

35th International Conference on Software Engineering & Knowledge Engineering (SEKE2023)

Held online

San Francisco, California, USA
1-10 July 2023

ISBN: 978-1-7138-7951-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2023) by KSI Research Inc.
All rights reserved.

Printed by Curran Associates, Inc. (2023)

For permission requests, please contact KSI Research Inc.
at the address below.

KSI Research Inc.
156 Park Square Lane
Pittsburgh, PA 15238
USA

Phone: 412-606-5022

office@ksiresearch.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of Contents

Session SCE: Social Computing and Engineering

Xinzhi Wang, Mengyue Li, Yige Yao, Zhennan Li, Yi Liu and Hui Zhang

Short Review of Intention Mining in Social Crisis Management through Automatic Technologies 2

Qitao Hu and Xiao Wei

Topic and Speaker-aware Hierarchical Encoder-Decoder Model for Dialogue Generation 8

Senjun Pei and Weidong Liu

Convolution Neural Network Based Patent Infringement Detection Method 14

Wenwen Xiao, Xinzhi Wang, Xiangfeng Luo and Shaorong Xie

DDCL: A Dual Decision-making Continuous Reinforcement Learning Method Based on Sim2Real 20

Fayrouz Elsalmy, Nada Hany Sherief and Walid Abdelmoez

Inclusive Gamification: An Exploratory Study in Software Development Enterprises (S) 26

Session SEKE1: Software Engineering and Knowledge Engineering

Ryo Soga, Hideyuki Kanuka, Takatomi Kubo, Takashi Ishio and Kenichi Matsumoto

Will you use software development support using biosignals? A survey from software developers 31

Melody Hammel and Lan Lin

Assuring Domain Software Quality through Workflow Testing and Specification 37

Ju Ma, Yi-Yang Sun, Peng He and Zhang-Fan Zeng

GSAGE2defect: An Improved Approach to Software Defect Prediction based on Inductive Graph Neural Network 45

Pankaj Kamthan and Nazlie Shahmir

Small Educational Steps Towards Improving the Status of Women in Software

Engineering	51
<i>Yuanchi Ma, Hui He and Zhendong Niu</i>	
BDC:Using BERT and Deep Clustering to Improve Chinese Proper Noun Recognition	57

Session SEKE2: Software Engineering and Knowledge Engineering

<i>Keita Murase and Shingo Takada</i>	
Applying Reinforcement Learning for Automated Testing of Mobile Application Focusing on State Definition, Reward, and Learning Method	64
<i>Carlos Pantoja, João Victor Guinelli, Tielle Alexandre and Jose Viterbo</i>	
A Model-Driven Development Framework for Geographical and Relational Database Systems	70
<i>Masaya Fujimoto, Hiroyuki Nakagawa and Tatsuhiro Tsuchiya</i>	
Expansion Mechanism for Runtime Verification of Self-adaptive Systems	76
<i>Jing Zhou, Shan Leng, Fang Wang and Hansheng Wang</i>	
Automatic Discovery of Controversial Legal Judgments by an Entropy-Based Measurement (S)	82
<i>Wasja Brunotte, Jakob Droste and Kurt Schneider</i>	
Context, Content, Consent - How to Design User-Centered Privacy Explanations (S)	86

Session TSECQS: Theoretical Software Engineering, Classical and Quantum Software Similarities

<i>Iaakov Exman and Ariel Zvulunov</i>	
Quantum Software Models: Quantum Modules Tomography and Recovery Theorem	91
<i>Krishn Vishwas Kher, Ishan Joshi, Bharat Chandra Mukkavalli, Lei Zhang, M. V. Panduranga Rao</i>	
Automatic Diagnosis of Quantum Software Bug Fix Motifs	97
<i>Canh Minh Do and Kazuhiro Ogata</i>	
Symbolic Model Checking Quantum Circuits in Maude	103

Session SEKE3: Software Engineering and Knowledge Engineering

Yihao Zhang, Zeming Wei, Xiyue Zhang and Meng Sun
Using Z3 for Formal Modeling and Verification of FNN Global Robustness (S) 110

