



CENet 2018

**The 8th International Conference on Computer Engineering and
Networks**

August 17-19, 2018 in Shanghai

Conference Program

Co-Sponsored by



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Prof. Radjef Mohammed Said, University of Bejaia, Algeria

会议日程表Conference Program**8月17日 August 17, 2018 周五 Friday p.m.**

14:00-17:00	签到, 领取会议材料 Register, Approach	1楼大厅 The hall on the 1st floor
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8月18日 August 18, 2018 周六 Saturday a.m.

8:00-9:00	签到, 领取会议材料 Register, Approach	1楼大厅 The hall on the 1st floor
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9:10-9:30	开幕式 Opening Ceremony	宴会厅-B厅 Ballroom B
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9:30-10:10	大会嘉宾演讲 Keynote Speech (Prof. Victor I-chen Chang)	宴会厅-B厅 Ballroom B
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10:10-10:30	茶歇 Tea Break	宴会厅-B厅 Ballroom B
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10:30-11:10	大会嘉宾演讲 Keynote Speech (Prof. Sergei Gorlatch)	宴会厅-B厅 Ballroom B
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11:10-11:40	集体照 Collective photography	1楼大厅 The hall on the 1st floor
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11:40-13:00	自助午餐 Buffet Lunch	一楼西餐厅 The Western Restaurant on the 1st floor
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8月18日 August 18, 2018 周六 Saturday p.m.

14:30-15:30	分会场报告 Technical Sessions	昆斯厅 Room : Kungsi
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15:30-15:50	茶歇 Tea Break	昆斯厅 Room : Kungsi
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15:50-17:00	分会场报告 Technical Sessions	昆斯厅 Room : Kungsi
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17:30-20:00	自助晚宴 Banquet Dinner	杉树厅 The Shanshu restaurant on the 2nd floor
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8月19日 August 19, 2018 周日 Sunday a.m.

9:30-11:00	参观 浦东张江国创中心 Visit Zhangjiang Creative E-park	
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大会嘉宾介绍 **Keynote Speakers Resume**



Prof. Victor I-chen Chang

Title: Recent development in Industry 4.0 for smart manufacturing, data analytics, AI and security

Abstract: Industry 4.0 has been developed into products and services of various kinds, in which the high-tech plays a significant role involved with data analytics and AI. Smart manufacturing is a rising area, not only everything can be automated but also efficient, optimized, delivered and completed, but it also provides a strong foundation to Industry 4.0 and China 2025. However, there are 4 major challenges. First, too much data can be collected on daily basis. The data of priority and significance will be processed, Second, the integration of data analytics (including visualization) and AI (such as deep learning) should be developed to make everything better, faster, cost-down and efficiency up. Third, security and privacy play significant role and must be developed, tested and validated. Fourth, the standards in the processes and technology should be ready for organizational adoption. In this keynote, recommendations, illustrations and solutions will be provided, bringing the gap between the academia and industry. It is not just the cutting-edge techniques or publications alone but providing real-world solutions with publications is crucial for today's advanced research.

Bio: **Victor I-chen Chang** is currently an Associate Professor and a Supervisor of Ph.D. in Xi'an Jiaotong-Liverpool University. He is a world-leading data-driven AI scientist and expert who can demonstrate advanced software engineering with multi-disciplines in healthcare, finance, weather science, education, social networks, security and other related disciplines and services. Furthermore, Dr Chang is a founding chair on the international conference on Internet of Things and Big Data and is capable of integrating with smart devices/applications, wireless services and sensors. Some examples include: (1) UK temperature distributions; (2) blood clotting simulations; (3) Boeing stock analysis He has won a European Award on Cloud Migration in 2011, Best Papers in 2012 and 2015, IEEE Outstanding Service Award in 2015, the European Award in 2016 and Outstanding Young Scientist Award in 2017.



Prof. Sergei Gorlatch

Title: Distributed Applications Based on Mobile Cloud Computing and Software-Defined Networks

Abstract: We consider an emerging class of challenging networked multimedia applications called Real-Time Online Interactive Applications (ROIA). ROIA are networked applications connecting a potentially very high number of users who interact with the application and with each other in real time, i.e., a response to a user's action happens virtually immediately. Typical representatives of ROIA are multiplayer online computer games, advanced simulation-based e-learning and serious gaming. All these applications are characterized by high performance and QoS requirements, such as: short response times to user inputs (about 0.1-1.5 s); frequent state updates (up to 100 Hz); large and frequently changing numbers of users in a single application instance (up to tens of thousands simultaneous users).

This talk will address two challenging aspects of future Internet-based ROIA applications: a) using Mobile Cloud Computing for allowing high application performance when a ROIA application is accessed from multiple mobile devices, and b) managing dynamic QoS requirements of ROIA applications by employing the emerging technology of Software-Defined Networking (SDN).

Bio: **Sergei Gorlatch** has been Full Professor of Computer Science at the University of Muenster (Germany) since 2003. Earlier he was Associate Professor at the Technical University of Berlin, Assistant Professor at the University of Passau, and Humboldt Research Fellow at the Technical University of Munich, all in Germany. Prof. Gorlatch has about 200 peer-reviewed publications in renowned international books, journals and conferences. He was principal investigator in several international research and development projects in the field of parallel, distributed, Grid and Cloud algorithms, networking and computing, as well as e-Learning, funded by the European Commission and by German national bodies. Among his recent achievements in the area of communications and future Internet is the novel Real-Time Framework (www.real-time-framework.com) developed in his group as a platform for high-level development of real-time, highly interactive applications for entertainment. In the area of networking, his group has been recently working in the pan-European project OFERTIE on an application-oriented Quality of Service approach for emerging Software-Defined Networks (SDN).

分会场报告 Special Sessions

Paper ID	Presentaion Topic	Presenter
Session Chair		Yang Yang
CEN111	Sea Land Air Selabot Swarm Design Considerations	Tong Xu
CEN150	Layer Clustering-Enhanced Stochastic Block Model for Community Detection in Multiplex Networks	Chaochao Liu
CEN202	A Low Voltage Power Line Model for Broadband Communication	Ran Huo
CEN183	Research on Simulation System for Ship Transport Operation Based on HLA	Dezhuang Meng
CEN175	Improve Link Prediction Accuracy with Node Attribute Similarities	Zhenyu Wu
SS1002	An Image Classification Method Based on Deep Neural Network with Energy Model	Haitao Yu
SS1007	Research and Improvement of TF-IDF Algorithm Based on Information Theory	Long Cheng
SS1009	A Method Based on Improved Cuckoo Search for On-Site Operation and Maintenance Work Order Distribution in Power Communication Network	Mi Lin
SS1011	End-to-end Network Fault Recovery Mechanism for Power IoT	ZanHong Wu
SS1014	Cross - domain Virtual Network Resource Allocation Mechanism for IoT in Smart Grid	Zhan Shi
SS1022	An Energy-Balancing based Clustering Method in Sensor Networks for IoT Sensing and Monitoring	Hong Zhu
SS1027	Reliability oriented Probe Deployment Strategy for Power Cellular Internet of Things	Lei Wei
SS1028	Soft Frequency Reuse of Joint LTE and eMTC Based on Improved Genetic Algorithm	Jingya Ma
SS2006	Personalized Recommendation Leveraging Social Relationship	Jinpeng Chen

会场信息 Conference Information



会场交通地图 The Traffic Map of Conference Hotel

【距离上海浦东国际机场10分钟车程】
10 minutes away from Pudong International Airport
【距离上海迪士尼乐园15分钟车程】
15 minutes away from Shanghai Disney Resort
【距离地铁2号线川沙站300米】
300 meters from Chuansha Station of Metro Line 2



CEN104 Yan Shen, WenTao Tong

Title: An implementation of NIC controller integrated with security protection module

Abstract: In order to solve the disadvantages of traditional measures for the network security. Network security software consume a considerable amount of system resources, and dedicated security board or equipment has too much cost. This paper provide a new method of network security protection for personal users which is convenient and can overcome the disadvantages of common network security methods. A Gigabit Ethernet controller chip integrated with the security module is designed, and the security module is based on the state detection technology and misuse of intrusion detection technology. The test results on the FPGA show that the security network card controller designed in this paper occupies less system resources and has better security and protection performance. It can provide a low-cost hardware network security protect solution for individual and family users.

CEN110 Song Deng, XueKeXu, Fan Zhou, HaoJing Weng, Wen Luo

Title: General Parallel Execution Model for Large Matrix Workloads in Hadoop MapReduce Framework

Abstract: Large scale statistical computing is crucial for extracting useful information from huge amount of data for both large companies and research scientists. The solutions developed in the high performance community over the decades are more limited to high-end machines or clusters. The cost of maintaining such dedicated clusters are prohibiting, people start to look at cloud computing where we can rent a cluster by time and pay-as-we-go. In a cloud setting, system features including scalability and fault tolerance become important. In this paper, we proposed a simple and general parallel execution model for large matrix workloads. We implement the model in Hadoop MapReduce framework using map-only jobs. Because of the superiority of the model, experiments show that our Hadoop-based execution engine can reduce the execution time of matrix multiplication by half comparing with previous works.

CEN111 Tong Xu, Jiamin Huang, Mengyuan Zhanghu, Mengting Xu, Gao Li, Jun Steed Huang

Title: Sea Land Air Selabot Swarm Design Considerations

Abstract: To provide a platform that can change shape, status, and form for the rapid development of Artificial Intelligent, we describe a design concept of aeroamphibious unmanned boat-car-plane combination robot and its development plan. Considering the facts of the design contradictions among aerodynamics, hydromechanics, and powertrain, this design focuses on the land collaborative algorithm as well. We divided the design tasks into the aeroamphibious robot with sensor, action and communication parts. For the sensor module and communication, we prepare basic sensor and keep other sensor communication interfaces available. As the robot action, we choose roller wheel and proposed a three-mode transportation platform with only one engine. We follow open source strategy of both software and hardware to make the robot develop quick, upgradeable, expandable. We introduced a new multiple-party formula that was used to coordinate more than two moving platforms, which enable it meets both academic research and market development needs.

