David Hin

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I am an experienced data scientist with a strong foundation in software engineering principles. My projects address real-world problems across areas as diverse as software security, biology, and computer vision. They demonstrate my expertise in software development, encompassing web, mobile, and desktop-based applications. Many of these projects have been published in peer-reviewed literature, highlighting my ability to see projects to completion while working with different teams. I am seeking an opportunity where I can continually improve my engineering practices and find new ways to optimise complex tasks.

Education

University of Adelaide (2017 - 2020)
Bachelor of Engineering (Software) with First-class Honours
GPA: 6.8

Skills and Competencies

- **Programming Technologies:** Python, C, C++, Java, Node.js, React, SQL, Ruby, Git
- **Data Science:** Pandas, Scikit-learn, PyTorch, Keras, Tensorflow, High-performance computing (HPC), R
- **Cloud Technologies:** Amazon Web Services, Google Cloud Services, Firebase
- **Soft skills:** Cross-team collaboration, project management, mentoring, presentation skills

Experience

Development of an automated tool for detecting C/C++ software vulnerabilities, 03/2021 - 10/2021
Technologies Used: 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, 06/2020 - 01/2021
Technologies Used: 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.
- Published: 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*)

Supervision of summer projects at University of Adelaide, 11/2020 - 02/2021
- Conceptualised and oversaw two 12-week summer projects based on web application development, web scraping, and deployment of machine learning technologies.
- Final deliverables completed on-time and received great feedback from both the students and funder.

Development of web application for tracking of vulnerable software components, 03/2020 - 11/2020
Technologies Used: React, Node.js, Express, MongoDB, Google Cloud Services, Docker, HTML5/CSS3
- Built and deployed a microservice-based infrastructure 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 of online security vulnerability discussions, 01/2020 - 03/2020
Technologies Used: Python, SQL, Scikit-Learn, Docker
- Leveraged topic modeling and comprehensive data analysis techniques to extract a new taxonomy of thirteen security vulnerability discussion topics from > 20GB of data from online sites, while providing insightful visualisations.
- Published: 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* (pp. 109-118). (CORE A)

Development of security-related text classifier from online discussions, 10/2019 - 01/2020
Technologies Used: Python, Scikit-Learn, Docker
- Used machine learning, deep learning, and natural language processing techniques to classify and interpret real-world security-related posts from StackOverflow and the StackExchange network, constructing the largest publicly-available dataset for online security-related discussions.
- Awarded $10,000 by the Cybersecurity Cooperative Research Centre.
- Published: Le, T.H., **Hin, D.,** Croft, R. and Babar, M.A., 2020. PUMiner: Mining Security Posts from Developer Question and Answer Websites with PU Learning. In *2020 IEEE/ACM 17th International Conference on Mining Software Repositories (MSR)*. IEEE. (CORE A).

Development of interactive visualisation-based application for spectroscopy analysis , 07/2018 - 02/2019
Technologies Used: R, RStudio, 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.
- Work done as Associate Investigator for Centre for Nanoscale BioPhotonics.

Exploration of deep style transfer in images, 12/2018 - 1/2019
Technologies Used: Python, Matlab
- Leveraged covariance matrix adaptation evolution to transfer high-level image and style features from one image to another, using Python/Keras and Matlab.
- Work done under Adelaide Summer Research Scholarship (ASRS) program (awarded $1,200).
- Published: Alexander, B., **Hin, D.,** Neumann, A. and Ull-Karim, S., 2019, December. Evolving pictures in image transition space. In *International Conference on Neural Information Processing* (pp. 679-690). Springer, Cham. (CORE B)

Awards

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