Jie JW Wu

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RESEARCH INTEREST

I work in the intersection of AI and Software Engineering (SE). In the era of Big Data and Generative AI, I develop new approaches to simplify the complicated, time-consuming and sometimes tedious process of software development and decision-making in a more systematic, formalized way.

*Led by this goal, my research interests are a) **AI4SE** and b) **SE4AI** within the context of Large Language Models (LLM), Machine Learning (ML), and Data as a component to assist, systematize and automate the decision-making of software developers and other roles within the enterprises. My previous experiences include but are not limited to the following areas:*

- *LLM-based approach for software engineering tasks*
- *Software development process for ML-enabled systems*
- *Continuous data-driven software engineering (online and offline A/B testing)*
- *Automated tooling to assist developers or end users*
- *Search-based software engineering (evolutionary algorithms)*
- *Data-driven decision-making (multi-criteria decision-making)*
- *Recommender system (evaluation, candidate generation, ranking)*

EDUCATION

GEORGE WASHINGTON UNIVERSITY
Ph.D. in Systems Engineering, Dept. of Engineering Management and Systems Engineering, May 2023
Dissertation: Towards Formalizing Data-Driven Decision-Making from Big Data: A Systematic Multi-Criteria Decision-Making Approach in Online Controlled Experiments
GPA: 3.93/4.0

SHANGHAI JIAO TONG UNIVERSITY
M.S., Dept. of Computer Science, Apr 2015 (major GPA: 3.94/4.0)
B.S., ACM Honored Class, Dept. of Computer Science, Jun 2012

RESEARCH EXPERIENCE

SELF-EMPLOYMENT
Independent Researcher, Jul 2023 – Present
- Working on research papers and prototypes toward "AI-Driven development".

GEORGE WASHINGTON UNIVERSITY
Ph.D. Research Study, Aug 2019 – May 2023
Advisor: Prof. Thomas Mazzuchi, Prof. Shahram Sarkani
Dept. of Engineering Management and Systems Engineering, School of Engineering and Applied Science (SEAS)
- Conducted research on a launch decision making framework for online controlled experiments (A/B testing) using a systematic multi-criteria decision-making (MCDM) approach. It's the first attempt to formalize and model the empirical decision-making process from A/B test results using MCDM. Published the approach as first author in "Information and Software Technology".

- Conducted research on developing techniques based on multi-criteria evolutionary algorithms (MOEA) for automating A/B testing. Published the approach as first author in "Journal of Systems & Software".
- Developed the research strategy *SD^4 "**S**ystematic **D**ata-**D**riven **D**ecision-Making from Big **D**ata Technologies"* that indicates research opportunities to better formalize, automate and assist the empirical decision-making process in the software development and management process.

GOOGLE RESEARCH
Research Intern, Jun 2014 – Oct 2014
Mentor: Dr. Hui Fang
Project: **Deep Learning for Image Enhancement**,
- Trained a deep learning model that simulate multiple filter effects for an input image.
- Designed and implemented a tool that decomposes the image into multiple image bases using trained model, then compose multiple filter effects.
- Implemented a GUI application that shows instant interpolated filter effects when user adjusts the parameter bar.

MICROSOFT RESEARCH ASIA
Research Intern, Multimedia Search & Mining Group, Jul 2013 – May 2014
Project: **Smart Ink**
Advisor: Dr. Changhu Wang, Prof. Liqing Zhang
- Implemented an Add-In on Microsoft Visio, which recognizes and converts hand-drawn shapes into formal shapes interactively, detects user's correction or editing on shapes, greatly facilitating the flowchart production.
- Pushed the limit of hand-drawn flowchart/diagram recognition from 75.0% to 81.9% on a public benchmark dataset, with state-of-the-art speed and memory cost (0.56s per image).
- Implemented a module that rapidly recognizes shapes/flowcharts/diagrams from an image taken by cell phone, then convert them into a ppt file with recognized formal shapes.
- As the only developer and experiment conductor for SmartInk demonstrated at Microsoft TechFest, Redmond. Published SmartInk techniques as first author in top-tier AI conferences (AAAI, IJCAI).

SHANGHAI JIAO TONG UNIVERSITY
Undergraduate & M.S. Research Study, Jan 2012 – Jul 2013
Advisor: Prof. Liqing Zhang
Dept. of Computer Science & Engineering
- Conducted research on leveraging Gestalt Principles for the problem of salient region detection. Published the work as first author in ICIP conference.