CEN112 Xiawei Cao, Lang Li, Xuanlan Xie

Title: Optimization and Security Implementation of ITUbee

Abstract: ITUbee is the lightweight encryption algorithm that was proposed by the second International Symposium on lightweight encryption security and privacy in 2013. It is based

on the Feistel network. We optimized S-box, round function and round constant addition. The optimized round constant is the variable which is converted from the related round number i . There is no need to allocate area resource for it. The experimental results show that the throughput of the optimized ITUbee algorithm reaches 364.695Mb/s. The area is reduced to 10650 Slices. We studied and implemented the masking ITUbee algorithm to resist power analysis attack. The implemented performance is also compared. The area of the masking ITUbee is increased by about 4%. The clock frequency is raised from 100.291MHz to 102.396MHz, throughput is increased from 364.695 Mb/s to 372.349 Mb/s.

CEN114 Hong-Wei Deng, Lang Li , Xiao-Man Liang

Title: Improved Hybrid Query Tree Anti-collision Algorithm

Abstract: An improved algorithm based on the hybrid query tree (HQT) algorithm is proposed in this work. Tags are categorized according to the combined information of the highest bit of collision and second-highest bit of collision. Then, these tags are used to decide the postponement of several delayed-response time slots, to diminish the collision probability. The performance analysis results show that this algorithm is superior to the query tree (QT) and HQT algorithms. It reduces the query time and system communication traffic and improves the tag identification efficiency.

CEN116 Zhifei Yang, Tianfeng Yan, Yifei Yang, Jinping Qi

Title: Research on GNSS positioning aided by SVR

Abstract: In order to solve the problem of the influence of the surrounding environment on GNSS signal leads to the loss of GNSS measurement. Introducing the least squares support vector regression LS-SVR and the monotonicity of geological short-term subsidence deformation, the model of f LS-SVR assisted GNSS positioning is established. To explain the model, a GNSS settlement monitoring experiment was adopted. Example analysis shows when GNSS monitoring points are seriously affected by the surrounding area, the LS-GNSS model can obtain more stable positioning results. It eliminates the serious positioning error under the GNSS unlock, achieves the positioning ability under the ideal environment, expands the use range of the GNSS positioning, and improves the positioning accuracy of the GNSS.

CEN119 Yixuan Wang, Zhifei Yang, Rui Gao, Jianhui Yang, Tianfeng Yan, Qinghua Hu

Title: Interference Emitter Localization based on Hyperbolic Passive Location in Spectrum Monitoring

Abstract: Interference signals can always be found during spectrum monitoring, which has a serious impact in the regular use of radio business[1]. Sometimes is difficult to shield it by suppress signal, so it becoming increasingly important to find the location of the interference emitter[2]. This paper proposed an effective technique in interference emitter localization based on intersections of hyperbolic curves defined by the time differences of arrival of a signal received at three monitoring stations. The approach is noniterative and gives an explicit solution. In the end, this paper token an field test based on the hardware platform, the final result is given.

CEN120 Tianfeng Yan, Yu Zhang

Title: TDOA Time Delay Estimation Algorithm Based on Cubic Spline Interpolation

Abstract: In order to solve the fence effect caused by the fixed number of sampling points in the passive time difference positioning system in practical applications, a TDOA time delay estimation algorithm based on cubic spline interpolation is proposed. The algorithm uses

cubic spline interpolation to interpolate the spectral peak curve of the cross-correlation function. While ensuring the stability and convergence, the spectral peak curve is smoother, the accuracy of the peak value is improved, and the accurate time delay estimation of the signal source is further obtained. The measured results show that the TDOA time delay estimation method based on cubic spline interpolation can solve the fence effect well and obtain the time delay estimation value accurately. This method can use the algorithm to improve the time delay estimation accuracy under the condition that the hardware sampling rate is fixed, thus reducing the dependence of passive time difference positioning on the system hardware.

CEN121 Tianfeng Yan,Fuxin Xu,Nan Wei,Zhifei Yang

Title: An Improved Cyclostationary Feature Detection Algorithm

Abstract: For the question of the limits for practical application in the actual problems about complicated calculation and time-consuming of cyclostationary feature detection in the spectrum detection process, this paper proposes a new improvement algorithm based on the spectrum correlation characteristics and test statistics of the cyclostationary detection, and deduced its detection probability and false alarm probability. The improved algorithm starts from the spectral correlation characteristics and proves that the cyclic spectrum is conjugate symmetry about the relevant axis, which reduces the computational complexity. Starting from the test statistics, after discarding the more complex correlation factors, the computation complexity and detection performance of the improved test statistics are analyzed. It is concluded that the complexity is obviously reduced and the performance loss is minimal after discarding the correlation factors. The simulation results show that the improved algorithm detection performance is slightly reduced, but the computational complexity is greatly reduced , which further satisfies the requirement of fast and accurate spectrum detection and has strong practicality.

CEN122 Jiangwei Bai,Yi Yang,Lian Li

Title: Research and Application of Improved Genetic Algorithm in Lanzhou Self-service Terminal Patrol System

Abstract: During the 2016-2017 period, Lanzhou government deployed 5000 self-service terminals throughout the city[1]. In order to ensure the normal operation of these devices, a patrol team of about 20 people was organized to check the operating status of the devices and repair the faulty every day. However, due to the wide distribution, and large quantity of devices and the frequent drainage of patrol personnel, the patrol task can not be completed scientifically and efficiently. Most employees arrange the patrol sequence of devices on rules of thumb so that the efficiency of the patrol work cannot be further improved. In this paper, we made three new improvements to the genetic algorithm, such as using Greedy Ideas to generate initial population , combining of superior group retains and roulette strategy and superior offspring to stop mutation. And we use the genetic algorithm to design the daily patrol path, ensuring that the patrol work of the devices can be conducted scientifically and efficiently.

CEN124 Jingyu Wang,Wei Li,Juan Li ,Shuwen Chen, Jinzhi Ran

Title: Modeling and Simulation of self-organized criticality of intelligent optical network based on sand pile model

Abstract: With the continuous development of optical communication technology, the structure of optical network is becoming more and more complex, and complex network theory can analyze the nature of the actual system. From the angle of self-organizing criticality, the "sand pile" model of intelligent optical network is constructed, the model parameters are designed, and the self-organized critical model of intelligent optical network is established. Finally, the computer algorithm is designed according to the model, and the critical value of the whole network load is solved. The research shows that there is a quantitative relationship between the critical value of network load and the number of the betweenness, which has a certain guiding significance for improving the processing ability of key nodes and optimizing the network security.

CEN125 Congliang Hu, Huaqing Wan, LiangLi

Title: The improved parallel ray casting algorithm in embedded multi-core DSP system

Abstract: An improved parallel ray casting algorithm in embedded multi-core DSP system is proposed in this paper. The algorithm takes advantage of the improved bounding volume hierarchy (BVH) technology to speed up the intersection process. In order to increase the computing efficiency, the ray casting algorithm is parallelized on TMS320C6678 of TI, where the code and Cache are also optimized. Moreover, considering load balancing in parallel processing, we dispatch the parallel stages to 8 cores, and master-slave mode is adopted to schedule assigned tasks reasonably. The experimental results verify that our method has a good performance and exceeds the results of OpenMP (Open Multiprocessing). This paper proposes a new method to run rendering algorithm on embedded platform efficiently. The rendering algorithm usually runs on GPU, due to GPU's powerful computing capability.

CEN126 Qing Guo, Ao Xiong

Title: Chinese News Keyword Extraction Algorithm Based on TextRank and Word-Sentence Collaboration

Abstract: TextRank always chooses frequent words as keywords of a text. However, some infrequent words may also be keywords. To solve the problem, a keyword extraction algorithm based on TextRank is proposed. The algorithm takes the importance of sentences into consideration and extracts keywords through word-sentence collaboration. Two text networks are built. One network's nodes are words where the diffusion of two words is defined to calculate the correlation between words. Another's nodes are sentences where BM25 algorithm is used to calculate the correlation between sentences. Then a sentence-word matrix is constructed to extract the keywords of a text. Experiments are conducted on the Chinese news corpus. Results show the proposed algorithm outperforms TextRank in Precision, Recall and F1-measure.

CEN127 Ji Ping

Title: Power Quality Disturbances Detection based on EMD

Abstract: The power quality (PQ) disturbance signals have the characteristics of short duration and strong randomness, and often form complex disturbances, which make the disturbance signals difficult to detect and identify. In this paper, EMD algorithm is introduced to decompose the PQ disturbance signals and calculate the intrinsic mode function (IMF) of the disturbance signals. Then, Hilbert transform are performed for each IMF to obtain the characteristic information of the disturbance signal. EMD transform is used to detect the type, duration, frequency and amplitude of PQ disturbances. To verify the effectiveness of the algorithm, several kinds of PQ disturbance signals are simulated with

transient harmonic, voltage interruption, voltage drop and voltage surge and complex disturbances. Experimental results show that the algorithm can accurately detect power quality interferences. This paper provides a new method for the detection of PQ disturbances and a new idea for the power management.

CEN129 Dongcheng Chen,Jingying Hu

Title: Adaptive Learning for Correlation Filter Object Tracking

Abstract: To solve the real-time quality and adaptive quality of traditional correlation algorithm. An adaptive correlation filter tracking algorithm is proposed. First, training the filter using machine learning, make the algorithm be adaptive to the object changing. Then, weighting the image patch with a cosine window, the object region has larger weighting value than the edge region, which ensures the continuity of the Cyclic matrix. At last calculate the response matrix using the convolution of the input image patch and the filter matrix in Fourier domain. Experiment on various videos shows that for 26pixel×24pixel object, filter the image in a 130pixel×120pixel patch, the processing speed could be 210fps. The proposed tracking algorithm can track object with good timing quality and robustly.

CEN131 Zhou Fang,Ding Feng,Ding Ran,Zhao Xin

Title: A Fault Injection Method for Resilient Information Service Cloud Environment based on Association Model

Abstract: Considering the problem of how to estimate the influence on resilience of faults, and how to accurately inject faults, a fault injection method for resilient information service cloud environment based on association model is proposed. Firstly, five types of faults are presented based on cloud environment architecture, including the computing resources fault, communication networks fault, cloud platform fault, data fault and service fault, in order to implement the cross-layer mixed faults injection. Secondly, a fault injection description model is built through by multiple attribute group method, including fault type, injection point, injection mode, injection parameters and so on. Then, the "task-resource-failure" association model is proposed according to generate two relationships on "task-resource" and "resource-failure", in order to guidance the selection of fault injection objects. Finally, a large sample of resilient capability assessment experiments were repeated to summarize the fault injection rules , in order to support the selection of injected object and fault type setting.

