traditional algorithm has achieved good recognition for the recognition of most characters, but the recognition rate of the number "0" and the letter "O" is only 80-90%, which is difficult to meet the actual needs of the industry. For the recognition of these two characters, a recognition method based on deep learning is proposed. First, image preprocessing is performed on the characters, and then the sample data is manually labeled, and 40,000 training samples and 10,000 test sample images are obtained by the data samples enhancement. The results show that the CNN network can achieve more than 99% recognition rate, the training sample time is about 5 minutes, and 1000 images can be recognized in 1 second. Both the recognition speed and the recognition effect can meet the actual needs of the industry.

87	AM19430	Research on Cutting Performance Optimization of Diamond Wire Saw
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Abstract: Because the wire sawing machine cutting technology has the advantages of more efficient, safer, higher yield and less pollution than the traditional quarrying method, it has been widely used in the mining of mine stone. In order to better analyze and study this technology, combined with the research progress of domestic and foreign scholars, the wire sawing machine cutting technology has been comprehensively analyzed and summarized. Firstly, the current advanced modular design of the wire sawing machine is introduced. Secondly, the structural innovation of the multi-rope wire sawing machine is introduced. The cutting speed and feed rate are analyzed for the wear of the diamond bead rope and the wire sawing machine cutting. The law of the impact of efficiency, and finally summarize its development.

88	AM19434	A Look at Wavelet Packetes in Vector-valued Nonuniform Setting on Local Fields
	Authors	M. Younus Bhat
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Abstract: Wavelet Packets are particular linear combinations or superposition of wavelets. Wavelet packets form bases which retain many of the properties of their parent wavelets, but offer more flexibility than wavelets in representing different types of signals. Wavelet packets owing to their good properties have been widely applied to signal processing, coding theory, image compression, and so on. The concept of vector-valued nonuniform multiresolution analysis on local field of positive characteristic has been studied by Shah and Bhat. In this note, we study some of the properties of the wavelet packets that are associated with such type of an MRA on local fields of positive characteristic.

89	AM19437	Influence of thread depth and pitch on the biomechanical behaviour of dental implant systems
	Authors	Yulin Zhou ¹ , Zhihong Mao ¹ , Fan Liu ¹ , Jiansheng Wang ¹
	Affiliation	1 Division of Intelligent Manufacturing,Wuyi University,Jiangmen, China
<p>Abstract: Purpose: Thread depth and pitch are associated with initial stability of dental implant systems. The purpose of this study was to discuss the influence of thread depth and pitch of dental implant systems in mandibular bone mass using three-dimensional finite element methods. Methods: A simplified three-dimensional model of mandible with implant was created by Geomagic studio and Solidworks. ANSYS workbench was used to analyze the effects of the stress distribution in peri-implant bone tissue based on different thread depth and pitch designs of implants. Results: Based on the results of this study, the optimal dental implant design has the thread depth of 0.45~0.55mm and the pitches of 0.75~0.90mm. In addition, the results showed a negative correlation between thread depth and the stress in the implant with equal pitch, while there is a positive correlation between the stress and the pitch in the implant with equal thread depth.</p>		
90	AM19438	Stress performance comparison of thread shape and pitch of dental implant with various bone type by 3-D finite element analysis
	Authors	Yulin Zhou ¹ , Zhihong Mao ¹ , Fan Liu ¹ , Jiansheng Wang ¹
	Affiliation	1 Division of Intelligent Manufacturing,Wuyi University,Jiangmen, China
<p>Abstract: Objective: The aim of this study was to investigate the effect of implant thread shape and pitch on the stress distributions of implants and peri-implant bone tissues under different bone type conditions. Methods: A three-dimensional finite element simplified model of mandible with implant was created by Geomagic studio and Solidworks. ANSYS workbench was used to analyze. Results: Changing bone quality influences maximum equivalent stress (Max EQV) of implants most. The minimum Max EQV of implants was 197.49MPa and the maximum Max EQV of implants was 238.12MPa in bone type I; the minimum Max EQV of implants was 189.97MPa and the maximum Max EQV of implants was 243.71MPa in bone type II; The minimum Max EQV of the implant was 194.56MPa and the maximum Max EQV was 244.64MPa in bone type III; The minimum Max EQV was 167.57MPa and the maximum Max EQV was 239.36MPa in bone type IV. Conclusions: Under the condition of type I bone, the pitches of 1.0mm and 1.25mm is better; rectangular implant with the pitch of 0.8mm is used for bone type II, III and IV.</p>		
91	AM19470	Design of Intelligent Management System for Shared Paper Towel Machine Based on Lua
	Authors	LI Sheng, YANG Yong Jie
	Affiliation	Nantong University, College of Information Science and Technology, Nantong 226019, Jiangsu Province
<p>Abstract: Through new retail, Internet of things and artificial intelligence, the sharing paper towel machine has created intelligent equipment for providing paper towels in various public places. As a "paper towel supply" public service, it enters into public service areas such as public toilets, restaurants, stations and so on to solve the pain points of users'paper going out. The system uses Air202 developed by Lua as the main control chip for hardware control, data transmission with server through MQTT protocol, data encryption with Token token mechanism, mobile APP Scanning Necklace,and effectively designs an intelligent management system for paper towel machine.</p>		
92	AM19472	Progress in graphene-based nanocomposites 1
	Authors	Qianzhao ^{1*} ,yingding ¹ ,huilixu ¹ ,yongshen ¹ ,mingliwang ¹ ,weizheni ¹ , jiejunzhu ¹ ,ruimingxie ¹