PROFESSIONAL EXPERIENCE

SNAP INC., Seattle, WA
Software Engineer, Feb 2017 – Jul 2023
Teams: **Core Growth ML, User & Friend, Friend Recommendation, Friending Infrastructure (Identity)**
- Led several projects on evaluating the recall of friend recommendations reliably and comprehensively to guide the planning and prioritization of Friending team.
- Led several projects on new privacy algorithms to expand friend suggestion inventory during registration.
- Designed, and launched several scalable systems and algorithms that generate *~5 billion* of friend suggestions every day, leading to *~10 million* daily friend additions (~40% increase) from recommendation system. The types of friend suggestions of my system include 1) variants of Friends-of-Friends suggestions, 2) group-chat suggestions ("in a group with you"), 3) contact book related suggestions, 4) new user suggestions, etc.

- Designed and implemented algorithms to expand the Friends-of-Friends friend suggestion inventory to generate more suggestions, while still keeping users' friends list private. A US patent is applied for this algorithm titled "Additive Friend Suggestion System".
- Optimized a large-scale friend-link aggregation data pipeline that saved the infrastructure cost by 0.8 million / year (top 3 cost saving in the company-wide cost saving camp).

MICROSOFT CORPORATION, Redmond, WA
Software Engineer, OneNote Canvas & Ink Team, Oct 2015 – Feb 2017
Project: **OneNote Canvas**

- Implemented and launched several features on OneNote Canvas including *ink selection enhancement, canvas accessibility*.
- Co-created and shipped a new algorithm for selecting a group of strokes intuitively in OneNote app. A US patent is granted for our new algorithm titled "Intuitive Selection of a Digital Stroke Grouping".

PUBLICATIONS

- **Wu, Jie JW**. Does Asking Clarifying Questions Increases Confidence in Generated Code? On the Communication Skills of Large Language Models. Arxiv. (Under Review)
- **Wu, Jie JW**. Application of Systems Engineering Process in ML-Enabled Systems. Arxiv. (Under Review)
- **Wu, Jie JW**, Thomas A. Mazzuchi, Shahram Sarkani. A Multi-Objective Evolutionary Approach Towards Automated Online Controlled Experiments, Journal of Systems & Software, 2023.
- **Wu, Jie JW**, Thomas A. Mazzuchi, Shahram Sarkani. Comparison of multi-criteria decision-making methods for online controlled experiments in a launch decision-making framework, Information and Software Technology, 2023.
- **Wu, Jie**, Changhu Wang, Liqing Zhang, Yong Rui. Offline Sketch Parsing via Shapeness Estimation, IJCAI 2015. (M.S. Thesis)
- **Wu, Jie**, Changhu Wang, Liqing Zhang, Yong Rui. Sketch Recognition with Natural Correction and Editing, AAAI 2014. (M.S. Thesis)
- **Wu, Jie**, Changhu Wang, Liqing Zhang, Yong Rui. Sketch Recognition with Natural Correction and Editing, ACM MM 2014 (demo). (M.S. Thesis)
- **Wu, Jie** and Liqing Zhang. Gestalt Saliency: Salient Region Detection Based on Gestalt Principles, ICIP 2013. (B.S. Thesis, Top 1% Excellent Undergraduate Thesis Award at SJTU)
- **Wu, Jie**, Yi Liu, Ji-Rong Wen. Numeric Query Ranking Approach, WWW 2013 (poster).
- **Wu, Jie**, Li-Chen Shi, Bao-Liang Lu. Removing unrelated features based on linear dynamical system for motor-imagery-based brain-computer interface, ICONIP 2011.

Patents:

- Jonathan Brody, Donald Giovannini, Edward Koai, **Jie Wu**, Lin Zhong. "Additive Friend Suggestion for account security", United States Patent No. US 11,171,972 B1 (Granted)
- Carine Ramses Iskander, **Jie Wu,** Ian William Mikutel, Sarah Elizabeth Sykes, David Glen Garber. "Intuitive Selection of a Digital Stroke Grouping", United States Patent No. US 9,940,513 B2 (Granted)

HONORS

Letter from CEO in recognition of the new friend suggestion generation model, Snap Inc. Jun 2019
National Scholarship. (Highest-level scholarship from the Chinese government). Oct 2014
Excellent Master Academic Scholarship (1st class), SJTU. Nov 2013
Intel Fellowship. Sep 2013
Excellent Undergraduate Thesis at SJTU (Top 1%). (38 out of nearly 4000 theses) Jun 2012
Microsoft Fellowship for Undergraduates. (30 among universities in China) Aug 2011

First Class Price, National Olympiad in Informatics in Provinces (NOIP), Shanghai, Oct 2007

REFERENCES

Thomas A. Mazzuchi, Professor,
Dept. of Engineering Management and Systems Engineering, School of Engineering & Applied Science(SEAS),
Dept. of Decision Sciences, School of Business,
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Ji-Rong Wen, Professor and Executive Dean,
Gaoling School of Artificial Intelligence,
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Yong Rui, Ph.D., Fellow of ACM, IEEE, AAAS, IAPR, SPIE,
Chief Technology Officer, Senior Vice President at Lenovo Research,
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Jun Yu, Ph.D.,
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