CEN132 Le Cheng,Li-ping Zheng,Hai-bo Wang,Yan-hong Song,Ji-hong Gao

Title: A New Balanced Greedy Snake Algorithm

Abstract: The existing greedy snake algorithm (GSA) suffers from some problems, such as three forces are unbalance and the extracting contour on concave region is unsatisfactory. This paper presents an algorithm, called balanced greedy snake algorithm (BGSA), for solving objective contour extraction problem. BGSA is compose of continuity force, curvature force and image force, which is similar to the origin GSA. Whereas, BGSA improved the computing rule of GSA to balance the influence of above three forces. Especially, BGSA can process the image with concave region well. The results of experiment show that BGSA is efficient and outperform the existing GSA.

CEN133 XueSong Jiang,DongWang Li,XiuMei Wei,Jian Wang

Title: MOPSO-Based Research on Manufacturing Process Optimization in Process Industry

Abstract: To deal with the conflict between multiple targets involved in the manufacturing process of the process industry, multi-objective particle swarm optimization (MOPSO) is used

to solve the optimization problem among multiple objectives. Basing on the manufacturing process analysis of the process industry and with the background of the cement manufacturing process of a process industry, two objective functions, which are the total processing cost and the integrated error of the mineral content in the cement compared to the standard, are established, and the concrete realization process of algorithm is given. The results of the example analysis show that when using the results by means of MOPSO algorithm to guide the production, it not only can improve the product performance index, but also can reduce the cost required as much as possible with the same performance indicators. Therefore, it is feasible to use the MOPSO algorithm to optimize the multi-objectives involved in the manufacturing process.

CEN134 MaoYing Wu,Qin Lu

Title: QoS-PN ontology model for service selection

Abstract: In order to solve the existing QoS (Quality of Service) model lack of descriptions on the dynamic changes of attributes as well as user personalization QoS-PN, a new ontology model for QoS, is presented to provide users with a sharable and unified service quality description framework. By introducing UserPersonalise class and Status class. The QoS-PN model can rationally describe user's personalized requirements and dynamic changes of attributes, which solve the problem of service reliability and service personalization requirement. QoS-PN is described as three-layer ontology model: QoS configuration layer, QoS attribute layer, and QoS metric layer. QoS-PN can describe detailed information related to QoS attributes, metric methods, QoS attribute values, and units for the QoS, which improve the accuracy of service matching. An example of travel route inquiry is presented to show the feasibility of the QoS-PN model. Empirical results show that this model supports rich semantic description and has strong extensibility. The stability and accuracy of selected service are effectively improved when QoS-PN model is used to describing QoS information. The QoS-PN enhance descriptive ability for QoS information and the description of dynamic Attribute and personalization has been expanded. The problem of QoS stability and user personalization in service selection is solved.

CEN135 Tilei Gao,Tong Li,Rui Zhu,Rong Jiang,Ming Yang

Title: A Research about a Conflict-Capture Method in Software Evolution

Abstract: Software evolution is an important research direction and research focus in the field of software engineering. During the process of software dynamic evolution, the existence of conflicts between evolutionary components and original components is one of the key factors determining whether the dynamic evolution process is corrected or not. To solve this problem, resource management method is introduced and the concept of resource in software evolution process is redefined. According to the different patterns of resources used, sequence, selection and conflict relationship models among components are defined. And at last, a conflict-capture algorithm, which is used to capturing the components involved in the conflict relationships, based on recourse management. The results of this paper lay a theoretical foundation for maintaining consistency before and after evolution and ensuring the correctness of dynamic evolution.

CEN136 Ge Jiao,Lang Li ,Yi Zou

Title: An Optimized AES Masking Method for Resisting Side Channel Analysis

Abstract: In order to against the side channel analysis attack such as power, electromagnetic waves, and time attack, an optimized masking method is proposed for Advanced Encryption

Standard (AES) algorithm in this paper. This scheme adopts random hamming distance mask and offset randomization strategy in the first two rounds, the last round and two rounds randomly selected in the middle of the AES algorithm to ensure the security of each intermediate value. The scheme then adopts fixed-value mask strategy in the five rounds in the middle, which can reduce the time and space consumption to recalculate S box, improve the efficiency of the algorithm and reduce the production cost. To compare with other defence methods, we build a power analysis platform and conduct extensive experiments. The experimental results show that our optimized AES masking method is more secure than the compared methods, and it is able to resist second-order correlation power analysis (CPA) attacks.

CEN141 Leilei Yin, Yanchen Liu, Ziran Shen, YiJin Li

Title: A Technique to Predict Software Change Propagation

Abstract: Software change can occur frequently and it is inevitable in the lifecycle of software development. It can cause tremendous impact on software engineering including cycle, cost, workload, etc. This work proposes an advanced technique to assess the software changeability on the class level. From the perspective of member variable and function, mutual relations between classes are introduced to record the change likelihood and impact. Change propagation model between classes is developed to transform the change impact and the total impact is calculated to analyse the class changeability. Based on the analysis results, class changes with high risk should be avoided and those with low change risk should be given priority in the software change process. Finally, a simplified software system is applied for the initial evaluation of the method.

CEN142 Haifeng Wang, Yunpeng Cao

Title: Task Scheduling of GPU Cluster for Large-scale Data Process with Temperature constraint

Abstract: With the development of GPU general-purpose computing, GPU heterogeneous cluster has become a widely used parallel processing solution for Large-scale data. Considering temperature management and controlling becomes a new research topic in high-performance computing field. A novel task scheduling model for GPU cluster with temperature limitation was built to balance the heat distribution and prevent the temperature hotspots occur. The scheduling index was introduced by combining the utilization of GPU and temperature. And the state matrix was designed to monitor the GPU cluster and provided status information for scheduler. When the temperature exceeds specific threshold value, the scheduler can improve the speed of fans to reduce the temperature. The experimental results show that the proposed scheduler can balance the heat distribution and prevent the temperature hotspots. Compared with the benchmark scheduling model, the loss of scheduling performance is in the acceptable range.

CEN143 Jinsuo Liu, Gaofeng Zhao, Jiawei Wu, Wei Jia, Ying Zhang

Title: Unified Management Platform of Quantum and Classical Keys in Power Communication System

Abstract: With the advancement of quantum communication infrastructure, especially the completion of the “Quantum Beijing-Shanghai Trunk Line” and the launch of the Mozi quantum satellite, more and more industries have begun to incorporate quantum cryptography into business systems. However, it brought trouble to the key management of the original

business system. In this paper, in order to solve problem of managing quantum and classical keys, an unified management architecture of quantum and classical keys is designed, which contains four key components: power vertical encryption & authentication gateway, classic encryption device, QKD device, and unified key management center. All of these four components cooperate with each other to form a complete and efficient integrated key management system, which effectively solves the problem that the current power system cannot realize the quantum key management.

CEN145 Tieming Chen,Guangyuan Fu,Hongqiao Wang,Yuan Li

Title: Research on Influence of Image Preprocessing on Handwritten Number Recognition Accuracy

Abstract: In the process of handwritten number recognition, image pretreatment is a key step that has a great influence on the recognition accuracy. By unifying the standard, handwritten digital images are normalized, which can improve the adaptability of handwritten digital recognition algorithms to different writing habits. This article mainly considers the four characteristics of the angle, position, size and strength when writing characters, and how these factors influence four classical handwritten recognition algorithms. According to the four characteristics, tilt correction, offset correction, size normalization and thinning preprocessing were performed one by one to observe the changes of recognition accuracy in four classical algorithms. Through experiments, it is found that the recognition accuracy of the original data set and the scrambling data set are both greatly improved after preprocessing operation. In conclusion, it is essential to increase the recognition accuracy by image preprocessing in handwritten digital recognition.

CEN146 Rui Gao,Yanan Zhao,Yixuan Wang,Tianfeng Yan,Qinghua Hu

Title: An Improved Propagation Prediction Model Based on Okumura-Hata Model

Abstract: The explosive growth of wireless communications imposes severe challenges for radio spectrum usage and policy. In the complex electromagnetic environment, precise spectrum availability estimation and simulation are playing a more and more important role in economic development. Okumura-Hata model is one of the most popular empirical model for predicting macrocell path-loss in a general flat terrain, but poor in the mountainous terrain. This paper proposed an improved propagation prediction model based on the Okumura-Hata model, considering the effect of ductile diffraction in the hilly terrain environment. In order to verify the effectiveness of improved propagation prediction model, a comparative experiment is designed. The results of simulation analysis show that this improved propagation prediction model has high accuracy result in mountains terrain environment.

CEN147 Yu Huang,Lida Zhu,Han Tan,Fang Tian,Fang Zheng

Title: Predicting Drug-Target on Heterogeneous Network with Co-rank

Abstract: Heterogeneous network can bring more information compare with homogeneous network, so it has been extensively employed in many research field. In this research, we use Co-rank frame to predict the heterogeneous network of drug targets. First, we construct separate networks according the drug and target data information, and then merge these networks with the bipartite graph network. We have designed an Intra-network RWR and an Inter-network RWR to combine the heterogeneous network of drug and target. We compared our algorithm to the RWR and the ROC and Recall curves of the algorithm are all superior to the RWR.

CEN149 Yingchu Liu, Jinsha Yuan, Zhixiong Chen, Ran Liu, Xincheng Tian

Title: A Improved Algorithm of MAC Layer for Wireless and Power Line Cooperative Communication

Abstract: Power Line Communication (PLC) and Wireless Communication (WLC) are the popular research directions in the field of communication in the future. The concept of cooperative communication between the power line and wireless has been proposed. However, the current researches focus mainly on the physical layer, and the MAC layer is rarely researched. Therefore, this paper proposes a new CSMA/CA algorithm-W/P-CSMA (Wireless/Power Line alternative communication of CSMA/CA). It combines the advantages of PLC and WLC and formulates a new algorithm to make frames well transmitted in power line and wireless. Then through the MATLAB simulation, we study the key indicators. From the analysis of results, alternative communications have significantly improved time delay and throughput compared with PLC.