Marco Fiore, Marina Mongiello, Giovanni Tricarico, Francesco Bozzo, Cinzia Montemurro, Alessandro Petrontino, Clemente Giambattista and Giorgio Mercuri
Blockchain-based Food Traceability System for Apulian Marketplace: Enhancing Transparency and Accountability in the Food Supply Chain (S) 114

Kazusa Takemoto and Shingo Takada
Applying Symbolic Execution to Semantic Code Clone Detection (S) 118

Session ESSE: Empirical Studies and Software Engineering

Beiqi Zhang, Peng Liang, Xiyu Zhou, Aakash Ahmad and Muhammad Waseem
Practices and Challenges of Using GitHub Copilot: An Empirical Study 124

Qing Mi, Haotian Bai, Xiaozhou Wang, Wenrui Liu and Xingyue Song
An Empirical Study of Coding Style Compliance on Stack Overflow 130

Zeshan Xu, Jie Zhu, Li Yang and Chun Zuo
Mining the Relationship between Object-Relational Mapping Performance Anti-patterns and Code Clones 136

Haifeng Wang, Kun Yang, Xiangnan Zhao, Yuchen Cui and Weiwei Wang
Contribution-based Test Case Reduction Strategy for Mutation-based Fault Localization (S) 142

Anelis Pereira-Vale, Daniel Perovich and Sergio F Ochoa
Understanding the Pre-Contract Process of Small Software Projects 146

Junfeng Zhao, Wenhui Gai and Han Wu
Fortran Code Refactoring Based on MapReduce Programming Model 152

Jiman Du, Jiaxin Zhu, Hui Li, Wei Chen, Lijie Xu, Jie Liu and Zhifeng Chen
A Case Study of Dependency Network for Building Packages: The Fedora Linux Distribution 158

Shuo Li, Jie Liu, Haoxiang Tian, Shuai Wang, Wei Chen, Liangyi Kang and Dan Ye

EasyPip: Detect and Fix Dependency Problems in Python Dependency Declaration Files 162

Peiyang Li, Zixin Liu, Yuening Su, Hao Wang and Bo Jiang
CAPS: An Efficient Whole-Program Critical Paths Search Framework for Large-Scale Software 169

Zhiyong Ren and Hui Xu
Detect Stack Overflow Bugs in Rust via Improved Fuzzing Technique 175

Hao Zhu, Yichen Li, Jie Li and Xiaofang Zhang
An Efficient Design Smell Detection Approach with Inter-class Relation (S) 181

Tianmai Deng, Yixiao Xu, Chi Zhang and Zhengwei Qi
Dissecting Scale-Out Applications Performance on Diverse TLB Designs (S) 187

Yu Guo, Jun Guo, Mohan Shi and Aixuan Dong
Real-time Estimation Approach to Scrum Projects Effort: Task Point and Individual Reliability (S) 193

Zhiguo Li and Qin Li
ASC4AI: A Novel Automatic Service Composition Framework for AI Systems (S) 197

Omkarendra Tiwari and Vrinda Yadav
A Review of Methods for Identifying Extract Method Refactoring 203

Lufeng Wei, Zhi Li and Yuansong Qin
Towards generating contextualised fault scenarios for reliability risk analysis of cyber-physical systems (P) 209

Session SEAI: Software Engineering and AI

Zhenhua Zhang, Shizhan Chen, Guodong Fan, Guang Yang and Zhiyong Feng
CCGRA: Smart Contract Code Comment Generation with Retrieval-enhanced Approach 212

Ed van Doorn and Sylvia Stuurman
Detecting Design Patterns As Described By An Explicit Specification (S) 218

Jingjing Wang, Minhuan Huang, Yuanping Nie, Xiaohui Kuang, Xiang Li and Wenjing Zhong

