Lukas Schmidt

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Education and Honours

University of Waterloo, Department of Electronic and Computer Engineering   **Waterloo, ON**
Master of Applied Science   May 2023
- Thesis: Novelty Detection for SILGEO Hardware Assurance
  - Generalized the t-test to Multivariate t-distributions by integrating over the Mahalanobis distance
  - Created a Bayesian novelty detection model by using posterior predictive t-tests for hardware validation
- Relevant Courses: Deep Learning, Algorithm Design and Analysis, Methods and Tools for Software Engineering

University of Waterloo, Department of Mathematics   **Waterloo, ON**
Bachelor of Mathematics
Honours in Pure Mathematics with a Minor in Combinatorics & Optimization   December 2019
- University of Waterloo President's Scholarship for 2000$ 2014
- NSERC Undergraduate Student Research Awards for 4500$ 2016, 2017

Work Experience

Real-time Embedded Systems Lab   **Waterloo, ON**
Graduate Assistant   2020 - 2023
- Utilized 1TB of data to develop a novelty detection method that fully automated the operation of Palitronica's hardware validation platform
- Wrote a full stack demo including visualizations which I presented to clients on behalf of Palitronica
- Publication: Microcircuit Defect and Counterfeit Detection via Silicon Geometry
- **Skills:** Python(Scikit-rf, Scipy, Flask, Dagster, Poetry), Novelty Detection, t-SNE, PCA, K-means clustering, SQL, Elm, MLOps, Data Pipelines, Productionizing Models

Research Assistant   May 2017 - August 2017
- Evaluated various forms of Hidden Markov Models for use in real-time anomaly detection of time-series data, presenting the results to the research group
- Wrote a full stack app for interactive data mining using timed regular expressions with visualizations
- Publication: A Tool for Mining Timed Regular Specifications from System Traces
- **Skills:** Python(Flask, rpy2), R, Docker, Docker Compose, Javascript, Blockly, Plotly, GNUMake, Linux

Research Assistant   May 2016 - August 2016
- Successfully detected anomalies in 1TB of time-series data using autoencoders to win a competition in the Lab
- **Skills:** Python(Pandas, Numpy, Scikit-learn, Matplotlib, H2O, Jupyter Notebooks), Autoencoders

HealthIM   **Kitchener, ON**
Software Developer   May 2018 - August 2018
- Rebuild the web app with a modern framework (Angular 1 $\rightarrow$ React)
- **Skills:** Javascript(React, Redux), Webpack

Centre for Advancement of Trenchless Technologies (CATT)   **Waterloo, ON**
Software Developer   January 2018 -April 2018
- Implemented CATT's models to estimate the carbon footprints of wastewater treatment plants
- **Skills:** Javascript(d3.js), Git, HTML, CSS

Projects

- **Teaching Assistant:** Collaborated with the instructors and other TAs to grade coursework and answer $200+$ students' questions over two courses
- **Salz:** Wrote the game engine of an AI bot programming game based on Halite and Conway's Game of Life
- **NixPkgs:** Packaged scikit-rf (an RF/Microwave engineering package) for NixPkgs