CEN150 Chaochao Liu, Wenjun Wang, Carlo Vittorio Cannistraci, Xin Wang, Di Jin

Title: Layer Clustering-Enhanced Stochastic Block Model for Community Detection in Multiplex Networks

Abstract: Nowadays, multiplex data are often collected, and the study of multiplex-network(MN)s' community detection is a cutting-edge topic. multiplex-network(MN) layers can be grouped by clustering, and there are correlations between network layers that are assigned to the same cluster. Although the differences between network layers entail that the node community membership can differ across the layers, Stochastic-Block-Models (SBM)-based MN-community-detection methods current available are theoretically constrained to assume the same node community membership across the layers. Here, we propose a new SBM-based MN-community-detection algorithm, which surpasses this theoretical constraint by exploiting a two-stage procedure. Numerical experiments show that the proposed algorithm can be more accurate and robust than multilayer-Louvain algorithm, and may help to contain some inference issues of classical monolayer SBM. Finally, results on two real-world datasets suggest that our algorithm can mine meaningful relationships between network layers.

CEN152 Xue Chen, Wenjun Wang, Wei Yu, Bin Hu, Pengfei Jiao

Title: Integrating Latent Feature Model and Kernel Function for Link Prediction in Bipartite Networks

Abstract: Link prediction aims to infer unobserved links or predict future links from observed network structure. In recent years, most studies of link prediction mainly focus on monopartite networks. However, a variety of complex systems in real-world should be abstractly represented as bipartite networks, in which there are two types of nodes and no links connect nodes of the same type. In this paper, we propose Kernel-based Latent Feature Models (KLFM) framework which can extract more useful features hidden in the original network through some kernel-based nonlinear mappings. We also develop a kernel-based iterative scheme to solve the objective function. Extensive experiments on eight disparate real-world bipartite networks demonstrate that the KLFM framework achieves a more robust and explicable performance in comparison with the state-of-art methods.

CEN153 Yijie Wang, Songlin Ge

Title: An Improved ORB Image Matching Algorithm Based on Compressed Sensing

Abstract: Aiming at the problems such as large amount of computation, high complexity and slow speed in feature extraction of the existing algorithms, this paper presents an improved ORB image matching algorithm based on compressed sensing. Firstly, compressed sensing is used to compress the target image and the matched image, and obtain sparse matrices of

wavelet coefficient respectively. Secondly, the ORB algorithm is used to extract the feature points of the image. Finally, the KNN algorithm is used as a matching strategy to perform image matching. Experimental results demonstrate that the algorithm realizes fast image matching, overcomes the shortcomings of heavy computation efficiently and low efficiency in the process of extracting image features, and guarantees matching accuracy, which meets the real-time requirement. This algorithm can be used in the field of image matching and image process.

CEN156 Hongling Wang, Yueshun He, Ping Du

Title: Clustering Ensemble for Categorical Geological Text Based on Diversity and Quality

Abstract: Clustering analysis for geological text makes the navigation, retrieval or extraction of geological text more effectively. Clustering ensemble can be employed to obtain more robust clustering results. However, most generation approaches focus on the diversity of clustering members rather than their quality. Too much emphasis on the diversity of clustering members reduces the accuracy of clustering results. In order to solve the problem, a new generation method of clustering members is proposed in this paper. Hierarchical clustering algorithm and k-means algorithm alternately combined with random projection method are employed to generate diverse base members and a new selection strategy for the number of clusters is presented to improve the quality of clustering members. Furthermore, a clustering ensemble framework for geological text is constructed. The framework involves geological text preprocessing, geological text feature representation, clustering members generation and ensemble integration. Experimental results on two UCI datasets and one real-world geological text demonstrate that the clustering ensemble based on diversity and quality is superior to those clustering ensemble algorithms that only consider the diversity of clustering members.

CEN157 Shuwei Lei, Jiang Wu, Jin Liu

Title: A Collaborative Filtering Algorithm for Hierarchical Filtering of Neighbors Based on Users' Interest

Abstract: In order to alleviate the sparsity of rating data and single rating similarity, from the perspective of optimizing similarity, this paper proposes a collaborative filtering algorithm for filtering neighbors hierarchically based on user interest (HFNCF). Firstly, this paper adopts the user's rating number and rating size of each category to calculate user interest, and then improved similarity calculation, and join the interest coincidence degree factor to find similar users with the same interest of the target user, then find similar users with the target user having the largest interest cross-domain, and obtain the neighbor candidate set. Secondly, this paper considers the relative time changes between user ratings and adding time factors to improve the similarity of ratings to select the final similar neighbors. Finally, the comprehensive similarity is obtained by combining the two similarities, so that the target user's ratings are predicted based on the rating of the final similar neighbors, and generate recommendations by the rating. Experimental proof, the algorithm proposed in this research achieves a lower MAE on MovieLens dataset compared to the traditional algorithm. Therefore, the HFNCF algorithm effectively selects neighbors, and improves the recommendation quality and accuracy.

CEN158 Jiyang Ruan,Zhili Wang

Title: An Improved Algorithm for Dense Object Detection Based on YOLO

Abstract: The YOLO v3 (you only look once) algorithm based on CNN (convolutional neural network) is currently the state-of-the-art algorithm that achieves the best performance in real-time object detection. However, this algorithm still has the problem of large detection errors in dense object scenes. This paper analyses the reason for the large error, and proposes an improved algorithm by optimizing confidence adjustment strategy for overlapping boxes and using dynamic overlap threshold setting. Experiments show that the improved algorithm has better performance in dense scenes while has little difference in other scenarios compared to the original algorithm.

CEN163 Qifei Liu,Yanhui Du,Tianliang Lu

Title: User Identity Linkage across Social Networks

Abstract: In order to distinguish the accounts that belong to the same person, we propose a method to link user identity across social networks based on user profile and relation. According to similarity calculation algorithms and network embedding, a feature extraction method in multi dimension was designed based on username, location, personal description, avatar and relation. Then a hierarchical cascaded machine learning model(HCML) is proposed to integrate the classifiers in different dimension. The experiment validates that the method in this paper outperforms feature extraction in single dimension, traditional machine learning algorithm and weighting algorithm. The method can be applied to integrate user information across social networks.

CEN164 Wenzhe Zhang,Wenwei Tao,Yang Su,Song Liu,Zhaohui Hu

Title: A power network illegal access monitoring method based on random forests

Abstract: With the development of network technology, people have begun to pay more and more attention to the impact of illegal access on the power network, and have tried to take measures to monitor whether the power network is illegally accessed. People try to use machine learning to monitor the power network. Because of the high classification accuracy and high efficiency of the random forest algorithm, we proposed a random forest-based power network monitoring algorithm. Comparison experiments with other algorithms have proved that our algorithm is more superior both in terms of time consumption and accuracy.

CEN165 Yanzhou Chen,Qi Wang,Meng Sun,Peng Chen,Zhizhong Qiao,Zhangguo Chen

Title: Automatic Security Baseline Verification Method Based on SCAP and Cloud Scanning

Abstract: With the development of power networks, automated verification of security baselines has become increasingly important. Traditional verification methods have disadvantages such as low efficiency, inability to centralize management, and difficulty in maintaining and upgrading. In this paper, we proposed a method of automatically checking the security baseline based on the security baseline model and using the SCAP standard combined with efficient Cloud scanning technology. Our method not only improves efficiency, but also facilitates centralized management and maintenance of upgrades.

CEN166 Haizhu Wang,Chao Hu,Yue Chen,Bo Zhou,Zhangguo Chen

Title: Time-series based ensemble forecasting algorithm for out-limit detection on stable section of power network

Abstract: With the development of power company network technology, out-limit forecast of grid stable section is an important point of grid operation and control. However, due to the

large amount of grid stable section data in power grid, traditional single classic forecasting algorithms are difficult to predict efficiently and accurately. In order to solve this problem, we proposed a time-series based ensemble forecasting algorithm (TSEFA) for out-limit detection on grid stable section which integrates multiple classification forecasting algorithms to classify and predict the collected grid stable section data, and then to realize the forecasting of the out-limit quantity with comprehensive optimal accuracy. Compared with the other four single-model algorithms (i.e., SWAF, RA, ANN, SVM), our TSEFA algorithm achieves the effect of efficient and accurate forecasting, and enhances the security and stability of the grid stable section analysis platform.

CEN167 Bo He, An Zhou, Chao Hu, Duan Liang, Zhizhong Qiao, Zhangguo Chen

Title: Research and Design of Mobile Storage Monitoring Based on File Filter Driver

Abstract: In order to deal with the problem that the confidential information in the intranet is easily leaked, the method based on file filter driver is used for mobile storage monitoring to solve such problem. Through the close relationship between the file filter driver and other components of the operating system, we expound the principle of file filter driver. Except that, we discuss about the reason why the file filter driver is applied to the control of mobile storage device. Besides, the file filter technology related to this is elaborated. On this basis, we probably design a mobile storage monitoring system based on file filter driver.

CEN168 Meili Zhao, Guoquan Xiong, Jianghui Fu, meizhu Jiang, Hongling Wang

Title: Research on Multistage Forwarding of Media Stream

Abstract: In order to make full use of existing video monitoring systems, one urgent task of the network operation and management is to establish the provincial networking video monitoring system currently. According to the actual demand of the expressway management project in sichuan Province as the background, based on the Video network monitoring platform, we design a parallel to the administrative structure of the media flow in multistage forwarding mechanism, multi-level and multi-domain resource access, and design the media stream and control flow between stages. With the design idea to realize the centralized monitoring, distributed management, realize the sharing of video resources in different jurisdictions. The results of this research have been successfully applied in sichuan Province, and have achieved remarkable results.

CEN169 Shengyu You, Shengqing Liu, Hongling Wang

Title: Improvement of Wireless Positioning Algorithm Based on TOA

Abstract: With the development of Internet of Things (IoT) and Internet of Everything (IoE) technology and continuous promotion of industrialization, wireless positioning technology is playing an increasingly important role in the intelligent field. The location services of the high precision, high coverage and low energy overhead is a hot research issues. This paper studies the time of arrival (TOA) positioning algorithm for wireless positioning technology. To deal with the problem of the positioning accuracy decreased while the of TOA algorithm is reduced in NLOS measurement, an improved TOA algorithm is proposed. Through MatLab simulation experiment, the simulation results confirm the feasibility and effectiveness of the improved algorithm.