Fine-Grained Source Code Vulnerability Detection via Graph Neural Networks (S)	222
<i>Xinyan Yi, Hao Xu, Lu Lu, Quanyi Zou and Zhanyu Yang</i>	
Software Defect Prediction via Positional Hierarchical Attention Network (S)	228
<i>Ran Mo, Yushuo Wang, Yao Zhang and Zengyang Li</i>	
Just-in-Time Defect Severity Prediction (S)	232
<i>Jiaxin Liu, Hao Xu, Lu Lu, Quanyi Zou and Zhanyu Yang</i>	
A Software Defect Prediction Method based on Multi-type Features and Feature Selection	238
<i>Kirthy Kolluri, Tom Hill and Lawrence Chung</i>	
Identifying Risks and Risk Mitigation Strategies for Collaborative Systems during Requirements Engineering: A Goal-Oriented Approach (S)	244
<i>Haochen Jin, Liwei Zheng and Zhanqi Cui</i>	
AFL2oop: Loop Coverage Guided Greybox Fuzz Testing	250
<i>Liang Sun, Peng Wu and Shaoxian Shu</i>	
Research on Directed Grey-box Fuzzing Technology Based on Target (S)	256
<i>Wei Li, Zhiyi Zhang, Yifan Jian, Chen Liu and Zhiqiu Huang</i>	
DeepRank: Test Case Prioritization for Deep Neural Networks	262
<i>Shaojian Qiu, Shaosheng Wang, Yujun Liang, Wenchao Jiang and Fanlong Zhang</i>	
Code Clone Detection via Software Visualization Representation Learning	268
<i>Guang Yang, Tiancheng Jin and Liang Dou</i>	
Heterogeneous Directed Hypergraph Neural Network over abstract syntax tree (AST) for Code Classification	274
<i>Shuaishuai Feng, Xi Wu, Yongxin Zhao and Yongjian Li</i>	
Dispatching and Scheduling Dependent Tasks Based on Multi-agent Deep Reinforcement Learning	280
<i>Qing Qi and Jian Cao</i>	
GAT-Team: A Team Recommendation Model for Open-Source Software Projects	286
<i>Yiheng Shen, Xiaolin Ju, Xiang Chen and Guang Yang</i>	
An Empirical Study of Adversarial Training in Code Comment Generation	292
<i>Jun Cheng, Honglei Su and Jari Korhonen</i>	

No-Reference Point Cloud Quality Assessment via Weighted Patch Quality Prediction 298

Jie Li, Lixuan Li, Hao Zhu and Xiaofang Zhang

GraphPLBART: Code Summarization Based on Graph Embedding and Pre-Trained Model 304

Session KE: Knowledge Engineering

Qia Wang, Yi Wang and Ying Wang

An Efficient Lossless Graph Summarization Method for Large Streaming Graphs 311

Wen Sun, Yifan Li, Junfeng Yao, Qingqiang Wu and Kunhong Liu

Combining Structure Embedding and Text Semantics for Efficient Knowledge Graph Completion 317

Li-E Wang, Huachang Zeng, Shenghan Li, Xianxian Li, Shengda Zhuo, Jiahua Xie, Bin Qu, Zhigang Sun and Tianran Liu

CRCC: Collaborative Relation Context Consistency on the Knowledge Graph for Recommender Systems (S) 323

Yuxin Zhao, Xinjun Mao, Bo Sun, Tanghaoran Zhang and Shuo Yang

An Effective Method for Constructing Knowledge Graph to Search Reusable ROS Nodes (S) 329

Bin Li, Jian Wen Ding, Zhen Nan Chen, Han Peng Jiang and Fan Lin

Multi-Domain Feature Representation and Multi-Dimensional Feature Interaction for Person-Job Fit 333

Shizhao Huang, Yimin Wu, Jinwei Lu and Chao Deng

Related Questions Detection Model in Stack Overflow based on Semantic Matching 339

Yifan Wang, Jibin Wang, Jing Shang, Zhuo Chen, Xuelian Ding and Heyuan Wang

Learning Event Logic Graph Knowledge for Credit Risk Forecast 345

Junmin Zhu, Yizhao Yao, Xianwen Deng, Yaoguang Yong, Yanhao Wang, Libo Chen, Zhi Xue and Ruijie Zhao

