

# **32nd International Conference on Software Engineering & Knowledge Engineering (SEKE2020)**

Held online

Pittsburgh, Pennsylvania, USA  
9 – 19 July 2020

ISBN: 978-1-7138-4228-6

**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© (2020) by KSI Research Inc.  
All rights reserved.

Printed by Curran Associates, Inc. (2022)

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](mailto: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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## Table of Contents

---

### Session ITR: Internet of Things and Robotics

---

Formalization and Verification of VANET .....	1
<i>Ran Li, Huibiao Zhu, Lili Xiao, Jiaqi Yin, Yuan Fei and Gang Lu</i>	
The Prediction of Delay Time and Route Planning for Autonomous Vehicles (S) .....	7
<i>Gen Wang Gou, Yong Xin Zhao, Jia Wei Jiang and Ling Shi</i>	
DCBlock: Efficient Module for Unpaired Image to Image Translation Using GANs .....	13
<i>Jin Yong Kim, Myeong Oh Lee and Geun Sik Jo</i>	
A Detect-and-Modify Region-based Classifier to Defend Evasion Attacks .....	19
<i>Jiawei Jiang, Yongxin Zhao, Xi Wu and Genwang Gou</i>	
Inspect Characteristics of Rice via Machine Learning Method (S) .....	25
<i>Xin Ma, Mingliang Li, Jinxi Kong, Zhao Siming, Wei Li and Xiaohui Cui</i>	
Modeling and Verifying NDN-based IoV Using CSP .....	31
<i>Ningning Chen, Huibiao Zhu, Jiaqi Yin, Lili Xiao and Yuan Fei</i>	
Controller Synthesis for ROS-based Multi-Robot Collaboration .....	37
<i>Xudong Zhao, Rui Li, Wanwei Liu, Hao Shi, Shaoxian Shu and Wei Dong</i>	
Understanding Travel Patterns of Commuting Private Cars using Big data of Electronic Registration Identification of Vehicles .....	43
<i>Junchao Lv, Linjiang Zheng, Yuhui Ye and Chenglin Ye</i>	
TIMESIGHT: Discovering Time-driven Insights Automatically and Fairly .....	49
<i>Yohan Bae, Suyeong Lee and Yeonghun Nam</i>	
Physical Artifacts for Agents in a Cyber-Physical System: A Case Study in Oil & Gas Scenario (EEAS) .....	55
<i>Fabian Cesar Manoel, Carlos Pantoja, Leandro Samyn and Vinicius Jesus</i>	

### Session OKG: Ontologies and Knowledge Graphs

---

Classifying Common Security Vulnerabilities by Software Type (S) .....	61
<i>Onyeka Ezenwoye, Yi Liu and William Patten</i>	
Modeling Relation Path for Knowledge Graph via Dynamic Projection (S) .....	65
<i>Hongming Zhu, Yizhi Jiang, Xiaowen Wang, Hongfei Fan, Qin Liu and Bowen Du</i>	