CEN171 Shaobing Wu, Changmei Wang, Haoshun Cao, Xueming Jia

Title: Crime Prediction using Data Mining and Machine Learning

Abstract: In order to predict the crime in YD county, data mining and machine learning are used in this paper. The aim of the study is to show the pattern and rate of crime in YD county based on the data collected and to show the relationships that exist among the various crime types and crime Variable. Analyzing this data set can provide insight on crime activities within YD county. By introducing formula and methods of Bayesian network, random tree and neural network in machine learning and big data, to analyze the crime rules from the collected data. According to the statistics released by the YD county From 2012-09-01 to 2015-07-21, The crime of smuggling, selling, transporting and manufacturing drugs, Theft, Intentional injury, Illegal business crime, Illegal possession of drugs, Rape, Crime of fraud, Gang fighting, manslaughter, Robbery made the top ten list of crime types with high number of crimes. The crime rate of drugs was the highest, reaching 46.86%, farmers are the majority, accounting for 97.07%. people under the age of 35 are the subject of crime. Males accounted for 90.17 % of crimes committed, while females accounted for 9.83 %. For ethnic groups, the top five were han, yi, wa, dai and lang, accounting for 68.43%, 23.43%, 1.88%, 1.67% and 1.25% respectively. By adopting random forest, Bayesian networks, and neural network methods, we obtained the decision rules for criminal variables. By comparison, the classification effect of Random Trees is better than that of Neural Networks and Bayesian Networks. We observe the Random Trees algorithm to be very effective and accurate in predicting the crime data based on the collected data for the three algorithms. The relatively poor performance of the Bayesian Networks algorithm could be attributed to a certain factor of randomness in the various crimes and the associated features (exhibits a low correlation coefficient among the three algorithms).

CEN172 Ran Liu, Jinsha Yuan, Zhixiong Chen, Yingchu Liu, Dongsheng Han, Yihe Guo

Title: Research on the MAC Layer Performance of Wireless and Power Line Parallel Communication

Abstract: Wireless technology is dominant in residential and enterprise networks and it offers mobility and attractive data-rates. Power Line Communication (PLC) is becoming popular in home networks. The main advantages of PLC is the no-new-wires connectivity and the high density of electrical plugs in any residential or enterprise environment. The MAC layer, as one of the keep foundations of networks, is important to improve the overall performance of the communications system. However, previous research mainly focused on power line or wireless MAC layer and few studies MAC layer for power line and wireless parallel communication. Therefore this paper investigates a parallel MAC protocol for the hybrid PLC-Wireless network based on the carrier sense multiple access with collision avoidance (CSMA/CA) mechanism and we verify its performance via simulation.

CEN174 Zhuo Zhang, Jia Liu, Guangyuan Fu, Wenyu Fu

Title: Generative Information Hiding Method Based on Adversarial Networks

Abstract: Traditional Steganography need to modify the carrier image to hide information, which will leave traces of rewriting, then eventually be perceived by the enemy. In this paper, an information hiding scheme based on Auxiliary Classifier Generative Adversarial Networks (AC-GANs) model is proposed for Steganography. This method designs and trains the networks model based on AC-GANs by constructing a dedicated dictionary and image database. The sender can map the secret information into the category labels through the

dictionary, and then use the labels generate the real looking images to be sent through the model. On the contrary, the receiver can identify the image label through the model and obtain the secret information. Through experiments, the feasibility of this method is verified and the reliability of the algorithm is analyzed. This method transmits secret messages by generating images without overwriting the carrier images. It can effectively solve the problem of modification of carrier images in traditional information hiding.

CEN175 Yinuo Zhang, Subin Shen, Zhenyu Wu

Title: Improve Link Prediction Accuracy with Node Attribute Similarities

Abstract: Link prediction is one of the significant research problems in social networks analysis. Most previous works in this area neglect attribute similarity of the node pair which can easily obtain from real world dataset. Traditional supervised learning methods study the link prediction problem as a binary classification problem, where features are extracted from topology of the network. In this paper, we propose a similarity index called Attribute Proximity. The set of features are similarity index we proposed and four others well-known neighbourhood based features. We then apply a supervised learning based temporal link prediction framework on DBLP dataset and examine whether attribute similarity feature can improve the performance of the link prediction. In our experiments, the AUC performance is better when attribute similarity feature is considered.

CEN177 Guoqiang Li, Yifeng Cui, Haifeng Wang, Shunbo Hu, Li Liu

Title: Web Services Tagging Method based on Weighted Textual Matrix Factorization

Abstract: Web services are important technique basis of the Service-oriented Architecture. Services discovery is the prior to use the services which are published on the internet accurately. Tagging technique is widely used to assist the searching of service currently. To solve the time-consuming and error-prone problem in manual tagging, we propose a novel automatic approach to tag web services in this paper. There are two steps consisting of WSDL(Web Services Description Language) documents extracting and tag recommendation using the weighted textual matrix factorization. Experiments on real dataset are conducted and the results prove that our approach is effective.

CEN179 Huihong Lan, Jinde Huang

Title: The Cross-Language Query Expansion Algorithm Based on Hybrid Clustering

Abstract: To propose a cross-language query expansion algorithm based on hybrid clustering aiming at problems such as theme shift, word mismatch, translation ambiguity and polysemy etc in the cross-language information retrieval. The HPH-CLQE for cross-language query expansion is put forward by combining advantages of partition clustering and hierarchical clustering. This algorithm can achieve a good clustering effect by avoiding selection of the initial cluster center and cluster number. Then, the CLQE-HPH based on hybrid clustering is presented. This algorithm applies HPH-CLQE to conduct clustering analysis on top documents selected at the initial cross-language retrieval aiming to obtain the expansion word that is highly relevant with user query to achieve the cross-language query post-translation expansion. The experimental results based on NTCIR-5 CLIR data set indicate that MAP, P@5 and P@10 related to the algorithm proposed in this paper get improved greatly with the maximal increase of 20.52% by comparing with three standard algorithms. This algorithm can reduce problems such as theme shift and word mismatch etc in the cross-language information retrieval effectively and improve the cross-language information retrieval performance.

CEN180 Shuaishuai Yao,Xuesong Jiang,Xiumei Wei

Title: A model for job-shop scheduling based on NN-PSO technique

Abstract: Job-shop scheduling problem(JSP) has been one of the NP-Hard problems.Now, the most advanced algorithm is only limited to solve small scale problems effectively. For large-scale and super large scale job-shop scheduling problem, there is still no effective way to find its optimal solution quickly.In recent years, it is the main trend to solve the problem of job-shop scheduling with the combination of neural network and generic algorithms(GA).However, there will be complex operations such as crossover and mutation, and slow convergence or even stop convergence when approaching the optimal solution with GA. As an alternative, in this paper,we proposed a model for job-shop scheduling based on NN-PSO technique—neural network trained by the particle swarm optimization algorithm ,which is simple, less parameter and easy to implement, greatly accelerates the convergence speed.Experiments show that job-shop scheduling based on NN-PSO technique is superior to most traditional scheduling rules.

CEN181 Bo Wang,Lihong Wang,Weiling Chang,Jie Xu

Title: Incentive Cooperation Enforcement Based on Overlapping Coalition Formation Game Framework for Ad Hoc Networks

Abstract: Cooperation in ad hoc networks is one of the research hotspots to encourage cooperative forwarding among selfish nodes. In this paper, we formulate the problem as an overlapping coalition formation game. In this game, each node can freely decide to participate in one or more cooperative coalitions simultaneously, so as to maximize its utility for its cooperation. Then, we propose a distributed coalition formation algorithm (OCF) using three rules for the different choices for each node to find a stable coalition structure. At last, we verify the performance of OCF algorithm through extensive simulation. Simulation results show that the OCF algorithm achieves a better performance than the non-cooperative scheme based on AODV and the classical algorithms for coalitional games with disjoint coalition formation (DCF), in terms of packet delivery ratio, average end-to-end delay and total payoff of all the nodes.

CEN183 Dezhuang Meng, Jianbo Liu, Shuangquan Ge, Xiaoling Wang, Hao Tang

Title: Research on Simulation System for Ship Transport Operation Based on HLA

Abstract: The cabin of a certain type of ship is loaded with various types of weapons and its supporting equipment. Therefore, various factors such as space between equipment and environmental constraints must be considered in the design of transport operation scheme. Aiming at solving the problem of shortage of computing resources, Multi-angle battle positions and joined semi-physical simulation, a distributed simulation method based on HLA(High Level Architecture) is proposed. The federal members (nodes) are divided according to calculation and functions. Method to test delay time of communication between nodes is studied,and communication mechanism between nodes is developed. The results showed that the method can meet design requirements of the scheme and improve the expansibility and maintainability of the system. The system has been successfully applied to the design of a certain type of ship. Compared with the traditional method, the system can improve design efficiency of transport operation scheme and reusability of the simulation resources.

CEN184 Yanqin Mao,JiaYan Mao,Zhenyu Wu,Subin Shen

Title: A Data Acquisition and Processing Scheme Based on Edge Calculation

Abstract: In order to reduce network load and network latency of centralized server in smart home system, optimization method of data acquisition and application framework based on environment intelligence are proposed. Data acquisition and processing scheme based on edge calculation is designed and implemented. Empirical results show that optimizing the data acquisition and application framework will help improve the efficiency of data acquisition. Data acquisition and processing scheme based on edge calculation can effectively reduce network communications.

CEN186 Qingtao Zeng,Kai Xie,Yeli Li,Xinxin Guan,Chufeng Zhou,Shaoping MA

Title: Publication topic selection algorithm based on association analysis

Abstract: In the process of traditional education publishing, publication topic selection is completed by subjective experience of editorial team, which is difficult for editorial team to take into account complex factors such as needs of readers, knowledge update and market change. A large number of teaching materials are unsalable and publications can hardly meet actual needs of reader and market. Theme and content of traditional textbooks are lagging behind, which are difficult to meet the needs of today's education development. To solve these problems, this paper focuses on Publication topic selection algorithm based on association analysis. First of all, an algorithm for automatically acquiring data and information from web pages is designed. Then, this paper designs similarity degree calculation method, score prediction algorithm and prediction score updating algorithm. Finally, effectiveness of the algorithm is verified by experiments.

