CHIH-CHENG REX YUAN

EDUCATION

National Taiwan Normal University Sep 2014 - Jun 2019
Bachelor of Engineering in Computer Science and Information Engineering
· Academic Excellence Award (Jan 2016): Ranked top 5% in the class.

EXPERIENCE

Institute of Information Science, Academia Sinica Taipei, Taiwan
Research Assistant *May 2023 - Present*

· Published an AI fairness auditing framework and open-source tool supporting 15 statistical metrics, which systematically confirmed racial bias in the COMPAS dataset as reported by ProPublica in 2016. The paper appeared in 2024 PNC as "Ensuring Fairness with Transparent Auditing of Quantitative Bias in AI Systems".
· Proposed a privacy-preserving AI fairness auditing framework using differentially private synthetic data, evaluated across 5 machine learning models and 3 real-world datasets, demonstrating consistent bias detection while mitigating privacy risks. The paper is in the review process.

SiFive Hsinchu, Taiwan
Hardware Engineer *Sep 2022 - Apr 2023*

· Acted as the code owner of the assertion-based verification monitors of a bus communication protocol in Chisel/Scala, improving verification coverage by approximately 12% in the company's flagship product. This contribution strengthened the hardware verification process, a critical step in preventing costly design bugs.
· Developed regression automation tools for FPGA system validation in Bash and Perl, streamlining the validation process and reducing overnight continuous integration time by about 18%. This improvement was key in ensuring on-time project delivery during a high-pressure final sprint.

Institute of Information Science, Academia Sinica Taipei, Taiwan
Research Assistant *Jan 2017 - Jun 2022*

· Developed a hardware model checking algorithm based on Boolean learning and interpolation solving about 400 out of 747 instances in HWMCC10 benchmark. For comparison, the decade-old, state-of-the-art Berkeley tool solves about 600 instances on the same hardware.
· Designed a scalable SAT-based solution for Message Sequence Chart synthesis by reducing the NP-complete Poset Cover Problem, efficiently handling inputs with up to 100 linearizations and 10 elements.
· Proved the NP-hardness of k-anonymity Checking Problem and developed a randomized algorithm thereof for the 2010 Taiwanese Population And Housing Census data that revealed a minimum quasi-identifier of size 35 that identifies 37.7% of the database.

ACTIVITIES

Computer and Information Club Taipei, Taiwan
Vice President *Sep 2017 - Jun 2018*

· Worked closely with 5 other club staff members to co-organize joint workshops with the Electronics Club on Arduino programming, attended by approximately 30 students.
· Delivered hands-on courses on chatbot programming using Facebook and Line API to a group of 10 students.

CourseNTNU Taipei, Taiwan
Creator *Dec 2014 - Dec 2015*

· Developed a crawler of school course registration system by reverse-engineering the API calls.
· Built a course rating website using PHP and jQuery that attracted approximately 2,000 users and generated around 168,700 pageviews. Collaborated with 3 additional contributors who joined following the project's initial success.