Han Hu

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Education

Monash University, Melbourne, Australia — Jul. 2021 - May. 2024 (Flexible)

Ph.D. in Computer Science (CS)

- Monash Graduate Scholarship (MGS)
- Monash International Tuition Scholarship (MITS)

Tsinghua University, Beijing, China — Sep. 2017 – Jun. 2020

M.S. in Engineering

- Highest Prize in NASAC 2018 (Top Academic Competition of Static Analysis in China)
- Tsinghua-VMware Scholarship (First-Class Scholarship)

University of Electronic Science and Technology of China, Chengdu, China — 2013 – 2017

B.S. in Software Engineering (SE)

- Computer Science Core GPA: 88.91/100 (ranks 2/29 in my major).
- Outstanding Graduate of UESTC

Research Overview & Career Focus

My research is primarily in **AI for Software Engineering**. I am currently focused on the design and development of AI (Large Language Model) assisted automation tools for mobile app development, leveraging static code analysis and deep learning (DL). Key projects include **cross-platform user interfaces (GUI) adaptation** [TOSEM'2023, NeurIPS'2023] and **uncovering vulnerabilities in on-device DL models** [TOSEM'2023, WWW'2022, ICSE'2021]. Additionally, I possess experience in **code mining**, as evidenced by publications in TOSEM'2021 and ICONIP'2019.
Summary of Achievements: As the first author, I have contributed to three top-tier papers (CCF A, CORE A*), among a total of six high-impact publications. Moreover, I am the primary inventor in one out of four awarded Chinese national invention patents.
My recent research has pivoted to the exploration of LLMs in multimodal contexts, with a specific focus on potential applications and associated security implications. This involves the creation of interface design tools powered by LLMs and the development of benchmarks for automatically evaluating LLM outputs, with special emphasis on **prompt engineering** and **multimodal applications of LLM**.

Publications

- **Han Hu**, et al. (2023) A First Look at On-device Models on iOS. (TOSEM, **CCF A**, **CORE A***)
- **Han Hu**, et al. (2023) Automated Mapping of Adaptive App GUIs from Phone to TV. (TOSEM, **CCF A**, **CORE A***)
- **Han Hu**, et al. (2023) Pairwise GUI Dataset Construction Between Android Phones and Tablets. (NeurIPS, **CCF A**, **CORE A***)
- Yujin Huang, **Han Hu**, et al. (2021) Robustness of on-device Models: Adversarial Attack to Deep Learning Models on Android Apps (ICSE-SEIP, **CCF A** , **CORE A***)
- Qiuyuan Chen, Xin Xia, **Han Hu**, et al. (2021) Why My Code Summarization Model Does Not Work: Code Comment Improvement with Category Prediction.(TOSEM, **CCF A** , **CORE A***)

- Huang, Yujin, Terry Yue Zhuo, Qiongkai Xu, **Han Hu**, et al. (2022) "Training-free Lexical Backdoor Attacks on Language Models." (World Wide Web Conference, **CCF A**, **Core A***)
- **Han Hu**, et al. (2019) Code Generation from Supervised Code Embeddings. (ICONIP, **CCF C**, **CORE A**)
- Qiuyuan Chen, **Han Hu**, et al. (2019) Code Summarization with Abstract Syntax Tree. (ICONIP, **CCF C**, **CORE A**)
- Zhaoyi Liu, Qiuyuan Chen, **Han Hu**. (2019) Teacher-Student Learning and Post-Processing for Robust BiLSTM Mask-Based Acoustic Beamforming. (ICONIP, **CCF C**, **CORE A**)

Under Review

- **Han Hu**, et al. (2023) Deep Link Guided GUI Exploration of Android Apps. (resubmitted)

Work in Progress

- **Han Hu**, et al. Pioneering Large Language Model for Unified Device-Agnostic Adaptive GUI Design. (expected to submit)

Research Experience

Graphic User Interface of Phone Apps 2021 - Present

This research focuses on the cross-platform adaptability of mobile application Graphical User Interfaces (GUIs), aiming to propose a unified **Cross-Platform Adaptive Framework for Mobile Interfaces**. Due to varying screen sizes and interaction modes across platforms, app developers currently face the challenge of redeveloping GUIs for each platform, hindering the efficient use of existing designs. We propose an **Automated Cross-Platform GUI Conversion Framework** to enhance the efficiency of porting GUIs from mobiles to other devices like TVs and tablets.

Furthermore, current GUI exploration and testing tools exhibit low code coverage in app testing, often below 20%. To address this, we have designed a plugin to improve the **Test Code Coverage** of existing GUI testing tools, achieving a 26% higher coverage rate than the best current tools. This enhancement enables more effective cross-platform testing and data collection among mobiles, tablets, and TVs.

- **Han Hu**, et al. (2023) Automated Mapping of Adaptive App GUIs from Phone to TV. (TOSEM, **CCF A**, **CORE A***)
- **Han Hu**, et al. (2023) Pairwise GUI Dataset Construction Between Android Phones and Tablets. (NeurIPS, **CCF A**, **CORE A***)
- **Han Hu**, et al. Deep Link Guided GUI Exploration of Android Apps. (under review)
- **Han Hu**, et al. Pioneering Large Language Model for Unified Device-Agnostic Adaptive GUI Design. (expected to submit)

Security of Machine Learning Models 2021 - 2023

This research focuses on how to protect the security of machine learning models on Android and iOS platforms. We employ **Reverse Engineering** and **Static Code Analysis** on Apps to identify potential vulnerabilities in on-device models. Successfully, we have exploited these vulnerabilities using customized image inputs, causing malfunction in relevant features of real-world iOS and Android applications. We have also explored security protection mechanisms against such vulnerabilities.

- **Han Hu**, et al. (2023) A First Look at On-device Models on iOS. (TOSEM, **CCF A**, **CORE A***)
- Yujin Huang, **Han Hu**, et al. (2021) Robustness of on-device Models: Adversarial Attack to Deep Learning Models on Android Apps (ICSE, Industry Track, **CCF A**, **CORE A***)

Patents

Method, System, Electronic Device, and Storage Medium for Predicting Properties of Luminescent Materials. (Publication **NO. CN112396134B** and **NO. CN113470761B**)

Two granted Chinese invention patents, the **1st Author**

A Multi-Level Analysis-Based Method and Apparatus for C Language Defect Detection. (Publication **NO. CN111104335B**)

A granted Chinese invention patent, the third author

A Generalized Intelligent Review Platform and its Review Method (Publication **NO. CN106875156A**)

A granted Chinese invention patent, the fourth author

Work Experience

Ji Hua Laboratory, Foshan, China Jun. 2020 - Jun. 2021

Researcher & Developer

Developing cutting-edge interdisciplinary systems that combine deep learning and optics.

Monash University, Melbourne, Australia Mar. 2022 – Now

Teaching Associate

Unit: FIT2081 - Mobile application development; FIT2095- e-Business software technologies; FIT3077- Software engineering: Architecture and design

Academic Service

Program Committee

ACL-2020, 2023 (Core A*, CCF A)
EMNLP-2023 (Core A*, CCF A)
AACL-IJCNLP-2020, 2022, 2023 (Core B, CCF C)
ICONIP-2019 (Core A, CCF C)

Paper Reviewer

SIGIR-2023 (Core A*, CCF A)
SANER-2023 (Core A, CCF B)
EACL-2023 (Core A)
EMNLP-2022, 2023 (Core A*, CCF A)