Modeling HiBrinto Ontology to Develop Knowledge Management Portal for Highway Bridge Construction .....	71
<i>Shanmuganathan Vasanthapriyan and Banujan Kuhaneswaran</i>	
An Extended Knowledge Representation Learning Approach for Context-based Traceability Link Recovery (S) .....	77
<i>Guoshuai Zhao, Tong Li and Zhen Yang</i>	
Identifying Security Concerns Based on a Use Case Ontology Framework .....	83
<i>Imano Williams and Xiaohong Yuan</i>	
Towards High Quality Recommendations: A Goal-Oriented and Ontology-Based Interactive Approach (S) .....	89
<i>Ronaldo Goncalves, Robert Ahn, Tom Hill and Lawrence Chung</i>	
SHAMROQ: Towards semantic models of regulations .....	93
<i>Patrick Cook, Susan Mengal and Siva Parameswaran</i>	
On the Reuse of Knowledge to Develop Intelligent Software Engineering Solutions .....	101
<i>José Ferdinandy Silva Chagas, Luiz Antonio Pereira Silva, Mirko Perkusich, Ademar França Sousa Neto, Danyllo Albuquerque, Dalton Cézane Gomes Valadares, Hyggo Almeida and Angelo Perkusich</i>	
<hr/>	
Session SS: Software Specification	
<hr/>	
Research on Multi Source Fusion Evolution Requirements Acquisition in Mobile Applications (S) .....	107
<i>Yuanbang Li, Rong Peng, Bangchao Wang and Dong Sun</i>	
Detecting and Modeling Method-level Hotspots in Architecture Design Flaws .....	111
<i>Ran Mo, Shaozhi Wei and Ting Hu</i>	
Threat and Security Modeling for Secure Software Requirements and Architecture (S) .....	117
<i>Michael Shin, Don Pathirage and Dongsoo Jang</i>	
Knowledge-based Interface transition diagram for SRS(Software Requirements Specification) in mobile application (S) .....	121
<i>Taeghyun Kang, Hyungbae Park and Venkata Inukollu</i>	
Correct Software by Design for Software-Defined Networking: A preliminary Study .....	127
<i>Liang Hao, Xin Sun, Lan Lin and Zedong Peng</i>	
Dynamic Architecture-Implementation Mapping for Architecture-Based Runtime Software Adaptation .....	135

<i>Cuong Cu, Rachel Culver and Yongjie Zheng</i>	
An Automated Goal Labeling Method Based on User Reviews .....	141
<i>Shuaicai Ren, Hiroyuki Nakagawa and Tatsuhiro Tsuchiya</i>	
A Co-evolutionary Method Between Architecture and Code .....	147
<i>Tong Wang, Bixin Li and Lingyuan Zhu</i>	
<hr/>	
Session ESE: Empirical Software Engineering	
<hr/>	
An Empirical Study of Maven Archetype (S) .....	153
<i>Xinlei Ma and Yan Liu</i>	
Evaluating the Usefulness and Ease of Use of an Experimentation Definition Language (S) .....	158
<i>Florian Auer and Michael Felderer</i>	
Time-Aware Models for Software Effort Estimation (S) .....	164
<i>Michael Franklin Bosu, Stephen MacDonell and Peter Whigham</i>	
An Empirical Study on Issue Knowledge Transfer from Python to R for Machine Learning Software (S) ....	168
<i>Wenchin Huang, Zhenlan Ji and Yanhui Li</i>	
Quantifying the Relationship Between Health Outcomes and Unhealthy Habits (S) .....	174
<i>Swapna Gokhale</i>	
The Reaction of Open Source Projects to C++ Templates and Lambdas: An Empirical Replication Study .....	180
<i>Donghoon Kim and Loc Ho</i>	
Analyzing the Performance of Apps Developed by using Cross-Platform and Native Technologies .....	186
<i>Lucas Barros, Flávio Medeiros, Eduardo Moraes and Anderson Feitosa Júnior</i>	
On the Use of Support Mechanisms to Perform Experimental Variables Selection .....	192
<i>Lilian Passos Scatalon, Rogério Eduardo Garcia and Ellen Francine Barbosa</i>	
Testing the Stationarity Assumption in Software Effort Estimation Datasets .....	198
<i>Michael Bosu, Stephen MacDonell and Peter Whigham</i>	
<hr/>	
Session DSML: Distributed Systems and Machine Learning	
<hr/>	
Graph Machine Learning for Anomaly Prediction in Distributed Systems .....	204
<i>Sheyda Kiani Mehr, Wenting Sun, Xuancheng Fan, Nikita Butakov and Nicolas Ferlans</i>	