CEN187 Zhiming Zhong,Jie Wang,Chao Hu,Yue Chen,Tianming Huang

Title: An automatic discovery method based on SNMP and C4.5 in cross-regional interconnected power system

Abstract: Cross-regional interconnection connects the power system with the management information system, or with the Internet, and undermines the properties of the power monitoring system and the external network. Exposing the core assets of the power system originally deployed in the isolated environment to the external network brings great risks to the safe and stable operation of the system. In view of the seriousness of hidden information security risks in cross-region interconnections, this paper proposes an automatic discovery method based on SNMP and C4.5 algorithm for cross-regional interconnection of power systems. It mainly studies system network connection conditions. Based on the system's all equipment, it fully perceives the network connection of each device in the system, and finally realizes the automatic discovery and early warning of the inter-area interconnection of the system.

CEN189 Fan Yang,Yang Liu,Han Wei

Title: Image-based human protein subcellular location prediction using local tetra patterns descriptor

Abstract: Protein subcellular location has a huge positive influence on understanding protein function. In the past decades, many image-based automated approaches have been published for predicting protein subcellular location. However, in the reported literatures, there is a common deficiency for diverse prediction models in capturing local information of interest region of image. It motivates us to propose a novel approach by employing local feature

descriptor named the Local Tetra Patterns (LTrP). In this paper, local features together with global features were fed to support vector machine to train chain classifiers, which can deal with multi-label datasets by using problem transformation pattern. To verify the validity of our approach, three different experiments were conducted based on the same benchmark dataset. The results show that the performance of the classification with LTrP descriptor not only captured more local information in interest region of images but also contributed to the improvement of prediction precision since the LTrP encodes the local descriptor using the relationship between a reference pixel and its surrounding neighbors along horizontal and vertical directions. By applying the new approach, a more accurate classifier of protein subcellular location can be modeled, which is crucial to screen cancer biomarkers and research pathology mechanisms.

CEN191 Tianqi Yang, Yifei Hu

Title: Gait Recognition on Features Fusion Using Kinect

Abstract: The paper proposes a gait recognition method which is about multi-features fusion using Kinect. The data of 3D skeletal coordinates is obtained by Kinect, and the multi-features are as follows. Firstly, the human skeletal structure is treated as a rod-shaped skeletal model, and it can be simple and convenient to reflect the static characteristics of structure of the human body from the overall. Secondly, the angle of the hip joint is observed during walking so that the dynamic characteristics of the gait information are reflected from the local area. Thirdly, the key gait body postures features are selected from a special gait to reflect the characteristics of walking. Then, the three gait features information is fused, which improves the overall recognition rate. After removing the noise from the bone data, in order to fully reflect the uniqueness of the individual, gait features are extracted from multiple angles, including both static and dynamic features. For finding the center of mass, the distance from the center of mass to the main joint point are calculated to measure the change in the center of mass, and the characteristics of hip joints reflecting the changes of the lower extremity joints while walking. The paper classify each feature separately by using the Dynamic Time Warping (DTW) and K-Nearest Neighbor (KNN) algorithm, which is used at the decision level. The experimental results show that the proposed method achieves a better recognition rate and has a good robustness.

CEN195 Lu Liu, Zhiqian Wang

Title: Research on Cold-start Problem in User Based Collaborative Filtering Algorithm

Abstract: In order to solve the cold-start problem existing in traditional user based collaborative filtering algorithm, we propose a novel user clustering based algorithm, which firstly prefills user-item rating matrix, and then considers user characteristics as well as ratings when computing user similarities, and applies optimized k-means algorithm to cluster users. MovieLens is used as the test dataset. It is proved that the algorithm proposed in this paper can solve the cold-start problem and improve the accuracy of recommendation to some extent.

CEN197 Yingying Gai, Enxiao Liu, Yan Zhou, Shengguang Qin

Title: Automatic Retrieval of Water Chlorophyll-a Concentration based on Push Broom Images

Abstract: In order to fill the domestic blank in automatic retrieval of water Chlorophyll-a concentration using push broom images, an automatic retrieval system of Chlorophyll-a

concentration based on push broom images was designed and implemented on ENVI redevelopment platform in this paper. An airborne push broom hyper-spectrometer called Pika L with high spectral and spatial resolutions provides hardware support for retrieving more accurate and real-time Chlorophyll-a concentration. According to the characteristics of Pika L images, the automatic retrieval system mainly includes geometric correction and mosaicking, radiometric calibration, atmospheric correction and Chlorophyll-a concentration retrieval. The results show that the automatic processing of Pika L push broom images based on the ENVI redevelopment is a feasible technical solution and it provides technical support for automatic and real-time retrieval of water Chlorophyll-a concentration.

CEN198 Ming Deng, Yi Gong, Lin Deng, Zezhou Wang

Title: Research on Controllability in Failure-Recovery Process of Dynamic Networks

Abstract: The recovery model of complex networks is an important method to research the robust performance of the network. When a complex network dynamic failure occurs, the stability of its controllability measure is a prerequisite for ensuring full control of the network and failure network reconfiguration. In order to explore the trend of the controllability measure of the dynamic failure network model and the correlation between the parameters and the network controllability. This paper introduces the recovery model proposed by Majdandzic. Based on this model, the simulation model of spontaneous failure-recovery dynamic for the node was proposed by using the dynamic recovery mechanism. And the dynamic change process of the structure controllability in the dynamic recovery model under different parameters is analyzed. The simulation results show that when the network node has a spontaneous failure-recovery dynamic, its controllability measure has a significant phase transition phenomenon, and the position of the phase transition point shows a different trend with the probability of recovery, the activity threshold and the adjustment of network average degree.

CEN199 Zhili Chen, Huarui Wu, Huaji Zhu, Yisheng Miao

Title: Distributed Anomaly Detection Method in Wireless Sensor Networks based on Temporal-spatial QSSVM

Abstract: In Wireless Sensor Networks (WSNs), abnormal sensing data is easily generated due to factors such as the harsh working environment, sensor faults and external events. In order to improve the detection rate of abnormal data, reduce the false positive rate and the communication overhead, we propose a distributed anomaly detection method using one-class quarter-sphere support vector machine (QSSVM) based on temporal-spatial fusion in WSNs. Firstly, according to the synthetic data, the temporal-spatial QSSVM model is trained to determine the relevant parameters. Secondly, the trained QSSVM model is used to classify the streaming data in WSNs, and the abnormal data types are classified into noise, faults and events. Finally, the method decides whether to update the classification model based on whether the new sample has an effect on the boundary of the hypersphere. The experimental results show that the proposed method has a detection rate of 96% compared with other three methods, and the false positive rate is only 14%.

CEN202 Yihe Guo, Ran Huo, Zhiyuan Xie

Title: A Low Voltage Power Line Model for Broadband Communication

Abstract: The influence of skin effect and proximity effect on resistance and inductance of per-unit-length is analyzed. Based on the finite element method, the resistance and

inductance are solved by electromagnetic simulation software, and a method combining with open circuit impedance measurement to solve capacitance and conductance is proposed. The accuracy of the cable model is verified by testing, and the transmission characteristics of T network are emphatically analyzed. The modeling method has the advantages of accuracy and simplicity.

Index Terms-power line broadband communication, cable model, transmission line, distribution parameters, scattering parameters

SS1001 Kang Zhao,Yang Yang,Zhipeng Gao,Long Cheng

Title: Hybrid theme crawler based on links and semantics

Abstract: Common theme crawler generally analyses the page content or link structure, without solving the problem of computational complexity and easy "myopia", resulting in the page of recall and precision is not high. This paper introduces a mixed theme decision strategy, which fully considers the text content and link structure of the page. By introducing knowledge map database and entity database, the computational complexity is simplified and the judgment accuracy is increased. The experiment shows that the rate of inspection and precision is greatly improved.

SS1002 Yang Yang,Yonghua Huo,Jinbao Duan,Haitao Yu,Xuesong Qiu

Title: An Image Classification Method Based on Deep Neural Network with Energy Model

Abstract: The development of deep learning has revolutionized image recognition technology. How to design faster and more accurate image classification algorithms has become our research interests. In this paper, we proposed a new model called stochastic depth networks with deep energy model (SADIE), and the model improved stochastic depth neural network with deep energy model to provide attributes of images and analysis their characteristics. We also improved the network with Dirichlet distribution to make it more suitable for our task. The approach we adopted is to perform pre-processing such as image segmentation and denoising, and then normalize the data. Finally, we use training data to train our network based on deep energy model and testing data to verify the performance of the model. The results we finally obtained in this research include the Classified labels of images. The impacts of our obtained results show that our model has high accuracy and performance.

SS1003 Xian-Bin Han,Feng Qi

Title: Network Traffic Forecasting Using IFA-LSTM

Abstract: A network traffic prediction model is built based on LSTM neural network optimized with the improved firefly algorithm (IFA-LSTM). Aiming at some disadvantages of firefly algorithm including slow convergence, and easy to fall in local optimal values, we introduce a location update strategy based on the diversity of population, to avoid the optimization to fall into local optimal values. A dynamic step length updating measure is proposed to improve accuracy of the optimization , and to avoid the optimal solutions' oscillation problem. Simulation examples show that the prediction accuracy and convergent speed of the IFA-LSTM method are obviously improved , it can be used to predict network traffic.

SS1005 Bingwei Chen,Zidi Chen,Hecun Yuan,Lanlan Rui

Title: Method of Complex Internet of Things Simulation Attack and Reliability Analysis

Abstract: In recent years, with the rapid development of Internet of Things, the scale of networks has gradually increased, link capacity has become higher and higher. In this context, the research on the reliability of complex networks has been paid more and more attention. The network reliability analysis and evaluation technology need to be implemented by a corresponding network simulation and reliability comprehensive test analysis system, and presented to the user in a variety of visual forms more intuitively, so as to be further applied to the actual network environment. Simulate the network attack mode under complex network environment and get the reliability evaluation results under different attack strategies. Establishing complex network simulation attacks and analyzing them is of great significance in evaluating the reliability of complex IoT topologies. In this paper, a complex network evaluation model was further established. At the same time, three kinds of strategies are designed to simulate attacks on complex networks. Based on Django and the smart home network, the method is implemented in a more appropriate form of visualization. Finally, the method is tested and analyzed. The results show that the method can better represent the process of complex network simulation attacks and the changes of network reliability indicators.