SAWD: Structural-Aware Webshell Detection System with Control Flow Graph 351

Tong Niu, Yicong Xu, Shengping Xiao, Lili Xiao, Yanhong Huang and Jianwen Li

LTLf Satisfiability Checking via Formula Progression (S) 357

Yifan Wang, Masaki Nakamura, Kazutoshi Sakakibara and Yuki Okura

Formal Specification and Verification of an Autonomous Vehicle Control System by the OTS/CafeOBJ method (S) 363

Magali Legast and Axel Legay

Assistance in the management of rule sets for rule-based expert systems (S) 367

Mengyuan Wang, Tengfei Li, Jing Liu, Hui Dou, Hongtao Chen, John Zhang and Lipeng Zhang

Modeling and Verification of Autonomous Driving Systems under Stochastic Spatio-Temporal Constraints 373

Session DPCC: Data Privacy and Cloud Computing

Georg Grabner, Ali Ahmed and Nilufar Baghaei

Using Blockchain to Preserve Chain of Custody: Cloud Forensics Analysis (S) 380

Wenxiu Xu, Ningjiang Chen and Huan Tu

DNN Inference Task Offloading Based on Distributed Soft Actor-Critic in Mobile Edge Computing 386

Yuxin Xiang, Bing Deng, Hongyu Zhang, Randy Xu, Marc Mao, Yun Wang and Zhengwei Qi

Bindox: An Efficient and Secure Cross-System IPC Mechanism for Multi-Platform Containers 392

Xiguo Gu, Huiwen Yang, Shifan Liu and Zhanqi Cui

Smart Contract Vulnerability Detection Based on Clustering Opcode Instructions 398

Yingjia Du, Yuan Fei, Sini Chen and Huibiao Zhu

Formalization and Verification of Data Auction Mechanism Based on Smart Contract Using CSP 404

Session DMA: Data Mining and Analytics

Gabriel Mac'Hamilton Renaux Alves and Alexandre Magno Andrade Maciel

Survey on Data Ingestion for AutoML (S) 411

Bowen Chen

DGNN: Dynamic Graph Neural Networks for Anomaly Detection in Multivariate Time

Series	415
<i>Dolly Agarwal, Abdullah Al Imran and Kasun S Perera</i> FOODIE: A Data-centric Sifting Framework for Social Media Analytics	421
<i>Jie Xiong, Huiyuan Li, Qiyuan Duan and Qihan Du</i> Towards Extreme Multi-label Text Classification Through Group-wise Label Ranking	427
<i>Guangwei Zhang, Ming Jing, Yunjing Liu, Li Zhang, Anming Dong and Jiguo Yu</i> Interactive Visualization of Temporal Brain Connectivity Data based-on Frequent Feature Mining (S)	433
<i>Peng Zhang, Zhaohui Zhang, Chaochao Hu and Pengwei Wang</i> A Dynamic Drilling Sampling Method and Evaluation Model for Large-Scale Streaming Data	437
<i>Bowen Chen</i> ASTD: Automatic Seasonal-Trend Decomposition for Time Series	443
<i>Lidan Zhao, Tong Li, Zhen Yang and Junrui Liu</i> A novel subjective bias detection method based on multi-information fusion	449
<i>Rongxi Guo, Wanrong Jiang, Xi Zhao, Ding Cao and Guiquan Liu</i> ASMix: An Attention-based Smooth Data Augmentation Approach	456
<i>Samuel Abedu, Solomon Mensah, Frederick Bofofo, Eva Bushel and Elizabeth Akaafum</i> An Optimal Spacing Approach for Sampling Small-sized Datasets	462
<i>Wei Du and Shifei Ding</i> Heterogeneous Multi-Agent Communication Learning via Graph Information Maximization	468
<i>Ziyi Zhang, Rong Yan and Wei Yuan</i> Identifying Influential Spreaders in Complex Networks Using Neighborhood Network Structure	474