	Affiliation	Shanghai University of Engineering Science,Shanghai201620, PR China
<p>Abstract: Combines graphene and other substances generated composite material, become a focus in the field of the study, through the compound, can produce synergies, according to the related literature of recent years, with the focus of the graphene nanocomposite material for review, this paper introduces the preparation of graphene, modified after the performance of the research situation of graphene and polymers, inorganic materials, metals and their compounds between composite applications, and a detailed example is summarized, and the graphene nanocomposite is prospected.</p>		
93	AM19473	Research Progress of Graphene-based Polymer-based Metal (Metal Compound) Nanocomposites
	Authors	Qianzhao1*,yingding1, huilixu1, yongshen1, mingliwang1,jiejunzhu1, weizheni1
	Affiliation	Shanghai University of Engineering Science,Shanghai201620, PR China
<p>Abstract: In this paper, the situation of polymer nanocomposites is briefly introduced, the research on the composite properties, preparation and modification of graphene are described, and some examples are given to simply analyze the properties of graphene composites and the achievements of some researchers at the present stage. The current graphene-based metal nanocomposites (metals including platinum, gold, silver, manganese, copper) and graphene-based polymer nanocomposites are reviewed, the deficiencies in the current research fields are pointed out, and the prospect is made.</p>		
94	AM19474	Agent-Based Control Systems with Control Function Virtualisation
	Authors	Marco Perez Hern ´andez, Duncan McFarlane ´,Manuel Herrera, Amit Kumar Jain, Ajith Kumar Parlikad
	Affiliation	Institute for Manufacturing, University of Cambridge
<p>Abstract: Different approaches for endowing flexibility and adaptation to control systems have been part of the research agenda for several years. The preferred approach for addressing these requirements is based on multi agent systems, with agents usually embedded in a platform that provides runtime services therefore easing the development process. However, an approach that relies in platform's runtime services implies tying the ability of the control system to scale up, shrink or reconfigure their structure, to the capabilities given by platform. In this paper, we introduce and explore Control Function Virtualisation, a novel approach for engineering of control systems where control functions are built as independent software components decoupled from the hardware infrastructure. Virtual Control Functions (VCF) enable the creation of agents that are not embedded in a platform, thus removing constraints of closed/semi-closed environments. We demonstrate our approach by implementing a prototype. Although VCF agents are heavier than traditional agents embedded in platforms, our results show that VCF agents are a feasible approach to breakdown control systems enabling easy deployment and replication of agents.</p>		
95	AM19475	A Unified OCR Framework for Detection and Recognition of Expression and Text
	Authors	Tuanji Gong, Xuanxia Yao
	Affiliation	School of Computer & Communication Engineering, University of Science and Technology Beijing,Beijing, China
<p>Abstract: Optical character recognition (OCR) has been a continuous active research topic and applied in many fields. Although scanned document image recognition has attained a high accuracy, however it still faces many challenge problems in many conditions, such as handwritten Chinese recognition, mixture of printed and handwritten Chinese characters, mathematical expression, chemical equations. In traditional OCR, features selection plays an important role for recognition accuracy, while feature extractions are taken by hand and time-consuming. In this paper, we propose a unified framework to</p>		

detect and recognize text or math expression, as well as printed or handwritten character. The framework consists of three stages. The first stage called DCN (Detection & classification network), which based on SSD model, detects and classifies not only mathematical expression and text but also handwritten character and printed character. The second stage consists of various text recognition and ME recognition models and the final stage merges multiple outputs of the second stage into a whole text. Experimental results show that our framework achieves a relative 10% improvement in mixture of text and ME image as well as handwritten and printed character.