F(X)-MAN: An Algebraic and Hierarchical Composition Model for Function-as-a-Service .....	210
<i>Chen Qian and Wenjing Zhu</i>	
Privacy-aware OrLa Based Access Control Model in the Cloud .....	216
<i>Pengfei Shao and Shuyuan Jin</i>	
Formal Modelling and Verification of MCAC Router Architecture in ICN .....	222
<i>Junya Xu, Huibiao Zhu, Lili Xiao, Jiaqi Yin, Yuan Fei and Gang Lu</i>	
Data-sparsity Service Discovery using Enriched Neural Topic Model and Attentional Bi-LSTM .....	228
<i>Li Yao, Bing Li and Jian Wang</i>	
Explainable Deep Convolutional Candlestick Learner (S) .....	234
<i>Jun-Hao Chen, Samuel Yen-Chi Chen, Yun-Cheng Tsai and Chih-Shiang Shur</i>	
Conditional Normalizing Flow-based Generative Model for Zero-Shot Recognition .....	238
Xinwei Zhu, Haiping Zhang, Liming Guan, Dongjin Yu and Zhongjin Li	
An SNN Construction Method Based on CNN Conversion and Threshold Setting .....	244
<i>Ying Shang, Yongli Li and Feng You</i>	
Multi Classification of Alzheimer’s Disease using Linear Fusion with TOP-MRI Images and Clinical Indicators .....	250
<i>Qiao Pan, Golddy Indra Kumara and Jiahuan Chu</i>	
Deep Hashing with Large Batch Training for Cross-modal Retrieval .....	257
<i>Xuewang Zhang and Yin Zhou</i>	

---

#### Session SD: Software Development

---

Algebraic Higher-Abstraction for Software Refactoring Automation (TSE) (S) .....	264
<i>Iakov Exman and Alexey Nechaev</i>	
Reliable Compilation Optimization Selection Based on Gate Graph Neural Network .....	270
<i>Wu Jiang and Xu Jianjun</i>	
Trends in Software Reverse Engineering (S) .....	276
<i>Rehman Arshad</i>	
Do Experienced Programmers put too Much Confidence in Comments? (S) .....	281
<i>Elia Eiroa-Lledo, Abby Bechtel, Emily Daskas, Lily Foster, Raha Pirzadeh, Katie Rodeghiero and Erik Linstead</i>	
Formal verification of an abstract version of Anderson protocol with CafeOBJ, CiMPA and CiMPG (S) ....	287

<i>Duong Dinh Tran and Kazuhiro Ogata</i>	
Plagiarism Detection of Multi-threaded Programs using Frequent Behavioral Pattern Mining .....	293
<i>Qing Wang, Zhenzhou Tian, Cong Gao and Lingwei Chen</i>	
The Impact of Auto-Refactoring Code Smells on the Resource Utilization of Cloud Software .....	299
<i>Asif Imran and Tefvik Kosar</i>	
Towards Fine-Grained Compiler Identification with Neural Modeling .....	305
<i>Borun Xie, Zhenzhou Tian, Cong Gao and Lingwei Chen</i>	
Evaluating the Relationship of Personality and Teamwork Quality in the Context of Agile Software Development .....	311
<i>Alexandre Braga Gomes, Manuel Silva, Dalton Valadares, Mirko Perkusich, Danyllo Albuquerque, Hyggo Almeida and Angelo Perkusich</i>	
<hr/>	
Session ST: Software Testing	
<hr/>	
ISC-FS: An Improved Spectral Clustering with Feature Selection for Defect Prediction (S) .....	317
<i>Xuan Zhou, Lu Lu and Yexia Qin</i>	
A Semantic Convolutional Auto-Encoder Model for Software Defect Prediction (S) .....	323
<i>Zhihan Wang and Lu Lu</i>	
Revisiting Dependence Cluster Metrics based Defect Prediction .....	329
<i>Qiguo Huang, Xiang Chen, Zhengliang Li, Chao Ni and Qing Gu</i>	
Guidelines for Quality Assurance of Machine Learning-based Artificial Intelligence .....	335
<i>Koichi Hamada, Fuyuki Ishikawa, Satoshi Masuda, Tomoyuki Myojin, Yasuharu Nishi, Hideto Ogawa, Takahiro Toku, Susumu Tokumoto, Kazunori Tsuchiya, Yasuhiro Ujita and Mineo Matsuya</i>	
Call Sequence List Distiller for Practical Stateful API Testing (S) .....	342
<i>Koji Yamamoto, Takao Nakagawa, Shogo Tokui and Kazuki Munakata</i>	
Impact of Label Noise and Efficacy of Noise Filters in Software Defect Prediction .....	347
<i>Shihab Shahriar Khan, Nishat Tasnim Niloy, Md Aquib Azmain and Ahmedul Kabir</i>	
Using Deep Learning Classifiers to Identify Candidate Classes for Unit Testing in Object-Oriented Systems .....	353
<i>Wyao Matcha, Fadel Touré, Mourad Badri and Linda Badri</i>	
Unit Test Effort Prioritization Using Combined Datasets and Deep Learning: A Cross-Systems Validation (S) .....	359