Session OAEP: Optimization Approaches for Enhanced Performances

Bishshoy Das, Milton Mondal, Brejesh Lall, Shiv Dutt Joshi and Sumantra Dutta Roy

Altering Backward Pass Gradients to Improve Convergence (S) 481

Wei Liang, Wanghua Shi, Zhengyu Liao, Shiyou Qian, Zhonglong Zheng, Jian Cao and Guangtao Xue

BOP: A Bitset-based Optimization Paradigm for Content-based Event Matching Algorithms (S) 487

Yu Zhang, Ningjiang Chen and Siyu Yu

Transient Data Caching Based on Maximum Entropy Actor-Critic in Internet-of-Things Networks 493

Yulong Wang, Kai Deng, Fanzhi Meng, Zhi Chen, Mingyong Yin and Run Yang

Branchy-TEE: Deep Learning Security Inference Acceleration Using Trusted Execution Environment 499

Yaodanjuan Ren, Chen Chen and Zhengwei Qi

HaeNAS: Hardware-Aware Efficient Neural Architecture Search via Zero-Cost Proxy 505

Rong Wu

L*-Based Learning of Probabilistic Timed Automata with One Clock (S) 511

Session MLDLA: Machine Learning and Deep Learning Applications

Shunwen Shen, Lvqing Yang, Sien Chen, Wensheng Dong, Bo Yu and Qingkai Wang

DeepMultiple: A Deep Learning Model for RFID-based Multi-object Activity Recognition 518

Shuai Li, Bing Shi and Yaping Deng

A Dynamic Matching Time Strategy Based on Multi-Agent Reinforcement Learning in Ride-Hailing 524

Zhennan Chen, Zhicheng Zhang, Pengfei Li, Lingyue Wei, Shibo Feng and Fan Lin

mTrader: A Multi-Scale Signal Optimization Deep Reinforcement Learning Framework for Financial Trading (S) 530

Lei Mao, Jianxia Chen, Shi Dong, Liang Xiao, Haoying Si and Xinyun Wu

Aspect-level Sentiment Analysis Based on Convolutional Network with Dependency Tree 536

Georg Stettinger and Franz Wotawa

Smart Monitoring for Safety-Assurance in Autonomous Driving (S)	542
<i>Xingchen Ding, Chong Teng and Donghong Ji</i>	
Fake News Detection with Context Awareness of the Publisher	548
<i>Bakhta Haouari, Rania Mzid and Olfa Mosbahi</i>	
PSRL: A New Method for Real-Time Task Placement and Scheduling Using Reinforcement Learning	554
<i>Rui Xu, Cheng Zeng, Yujin Liu, Peng He and Min Chen</i>	
A Triplet Network Approach for Chinese Confusing Text Classification	560
<i>Xingfu Li, Bangchao Wang, Hongyan Wan, Yang Deng and Zihan Wang</i>	
Applications of Machine Learning in Requirements Traceability: A Systematic Mapping Study (S)	566
<i>Chen Qian, Hui Xiong and Jiyun Li</i>	
FeDeFo: A Personalized Federated Deep Forest Framework for Alzheimer's Disease Diagnosis	572
<i>Kang Zhong, Wu Guo, Bin Gu, Weitai Zhang and Chao Lin</i>	
A Detection-based Attention Alignment Method for Document-level Neural Machine Translation	578
<i>Gaoyi Lin, Zhihua Zhang and Zhanqi Cui</i>	
Widget Hierarchy Graph Guided Crash Reproduction Method for Android Applications (S)	584
<i>Xing Zhang, Tinglong Tang, Yirong Wu and Tingwei Quan</i>	
Construction Site Fence Recognition Method Based on Multi-Scale Attention Fusion ENet Segmentation Network (S)	588
<i>Jingxia Zeng, Mianfan Chen, Jianing Liu and Yuncheng Jiang</i>	
SLPKT: A Novel Simulated Learning Process Model for Knowledge Tracing	594
<i>Chen Qian, Boyin Yang and Jiyun Li</i>	
SARNet: A Self-Attention Embedded Residual Network for Multiclass Classification of Chronic Wounds (S)	600
<i>Yimin Peng, Rong Hu and Yiping Wen</i>	
AT-NCF: An Attention-based Time-aware Neural Collaborative Filtering Approach for Personalized Recommendation (S)	604