SS1006 Yabin Qin, Jiawen Li, Lanlan Rui

Title: An AR Based Edge Maintenance Architecture and Maintenance Knowledge Push Algorithm for Communication Networks

Abstract: Maintenance is an important aspect of the entire life cycle of communication network devices. The existing maintenance environment of the communication network is complex, with various types of equipment components and complicated structures. The quality of maintenance is greatly affected by the ability and experience of on-site maintenance personnel, and the maintenance cost is high, and the efficiency is low. In order to decrease the difficulty of on-site maintenance and improve maintenance efficiency and quality, we proposed an augmented reality (AR) based edge maintenance architecture. Moreover, we propose a context model-based maintenance knowledge push algorithm (CMKP) to help on-site maintenance personnel obtain auxiliary information. This will provide on-site maintenance personnel with intelligent assistance and improve overall maintenance efficiency.

SS1007 Long Cheng, Yang Yang, Kang Zhao, Zhipeng Gao

Title: Research and Improvement of TF-IDF Algorithm Based on Information Theory

Abstract: With the development of information technology and the increasing richness of network information, people can more and more easily search for and obtain the required information from the network. However, how to quickly obtain the required information in the massive network information is very important. Therefore, information retrieval technology emerges, One of the important supporting technologies is keyword extraction technology. Currently, the most widely used keyword extraction technique is the TF-IDF algorithm (Term Frequency-Inverse Document Frequency). The basic principle of the TF-IDF algorithm is to calculate the number of occurrences of words and the frequency of words. It ranks and selects the top few words as keywords. The TF-IDF algorithm has features such as simplicity and high reliability, but there are also deficiencies. This paper analyzes its shortcomings for an improved TFIDF algorithm, and optimizes it from the information theory point of view. It uses the information entropy and relative entropy in information theory as the calculation factor, adds to the above improved TFIDF algorithm, optimizes its performance, and passes Simulation experiments verify its performance.

SS1009 Mi Lin,Jie Hong,Ming Chen,Bo Li,Huanyu Zhang,Zhiyuan Long,Mingsi Zhu, Weiming Wu,Wencheng Deng

Title: A Method Based on Improved Cuckoo Search for On-Site Operation and Maintenance Work Order Distribution in Power Communication Network

Abstract: The on-site operation and maintenance (O&M) of the power communication network is an important condition for the stability and efficiency of the smart grid. Moreover, the distribution of the work order is the basis for task assignment in the power system, ensuring the efficient unified management and safe stable operation. In order to optimize the process of the work order distribution for on-site O&M of power communication network, the paper proposes a distribution method based on the improved cuckoo search. First of all, according to distribution requirements of the work order, multiple factors are analyzed, the overall strategy and workflow of distribution are designed, and a distribution analysis model for work order is established. Then, a work order distribution algorithm based on improved cuckoo search is proposed, mixing extreme dynamics optimization search, combining with work order distribution characteristics to find the optimal configuration solution under multiple optimization goals. The four goals of less makespan, higher quality, higher personnel utilization, and less wait time for work orders are achieved, which provides theoretical support for improving efficiency, standardizing management and ensuring safety on on-site O&M. Finally, the simulation shows that this method can achieve higher efficiency and quality of on-site O&M.

SS1011 ZanHong Wu, Zhan Shi, Ying Wang, Zhuo Su

Title: End-to-end Network Fault Recovery Mechanism for Power IoT

Abstract: Abstract—With the rapid development of power internet of things (PIoT) and increasing demands of power services, it is difficult for traditional network structure to fully differentiate QoS and reliability requirements of services. Software Defined Network (SDN) is an important virtualization technology. It separates network control plane from data forwarding infrastructure plane, simplifying network management and control. In this paper, a network resource allocation and fault recovery mechanism for PIoT is proposed. Firstly, it builds an SDN-based virtualized system model to abstract the physical network resources. Then, considering the factors such as network operation cost, revenue, service rate, QoS requirements, network load balancing, and network stability, this paper proposes an operating profit maximization model for multimedia services and uses dynamic resource load balancing (DRLB). The simulation results show that proposed mechanism can improve fault recovery ability of network on the basis of ensuring efficiency of resource utilization.

SS1012 Yingyan JIANG, Yezhao CHEN,Feifei HU, Guoyi ZHANG,Peng LIN

Title: Behavior Similarity Awared Abnormal Service Identification Mechnism

Abstract: In order to maintain network security, it is very important to identify services with abnormal behavior and take targeted measures to prevent abnormal behaviors. We propose abnormal service identification mechanism based on behavior similarity. This method proposes a formula for service behavior similarity calculation of flow ports for services with correlation. And then k-similarity clustering algorithm is proposed to find abnormal service behaviors. Meanwhile, we analyse outliers to improve the accuracy of clustering results. At last, the experimental results show that k-similarity clustering algorithm can differentiate abnormal services accurately.

SS1014 Zhan Shi, Zhou su, Peng Lin

Title: Cross - domain Virtual Network Resource Allocation Mechanism for IoT in Smart Grid

Abstract: In order to solve the problem of cross-domain resource allocation in IoT in Smart Grid, this paper proposes a virtual network resource allocation mechanism based on particle swarm algorithm. Its goal is to minimize mapping overhead under planning request. In this paper, VN request is divided into multiple virtual subnets according to matching set of virtual resource matching phase, virtual library resource type price information and border node information. We also propose a cross-domain virtual network mapping algorithm based on particle swarm optimization. It can be used to improve the efficiency of cross-domain virtual network mapping. Finally, the execution time, mapping cost and performance of the algorithm in different environments are tested by simulation experiments, which verifies its efficiency and stability performance in virtual network partitioning.

SS1016 Ying Wang, Zijian Liu, Zhongmiao Kang, Weijian Li, Hui Yang

Title: Quality Evaluation System of Electric Power Backbone Optical Transport Network

Abstract: Optical transport network (OTN) provides strong support for the safe and stable operation of large capacity optical network, but the rapid development of large capacity optical network also puts forward higher requirements for the quality of the communication network. The existing evaluation system cannot effectively evaluate the operation quality of the OTN. In order to achieve the effective evaluation of the survivability of the backbone network, this paper puts forward a quality evaluation system based on the multi index comprehensive evaluation method.

SS1018 Dong Wu, Liu Qing, Liu Xu, Cai Cheng, Chen Dengchi, Peng dili, Tang Qi

Title: Maintenance Scheduling Algorithm based on Big data for Power Communication Transmission Network

Abstract: With the development of the construction of power grid information, the scale of power communication transmission network is rapidly expanding, which greatly increases the difficulty of maintenance scheduling and requires the relevant intelligent algorithm to assist the operation and maintenance department to formulate an efficient maintenance plan. Aiming at solve maintenance problem of power communication transmission network, we proposed a maintenance task scheduling model which balancing the waiting time of maintenance task, considering the scheduling requirements of maintenance task of power communication network with non-interruptible conditions of service. Experiment results show that the feasibility and effectiveness of the algorithm are verified. A maintenance scheduling algorithm for power communication transmission network based on big data is useful to solve the problem which using heuristic method to generate the scheduling scheme for maintenance task of the power communication network.

SS1022 Hong Zhu, Yangling Chen, Mingchi Shao, Nan Xiang, Lin Peng

Title: An Energy-Balancing based Clustering Method in Sensor Networks for IoT Sensing and Monitoring

Abstract: The Internet of Things (IoT) sensors have been widely applied into human social activities for a long time. To better use the limited energy resource, an energy-balancing based cluster-head alternatively selecting and cluster-node evenly clustering strategy is proposed in this paper. First, the optimal number of cluster nodes is obtained through simulation. Then, the weights for each cluster-head node are set according to the proposed strategy to balance the remaining energy of IoT sensor in the entire network. The simulation results show that,

compared with the traditional clustering algorithm, the proposed clustering algorithm can balance energy consumption and extend life-time of the whole sensor network.

SS1024 Chen Xi, He Shangjun, Hou Gonghua, Yang Lifan, Lin Lin, Feng Xiao

Title: Denoising SOM: An Improved Fault Diagnosis Method for Quantum Power Communication Network

Abstract: With the continuous expansion of quantum power grids, big data analysis of the power grid has become an important issue in the management of smart grid operation and maintenance. Due to the complexity of the power grid system and the limitations of software and hardware environmental conditions, frequent faults in the power grid are very important for the processing of alarm data. This article analyzed the characteristics of power grid alarm data and proposes an improved fault diagnosis method, Denoising SOM. This method uses the self-organizing map (SOM) neural network as a basis, and proposes the idea of denoising the alarm data sample to improve the robustness of the model. In addition, this method also optimizes the Euclidean distance calculation and the neighbourhood function setting of the SOM neural network. The results of comparative experiments show that the fault diagnosis method proposed in this paper has higher accuracy in the task of multi-source fault diagnosis and reduces the time consumption.

SS1026 Minchao Zhang, Xingyu Chen, Yue Hou, Guiping Zhou

Title: Improved Multi-swarm PSO based Maintenance Schedule of Power Communication Network

Abstract: Maintenance schedule is an important and complex task in power communication system. This paper builds a maintenance schedule model that considers decreasing average waiting time of maintenance as well as some constraints. This paper uses Hadoop and MapReduce to handle huge amount of information in power communication network. An improved multi-swarm PSO (Particle Swarm Optimization) algorithm is proposed to schedule maintenance. This algorithm combines the MPSO algorithm with the bacterial chemotaxis. Experiment demonstrates accuracy and efficiency of the improved MPSO algorithm.

SS1027 Lei Wei, Daohua Zhu, Wenwei Chen, Yukun Zhu, Lin Peng

Title: Reliability oriented Probe Deployment Strategy for Power Cellular Internet of Things

Abstract: With the power cellular Internet of Things (IoT) communication system playing a more important role for information transmission in the smart grid, higher requirements for the maintenance and monitoring technologies need to be satisfied. However, at present, the monitoring capability of the power cellular IoT communication network is relatively scarce, whose security, reliability, and real-time performance cannot be guaranteed. Therefore, we first introduce the loop rate of deployment probes and model the minimum weighted vertex coverage problem of probe deployment as the largest weighted independent set problem. Then we propose a fast heuristic algorithm to find its minimum deployment overhead. The simulation results show that the proposed algorithm can locating faults effectively, as well as the improving monitoring capability.