*Fadel Toure and Mourad Badri*

An Empirical Investigation on the Relationship Between Bug Severity and Bug Fixing Change Complexity .....	365
<i>Zengyang Li, Dengwei Li, Peng Liang and Ran Mo</i>	

---

Session NLP: Natural Language Processing

---

Can language help in the characterization of user behavior? Feature engineering experiments with Word (S) .....	371
<i>Eduardo Lopez and Kamran Sartipi</i>	
Patent Technical Function-effect Representation and Mining Method (S) .....	375
<i>Weidong Liu, Piyang Zhang and Wenbo Qiao</i>	
Towards A Systematic Derivation Of BPMN Model From Business Process Textual Description (S) .....	380
<i>Wiem Khlif, Nourchène Elleuch Ben Ayed and Faten Chihi</i>	
A Novel Self-Attention Based Automatic Code Completion Neural Network (IPA) .....	386
<i>Bohao Wang, Wanyou Lv, Jianqi Shi and Yanhong Huang</i>	
An Ensemble Approach to Detect Code Comment Inconsistencies using Topic Modeling (S).....	392
<i>Fazle Rabbi, Md Nazmul Haque, Md Eusha Kadir, Md Saeed Siddik and Ahmedul Kabir</i>	
A Combined Model for Extractive and Abstractive summarization based on Transformer model (S) ...	396
<i>Xin Liu and Liutong Xu</i>	
Modeling Topic Exhaustion for Programming Languages on StackOverflow (IPA) .....	400
<i>Rao Hamza Ali and Erik Linstead</i>	
An Efficient Application Searching Approach Based on User Review Knowledge Graph .....	406
<i>Fang Li and Tong Li</i>	
SLK-NER: Exploiting Second-order Lexicon Knowledge for Chinese NER (S) .....	413
<i>Dou Hu and Lingwei Wei</i>	

---

Session SMM: Social Media Mining

---

Sentiment Analysis over Collaborative Relationships in Open Source Software Projects .....	418
<i>Lingjia Li, Jian Cao and David Lo</i>	
Searching, Examining, and Exploiting In-demand Technical (SEE IT) Skills using Web Data Mining .....	424