Cairong Yan, Xiaopeng Guan, Haixia Han and Zhaohui Zhang
MB-DP: A Multi-behavior Recommendation Model Integrating Dynamic Preferences 608

Session LMQA: Language Models and Question Answering

Aoxing Wang, Pengfei Duan, Yongbing Li, Wenyan Hu and Shengwu Xiong
LMGFuse: Language Models and Graph reasoning Fuse deeply for question answering 615

Zuotong Xie, Kai Ouyang, Xiangjin Xie, Hai-Tao Zheng, Wenqiang Liu, Dongxiao Huang and Bei Wu
KLAPrompt: Infusing Semantic Knowledge into Pre-trained Language Models by Long-answer Prompt Learning 621

Xingang Wang, Xiaomin Li and Xiaoyu Liu
Reinforced Multi-modal Circulant Fusion based Transformers for Rumor Detection (S) 627

Qian Wang, Cheng Zeng, Yujin Liu and Peng He
A Medical Question Classification Approach Based on Prompt Tuning and Contrastive Learning (S) 632

Xiaoyan Gao, Ji Chen, Xiangqian Ding, Shuo Shi, Junhua Jia and Xiaowei Xin
An intelligent question answering system based on RoBERTa-WWM under home appliance knowledge graph (S) 636

Yingshuai Kou, Neng Gao and Yifei Zhang
Variational Autoencoder with Stochastic Masks to Solve Exposure Bias in Recommendation (S) 642

Fengyong Peng, Xi Wu, Yongxin Zhao and Yongjian Li
Anaphora Ambiguity Detection Method Based on Cross-domain Pronoun Substitution (S) 646

Zhe Wen, Yatao Qi, Huan Liu, Zheng Lin and Weiping Wang
Multi-source Machine Reading Comprehension with Meta-Learning and Adaptive Adversarial Training 650

Tong Zhang, Ailing Tang and Rong Yan
Enhanced BERT with Graph and Topic Information for Short Text Classification (S) 656

Xi Tao, Hao Wang, Xiangfeng Luo and Pinpin Zhu

Few-Shot Link Prediction using Variational Heterogeneous Attention Networks 660

Xingchen Ding, Chong Teng, Donghong Ji and Fei Li

HGAPT: Heterogeneous Graph Augmented Prompt Tuning for Low-Resource Fake News Detection 666

Yunlai Luo

Token-level Input Grammar Synthesis (P) 672

Session CVA: Computer Vision and Applications

Puhui Qu, Keyu Chen and En Cheng

YOLOv7-marine: An Improved YOLOv7 Model for Object Detection in Marine Environments (S) 675

Yuheng He, Wenbin Yang, Xiangfeng Luo, Liyan Ma and Shaorong Xie

Object-Level Contrast Learning for 3D Sparse Object Detection in Ocean Scene 679

Qiaoning Lei, Yinsai Guo, Liyan Ma and Xiangfeng Luo

Few-Shot Object Detection via Instance-wise and Prototypical Contrastive Learning 685

Jiyun Li, Sheng Yang and Qian Chen

SWS-NET: An Image Segmentation Framework For Chronic Wounds Based On Self-Supervised Learning 691

Shouhong Wan, Rui Wang, Peiquan Jin and Xuebin Yang

BDC-FR: Faster R-CNN with Balanced Domain Classifier for Cross-Domain Object Detection (S) 697

Luo Yang and Lin Rongheng

MBR-MDA: Multi-person Behavior Recognition Method Based on Multi Descriptors Aggregations 701

Notes: (S) denotes a short paper. (P) denotes a poster, which is not considered a paper.