Wang Jingyi

COM2-01-09
School of Computing, National University of Singapore, 117418, Singapore
(+65) 91334539
wangjyee@gmail.com

Education/Working Experience

2009.09–2013.07 **Xi'an Jiaotong University**, *B.E.*, Information Engineering, China.
- GPA: 3.71/4.0, top 10%

2013.09–2018.03 **Singapore University of Technology and Design**, *Ph.D.*, Information Systems Technology and Design, Singapore.
- GPA: 4.67/5.0
- Research interests: formal methods, security, software engineering, machine learning
- Supervisor: *Prof. Sun Jun*

2018.04–2019.03 **Singapore University of Technology and Design**, *Research Fellow*, Information Systems Technology and Design, Singapore.
- Supervisor: *Prof. Sun Jun*

2019.04–present **National University of Singapore**, *Research Fellow*, School of Computing, Singapore.
- Supervisor: *Prof. Dong Jin Song*

Selected Recent Projects

2019.10–present **Explaining AI with the Right Level of Abstraction**, *TOSEM submission*, AISG, NUS.
- This project aims to bridge the gap between complex models (e.g., deep learning models) and explainable formal models (e.g., finite-state automata and Markov chains) by automatically identifying the right level of abstraction through abstraction refinement.

2018.07–2019.04 **Fuzzing AI-Systems for Adversarial Sample Generation and Mitigation**, *ICSE 2019*, Huawei Singapore, SUTD.
- This project aims to develop more robust deep learning systems against adversarial attacks in different application scenarios. We also proposed two algorithms based on mutation testing to detect adversaries at runtime.

2017.05–2017.12 **Importance sampling of Interval Markov Chain**, *DSN 2018*, SUTD.
- We proposed an importance sampling algorithm for learned approximate probabilistic model in the form of Interval Markov Chains.

2017.05–2017.08 **Towards Optimal Concolic Testing**, *ICSE 2018*, SUTD.
- We formally proposed the optimal strategy for concolic testing in general and developed a practical algorithm to approximate it.

2015.11-2016.10 **Automatically 'Verifying' Cyber-physical systems through Learning, Abstraction and Refinement**, *TSE 2018*, SUTD.
- We proposed a hybrid approach combining learning, abstraction and refinement to 'verify' a given safety property from system traces. Either a model will be learned to 'verify' the property or a counterexample will be reported. The learned models can then be used for subsequent analysis like runtime monitoring.

Publications

*Based on CORE ranking system, * means corresponding.*

[A*] **Jingyi Wang**, Guoliang Dong, Jun Sun, Xinyu Wang and Peixin Zhang, *"Adversarial Samples Detection for Deep Neural Networks through Model Mutation Testing"* 41st International Conference on Software Engineering (ICSE), May 25 – 31 2019, Montreal, QC, Canada.

[A*] **Jingyi Wang**, Jun Sun, Shengchao Qin and Cyrille Jegourel, *"Automatically 'Verifying' Discrete-time Complex Systems through Learning, Abstraction and Refinement."* IEEE Transaction on Software Engineering (TSE).

[A*] Peixin Zhang, **Jingyi Wang***, Jun Sun, Guoliang Dong Xinyu Wang, Tai Dai, Xingen Wang and Jin Song Dong, *"White-box Fairness Testing through Adversarial Sampling"* 42rd International Conference on Software Engineering (ICSE), 23-29 May 2020, Seoul, South Korea.

[A*] Xinyu Wang, Jun Sun, Zhenbang Chen, Peixin Zhang, **Jingyi Wang*** and Yun Lin, *"Towards Optimal Concolic Testing."* 40th International Conference on Software Engineering (ICSE), Gothenburg, Sweden, 2018. (ACM SIGSOFT Distinguished Paper Award)

[A] **Jingyi Wang**, Jun Sun, Yifan Jia, Shengchao Qin and Zhiwu Xu, *"Towards 'Verifying' a Water Treatment System."* 22nd International Symposium on Formal Methods (FM), 15-17 July 2018, Oxford, UK.

[B] **Jingyi Wang**, Jun Sun, Qixia Yuan and Jun Pang, *"Should We Learn Probabilistic Models for Model Checking? A New Approach and An Empirical Study."* 20th International Conference on Fundamental Approaches to Software Engineering (ETAPS/FASE), Uppsala, Sweden, 2017.

[A] Cyrille Jegourel, **Jingyi Wang** and Jun Sun, *"Importance Sampling of Interval Markov Chains."* IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2018.

[A] Pingfan Kong, Yi Li, Xiaohong Chen, Jun Sun, Meng Sun, and **Jingyi Wang**, *"Towards Concolic Testing for Hybrid Systems."* 21st International Symposium on Formal Methods (FM), Cyprus, 2016.

[B] **Jingyi Wang**, Jun Sun, Qixia Yuan and Jun Pang, *"Learning Probabilistic Models for Model Checking: An Evolutionary Approach and An Empirical Study."* International Journal on Software Tools for Technology Transfer (STTT).

[B] **Jingyi Wang**, Xiaohong Chen, Jun Sun and Shengchao Qin, *"Improving Probability Estimation through Active Probabilistic Model Learning."* 19th International Conference on Formal Engineering Methods (ICFEM), Xi'an, China, 2017.

[A] Long H. Pham, Jun Sun, Lyly Tran, **Jingyi Wang** and Xin Peng, *"Learning Likely Invariant to Explain Why a Program Fails."* 22nd International Conference on Engineering of Complex Computer Systems (ICECCS), Fukuoka, Japan, 2017.

[B] Manman Chen, Tian Huat Tan, Jun Sun, **Jingyi Wang**, Yang Liu, Jing Sun, and Jin Song Dong, *"Service Adaptation with Probabilistic Partial Models."* 18th International Conference on Formal Engineering Methods (ICFEM), Tokyo, Japan, 2016.

Several other papers are under double blind review.

Skills

Programming	**Java, Python,** Shell scripting, C++
English	TOEFL: 100, GRE: 154(V)+167(Q)+3.0(AW), CET-6: 618/750

Activities

- Conferences: FSE'13 poster, FM'14 volunteer, ICFEM'16/17, FASE'17, FM'18, ICSE'19 oral presentation
- Reviewer: IEEE Trans on Reliability (2 times), SCP, ISSE, AVOCS'15/17, APSEC'16, TASE'16, InterWare'17, ICOST'18, ICFEM'18/19, PRDC'18, TASE'19, FM'19, TNCE, HSCC'20

Awards

- **ACM SIGSOFT Distinguished Paper Award (ICSE 2018)**
- Huawei Distinguished Collaborator
- President's Graduate Fellowship, Singapore
- ETAPS'17 student scholarship
- National Inspiration Scholarship, China; Pan Wenyuan Scholarship
- Distinguished Graduate of Xi'an Jiaotong University

Reference

- Prof. Dong Jin Song, Posdoc supervisor, National University of Singapore, contact: dcsdjs@nus.edu.sg
- Prof. Sun Jun, PhD supervisor, Singapore Management University, contact: junsun@smu.edu.sg
- Prof. Wang Xinyu, close collaborator, Zhejiang University, contact: wangxinyu@zju.edu.cn