SS1028 Jingya Ma, Jiao Wang, Dongbo Tian

Title: Soft Frequency Reuse of Joint LTE and eMTC Based on Improved Genetic Algorithm

Abstract: Enhanced machine-type (eMTC) communications for cellular Internet of Things (IoT) are expected to make up the shortcomings of traditional LTE technologies. In this paper, LTE and eMTC are jointly used in the cell, and the frequency is efficiently used through soft

frequency reuse (SFR). After that, a 0-1 knapsack problem with the purpose of maximize access ratio was constructed. We construct an improved genetic algorithm to solve the problem. The simulation results show that the joint LTE and eMTC methods increase the access ratio by 8%, and the improved genetic algorithm also has a mostly 5% improvement compared to the traditional dynamic programming method.

SS1030 Gangsong Dong, Wencui Li, Shiwen Wang, Xiaoyun Zhang, Ji Zhao Lu, Xiong Li

Title: The Assessment Method of Network Security Situation Based on Improved BP Neural Network

Abstract: With the popularity of the Internet and the emergence of cloud computing, network security issues have become increasingly prominent. In view of the low efficiency and poor reliability of the existing network security situation assessment methods, this paper proposes a quantitative assessment method based on an improved BP neural network. Aiming at the disadvantages of slow convergence speed, easy oscillation, and local minimum in BP neural network, this paper optimized the algorithm by combining Cuckoo search algorithm, introducing momentum factor and adaptive learning rate. The simulation results show that the improved CS-BPNN algorithm in this paper has fast convergence rate and high evaluation accuracy, which provides a new method for network situation assessment.

SS1033 Jinsuo Liu, Daohua Zhu, Jingzhi Xue, Tao Ma

Title: Coverage Enhancement for Cellular Internet of Things based on D2D Multicasting

Abstract: Cellular Internet of Things (cIoT), which will create a huge network of billions or trillions of Things communicating with one another, are facing many technical and application challenges. In particular, in this paper, we have proposed a mechanism based on D2D multicast group communication. The goal of us is to enhance the coverage ability of the cellular network system which is used in IoT. Firstly, we propose a D2D clustering algorithm with the consideration of energy consumption and the outage of the system. Secondly, we want to improve the throughput of the whole system. We decomposed this optimization problem into two sub problems: power control and channel assignment. Referring to the Genetic Algorithm, we get the optimal transmit power of the whole devices. Then, we use the Greedy Algorithm to obtain the perfect channel allocation. Finally, the simulation results demonstrated the efficiency of the communication mechanism proposed by us.

SS1034 Jingya Ma Dongchang Li Jiao Wang

Title: Indoor-Outdoor Wireless Caching Relay System for Power Transformation Station in Smart Grid

Abstract: In power transformer station of smart grid, a large number of IoT terminal devices need to collect hotspot data in real time to realize monitoring and managing current operating environment of the grid. Since the electricity business requires high read-time performance and reliability, so how to reduce the communication delay between these terminals and increase the transmission efficiency of information has become a challenge for smart grid. Performance of cellular signals received by terminals in transformer station is severely impacted by participant terminals with poor channel conditions, which is usually the cases in the indoor environment due to strong penetration loss. To strengthen the indoor cellular signals, operators deploy the indoor-outdoor relay system (RS), which amplifies wireless signals and improves indoor throughput. Based on the present indoor-outdoor RS, this article proposes to augment it by adopting caching entities and developing caching mechanism that further improves the utilization of wireless resources. The resulting indoor-outdoor caching

relay system (CRS) operates in two phases periodically under the control of management agent at the Macro Base Station (MBS). In Phase I, spectrum resources of the established links between MBS and terminals are extracted to support data caching in the system. In Phase II, CRS directly serves indoor terminals and the fronthaul resources are released to serve other terminals. Simulation results verify that the great throughput improvement achieved by CRS with our proposed caching-relay mechanism.

SS1039 Qingtao Zeng, Kai Xie, Yeli Li, Xinxin Guan, Chufeng Zhou, Shaoping MA

Title: Storage optimization algorithm for publication blockchain

Abstract: “We Media” is developing rapidly and there is a sharp increase in the number of various electronic publications. Meanwhile, copyright issues between author and publisher are becoming increasingly prominent. To solve this problem, storage optimization algorithm for publication blockchain is based on Pearson similarity algorithm and K-means algorithm. On this basis, the prediction algorithm is established. These algorithms are used to adjust Merkle tree structure. Finally, effectiveness of the algorithm is verified by experiments.

SS2001 YangQun Li

Title: Mobile Internet Application Classification based on Machine Learning

Abstract: Service classification technology helps service suppliers understand how to use network services that offer personalized services to users. In this study, machine learning technology is used to classify such services, called mobile Internet applications (APPs). Firstly traffic of different application is collected and is used to build model by using C4.5 and SVM algorithm. Secondly, the model is used to classify the application type from the mobile internet traffic. Then traffic of applications is merged as major class by application type such as web browsing, e-commerce and the above two algorithms are applied to classify the major class that different applications belong to. Finally the Precision and Recall ration of two algorithms are compared and analyzed. Mobile stream video/audio is better recognized than Mobile app using http by using machine learning method. In order to improve the mobile application classification result, the only machine learning algorithm is not enough.

SS2002 Haifeng Wang, Ming Zhang, Yunpeng Cao

Title: Prediction Model of Wavelet Neural Network for Hybrid Storage System

Abstract: The Hybrid storage system needs to distinguish the data state to manage data migration. The frequently data may be placed solid-state hard disk to improve the accessing performance. Here a novel prediction model of the frequently accessing data that is called hot access data is proposed. This model extracts the workload features and is built based on the wavelet neural network to identify the data state. The prediction model is trained by the sampling data from historical workloads and can be applied in the hybrid storage system. The experimental results show that the proposed model has better accuracy and faster learning speed than BP neural network model. Additionally, it has better independent on training data and generalization ability to adapt to various storage workloads.

SS2003 Zhenyu Wu Jiaying Chen

Title: Detecting Hot Spots Using the Data Field Method

Abstract: With the developments of the mobile devices and Internet of things, the location data have recorded amount of information about people activities. Mining the hot spots from the location-based data and studying the changing patterns of hot spots are useful to the early

warnings of the disasters, traffic jams and crimes. Current researches on hot spots detections ignore the temporal factors. In this paper, the data field method is used to describe the interactions of spots, and the temporal factors are incorporated into the data field method. Furthermore, a hot spots detection method is proposed. Finally, the heat map is used to illustrate the effectiveness of the proposed method based on an open dataset.

SS2004 Jiaying Chen,Zhenyu Wu

Title: A Method for Measuring Popularity of Popular Events in Social Networks Using Swarm Intelligence

Abstract: Social network is a platform for users to post and forward contents that they are paying attention to. So through the measurement of the popularity of the event, it is possible to excavate social focus and predict the development trend of the event. The user is used as the main body to measure the popularity, so as to construct the interaction graph, and the indicator of the graph has a degree distribution sequence, a clustering coefficient and a degree centrality. Among them, the user distribution of the degree distribution sequence of the interaction graph shows the distribution of "power law distribution", and the power index introduced by the degree distribution sequence can effectively reflect the distribution of the user's participation degree in the popular event; the clustering coefficient reflects the user's agglomeration in the popular event; the degree centrality reflects the dominant position of the user participating in the popular event; the number of users reflects the size of the network Formed by the popular event. The comprehensive indicator obtained after

nondimensionalization and analytic hierarchy process of these four indicators can comprehensively and accurately measure the popularity of popular events. The comprehensive indicator shows that the popular event of the "Ching Ming Festival" is more consistent with the actual situation during the day. Further more, the measure of popularity is more sensitive and can reflect minor changes in the popular spot.

SS2005 Jinpeng Chen,Tianyi Yan,Jinghan Shi,Hemiao Zhang,Pinguang Ying,Kaimin Wei

Title: Temporal-Aware Point of Interest Recommendation on Location-Based Social Networks

Abstract: In this work, our aim is to generate a top recommendation list of POIs for a target user. Specially, we explore how to produce the POIs recommendation by leveraging temporal information. In order to exploit temporal influences, we first denote the research problem of this paper. Second, we perform collaborative filtering by detecting users' temporal preferences. At last, we execute some experiments on the real world dataset. Our experimental results indicate that our proposed method outperforms current state-of-the-art POI recommendation approaches.

SS2006 Wenchao Shi,Yiguang Lu,Zhipeng Huang,Enbo Du,Yihan Cheng,Jinpeng Chen

Title: Personalized Recommendation Leveraging Social Relationship

Abstract: The goal of recommender system is recommending products users may be interested in. Recommending content is an important task in many platforms. But many platforms only have implicit feedback information from users. Each single user generates behavior on only a few products lead to sparse datasets from users. And traditional recommending algorithms show poor performance when face the two problems. In this paper, we present a social bayesian personalized ranking based on similar friends (SFSBPR). We alleviate the sparsity problem when recommend by users' implicit feedback. Experiment on

real-world sparse datasets show that our method outperforms current state-of-the-art recommendation method.

SS2007 Wenming Guo,Lin Huang,Lihong Liang

Title: A Weld seam Dataset and Automatic Detection of Welding Defects using Convolutional Neural Network

Abstract: In this paper, we propose a dataset which contains 13006 digitalized x-ray images of welds. And do some preparation work on the original images which can be used to put into the convolutional neural network. Firstly, because of the feature of the input is the original image, but defects of welds are very small in the whole diagram, so that cut up the welds area. Secondly, do some picture preprocessing which includes data enhancement, image regularization, mean subtraction, normalization, etc. Then a model which is built to train and then test the weld images cropped from x-ray images is constructed based on convolutional neural network. Different from the results ever achieved, this model directly using the feature between pixels and pixels of images without extra extraction of the image feature. Finally, tell the procedure when it comes to train dataset and test dataset, compare the different result of the different image preprocessing, we propose several experiments and results. The results demonstrate that what kind of preprocessing method is better and to do the classification of the picture.