Boyang (Edward) Zhang

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GitHub

Education

CISPA Helmholtz Center for Information Security PhD, Computer Science	Saarbrücken, Germany Dec 2021 - Present
University of California, San Diego MS, Electrical Engineering (Machine Learning and Data Science)	San Diego, CA, USA Sep 2017 - June 2019
Bowdoin College B.A. Physics High Honor, German (minor)	Brunswick, ME, USA Aug 2013 - May 2017

Research Experience

Super Models for Global Health   Remote
Research Assistant – Single Payers with Machine Learning   Mar 2021 – Nov 2021
Advisor: James G. Kahn

- Evaluate machine learning algorithms' advantages in dealing with complex health insurance claims data including elimination of prior causal models, predicting non-linear interactions between features, reducing project design/hypothesis test time, and assisting feature selection/engineering for inference
- Identify health service research projects that are underperforming due to limited data quantity or quality
- Integrate machine learning algorithms (Random Forest, SVM, DNN, GBM) into existing projects using simulated claims data (DE-SynPUF) to evaluate single payer healthcare system's potential impact on HSR

Bowdoin College, Department of Physics   Brunswick, ME
Honors Project – High Frequency Ultrasonic Propagation in Silicon   Aug 2016 – May 2017
Advisor: Madeleine Msall

- Imaged the anisotropic propagation of ultrasonic wave in different solids, to help providing information for calibrating dark matter detector schemes (CRESST, super-CDMS)
- Developed algorithms for simulating wave propagation in solids with known elastic constants
- Analyzed correlations between different parameters of the excitation pulse with the wave propagation
- Awarded department prize Noel C. Little Prize in Experimental Physics

Professional Experience

C&B Tech   San Diego, CA
Software Engineer – Machine Learning   July 2019 – Nov 2020

- Developed image-based defect detection machine learning models for manufacturers in multiple industries (PCBs, LED panels), reaching human inspection's accuracy and efficiency (TensorFlow, Keras)
- Implemented feature extractions in PCB project to reduce deep learning model's workload by 40% and allow quick adjustment to different requirements from various manufacturers (scikit-learn, OpenCV)
- Automated processing raw data from manufacturers into ready-to-use data packages for prediction model development and testing. Decreased engineering hours significantly (Pandas, NumPy)
- Created web applications used in demo for new customers, showcasing prediction models from different projects. Achieved test data uploading, bulk data processing, user-specific model tuning, real-time result inspection, result updating and downloading (Java, Spring Boot)
- Designed and deployed relational database to manage user and content data used in demo (MySQL)

C&B Tech

<div align="right">San Diego, CA</div>

Software Engineer Intern
<div align="right">July 2019 – Sep 2019</div>

- Implemented and tested deep learning models from multiple research papers to improve existing prediction models' scalability and performance when transferred to new types of data
- Developed web application to integrate multiple project's prediction algorithms to simplify data management and performance testing (Python, Flask)

Projects

Hand-drawn Doodle Recognition (Python, Tensorflow, Keras)
<div align="right"><u>Github</u></div>

- Processed 3 million doodle drawings of 32 categories from Google AI's "Quick, Draw!" game to stroke-based sequential data for classification using RNN models
- Built stacked LSTM and Convolution-LSTM models to predict doodle's categories with 91.8% accuracy, outperforms other team member's image-based CNN models by 9% while using fewer parameters

Visual Inertial SLAM (Python, SLAM, Numpy)
<div align="right"><u>Github</u></div>

- Implemented extend Kalman filter from scratch to locate the robot and generate 2D mapping of visual features using IMU measurements and pixel coordinates from stereo RGB images
- Applied SLAM approach to correctly locate robot trajectory and map out static landmarks in test sets with minimal deviation even when high artificial noises were added to the data

Skills

Programming Languages: Python, Java, JavaScript, HTML, CSS, SQL, MATLAB
Tools and Libraries: TensorFlow, PyTorch, Keras, scikit-learn, OpenCV, NumPy, Pandas, Flask, Spring Boot;

Languages

English – Fluent; Mandarin – Native; German – Basic (A2)