

Experience

Development of an automated tool for detecting C/C++ software vulnerabilities

Centre for Research on Software Engineering Technologies

Mar 2021 – Oct 2021 | Python, Docker, PyTorch / PyTorch Lightning

- Conceptualised and implemented an automated software vulnerability detection tool for C/C++ code focused on usability and explainability. The tool leveraged graph neural network architectures to outperform the state-of-the-art model by 104%.
- Hin, D., Kan, A., Chen, H. and Babar, M.A., 2021. LineVD: Statement-level Vulnerability Detection using Graph Neural Networks. *Under Review*.

Development of an automated pipeline for software vulnerability assessment in Java

Centre for Research on Software Engineering Technologies

Jun 2020 – Jan 2021 | Python, Java, Keras/Tensorflow

- Designed an automated software vulnerability assessment pipeline for Java code using deep learning, achieving 50% higher accuracy and requiring 6.3x less time to train compared to baseline models.
- Le, T.H., Hin, D., Croft, R. and Babar, M.A., 2021. DeepCVA: Automated Commit-level Vulnerability Assessment with Deep Multi-task Learning. In *Proceedings of the 36th IEEE/ACM International Conference on Automated Software Engineering (CORE A*)*

Development of web application for tracking of vulnerable software components

The University of Adelaide

Mar 2020 – Nov 2020 | React, Node.js, Express, MongoDB, Google Cloud Services, Docker, HTML5/CSS3

- Built and deployed a microservice-based backend and front-end web application for innovatively tracking and analysing vulnerable software components.
- Awarded \$10,000 by the Cybersecurity Cooperative Research Centre.
- This project achieved the highest mark for final year Honours project for Bachelor of Engineering (Software) at the University of Adelaide (2020).

Analysis and visualisation of online security vulnerability discussions

Centre for Research on Software Engineering Technologies

Jan 2020 – Mar 2020 | Python, SQL, Scikit-Learn, Docker

- Processed >50GB of data from StackExchange and applied topic modelling to get insights on the key types of vulnerability discussion topics being discussed by developers
- Le, T.H., Croft, R., Hin, D. and Ali Babar, M.A., 2021. A Large-scale Study of Security Vulnerability Support on Developer Q&A Websites. In *Evaluation and Assessment in Software Engineering (CORE A)*

Development of interactive visualisation-based application for spectroscopy analysis

Centre for Nanoscale BioPhotonics

Jul 2018 – Feb 2019 | R, R Shiny

- Created an app to analyse data collected from custom built biological autofluorescence spectroscopy equipment, involving manipulation of raw signal data, unsupervised learning, and dimension reduction techniques.

Skills & Competencies

Software Development

Python C C++ Java Node.js
React SQL Ruby Git
Firebase Amazon Web Services
Google Cloud Services

Data Science

Pandas Scikit-learn R
Deep Learning PyTorch/Tensorflow
High-performance computing (HPC)

Soft skills

Cross-team collaboration Mentoring
Project management Presentation skills

Education

Bachelor of Engineering (Software) with First-class Honours

University of Adelaide

Feb 2017 – Dec 2020 | GPA: 6.8/7

Achievements

- 2021 - Cybersecurity CRC PhD Top-Up Scholarship
- 2020 - Lifelenz Prize, for achieving the highest Honours mark in Bachelor of Engineering (Software)
- 2020 - Cybersecurity Cooperative Research Centre Honours Scholarship
- 2020 - University of Adelaide: Executive Dean's Award for Academic Excellence
- 2019 - Cybersecurity Cooperative Research Centre Summer Scholarship
- 2018 - Australian Oracle User Group Prize, for achieving highest score in Web and Database Computing course
- 2018 - University of Adelaide: Executive Dean's Award for Academic Excellence
- 2017 - University of Adelaide: Executive Dean's Award for Academic Excellence
- 2016 - Dux of The Heights School, SA
- 2015 - Govhack: International Digital Humanities Hack, N3xGen South Australian Champion