<i>Taeghyun Kang, Hyungbae Park and Sunae Shin</i>	
Sentiment Analysis of Online Reviews with a Hierarchical Attention Network .....	429
<i>Jingren Zhou and Peiquan Jin</i>	
Cross-project Reopened Pull Request Prediction in GitHub (S) .....	435
<i>Abdillah Mohamed, Li Zhang and Jing Jiang</i>	
Restaurant Failure Prediction Based on Multi-View Online Data .....	439
<i>Ping Liang, Dongjin Yu and Xiaoxiao Sun</i>	
Detecting Spammers from Hot Events on Microblog Platforms: An Experimental Study .....	445
<i>Jialing Liang and Peiquan Jin</i>	
Automatic Identification of Architecture Smell Discussions from Stack Overflow .....	451
<i>Fangchao Tian, Fan Lu, Peng Liang and Muhammad Ali Babar</i>	
Exploring CQA User Contributions and Their Influence on Answer Distribution (S) .....	457
<i>Yi Yang, Xinjun Mao, Zixi Xu and Yao Lu</i>	
Copy and Paste Behavior: A Systematic Mapping Study (S) .....	463
<i>Luqi Guan, John Castro, Xavier Ferré and Silvia Acuña</i>	
Generating Luck from Weak Ties in Social Networks (S) .....	467
<i>Iaakov Exman, Omer Ganon and Asaf Yosef</i>	
<hr/>	
Session RS: Recommender Systems	
<hr/>	
Personalized Video Recommendation Based on Latent Community (S) .....	473
<i>Han Yan, Ye Tian, Shunyao Wang, Xiangyang Gong, Xirong Que and Wendong Wang</i>	
Mining and Predicting Micro-Process Patterns of Issue Resolution for Open Source Software Projects .....	477
<i>Yiran Wang, Jian Cao and David Lo</i>	
Deep Graph Attention Neural Network for Click-Through Rate Prediction .....	483
<i>Wen Fang and Lu Lu</i>	
A Session-based Job Recommendation System Combining Area Knowledge and Interest Graph Neural Networks (S) .....	489
<i>Yusen Wang, Kaize Shi and Zhendong Niu</i>	
Modeling and Selecting Frameworks in terms of Patterns, Tactics, and System Qualities .....	493
<i>Hind Milhem, Michael Weiss and Stéphane Somé</i>	

An Evaluation of Recommendation Algorithms for Tourist Attractions .....	501
<i>Anderson Feitosa Júnior, Flávio Medeiros and Ivo Calado</i>	
Who Should Close the Questions: Recommending Voters for Closing Questions Based on Tags .....	507
<i>Zhang Zhang, Xinjun Mao, Yao Lu and Jinyu Lu</i>	
A Deep Spatio-temporal Residual Network Model for Commercial Activeness Prediction .....	513
<i>Ping Liang, Dongjin Yu and Xiaoxiao Sun</i>	
Collaborative Denoising Graph Attention Autoencoders for Social Recommendation .....	519
<i>Nan Mu, Daren Zha, Lin Zhao and Rui Gong</i>	
Identifying Similar Users Based on Metagraph of Check-in Trajectory Data .....	525
<i>Rui Song, Tong Li, Xin Dong and Zhiming Ding</i>	
<hr/>	
Session SB: Security and Blockchain	
<hr/>	
Formal Security Analysis for Blockchain-based Software Architecture .....	532
<i>Nacha Chondamrongkul, Jing Sun and Ian Warren</i>	
Characterizing Vulnerabilities in a Major Linux Distribution .....	538
<i>Stephen Tate, Moulika Bollinadi and Joshua Moore</i>	
Mining DApp Repositories: Towards In-Depth Comprehension and Accurate Classification .....	544
<i>Yeming Lin, Jianbo Gao, Tong Li, Jingguo Ge, Bingzhen Wu</i>	
Automated Rogue Behavior Detection for Android Applications (S) .....	550
<i>Shuangmin Zhang, Ruixuan Li, Junwei Tang and Xiwu Gu</i>	
Benchmarking the efficiency of RDF-based access for blockchain environments .....	554
<i>Juan Cano-Benito, Andrea Cimmino Arriaga and Raúl García-Castro</i>	
SecureChange: An Automated Framework to Guide Programmers in Fixing Vulnerability .....	560
<i>Sayem Mohammad Imtiaz, Kazi Zakia Sultana and Tanmay Bhowmik</i>	
Significant API Calls in Android Malware Detection (Using Feature Selection Techniques and Correlation Based Feature Elimination) .....	566
<i>Asadullah Hill Galib and B M Mainul Hossain</i>	
Threat Intelligence Relationship Extraction Based on Distant Supervision and Reinforcement Learning (S) .....	572
<i>Wang Xuren, Yang Jie, Wang Qiuyun, and Su Changxin</i>	

**Note:** (S) denotes a short paper.