KAIHAN ZHU (PETER)

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EDUCATION

UNIVERSITY OF PENNSYLVANIA (PENN) — **Aug 2021 - May 2023 (Expected)**
MSE in Computer and Information Science — Major GPA: 3.77 / 4.0

UNIVERSITY OF CALIFORNIA, SAN DIEGO (UCSD) — **Sep 2017 - Jun 2021**
BS in Computer Science — Major GPA: 3.96 / 4.0
BA in Economics — Major GPA: 3.71 / 4.0

WORK EXPERIENCES

RESEARCH SCIENTIST, Nanotools Bioscience — Mar 2020 - Jun 2021

- Researched methods to segment individual cardiomyocyte cells' boundaries in videos and to extract and analyze action potential and contraction traces using **image processing**, **computer vision**, **machine learning**, and **signal processing** methods, with **NumPy**, **OpenCV**, **SciPy**, **SKLearn**, **Tensorflow**, etc.
- Responsible for building a **Python** GUI application to allow researchers to batch process videos or sets of images using the method researched, with **TKinter**, **Threading**, and **Pyinstaller**. The application was built with future extension in mind.

COMPUTER SCIENCE TUTOR, University of California, San Diego — Apr 2019 - Jun 2020

- Tutored computer science courses and assisted professors by holding office hours, grading homework, and creating exam questions.

JAVA ENGINEER INTERN, Shanghai Amarsoft Info Tech Corp for Wanda Group — Aug 2018 - Sep 2018

- Utilized **Java**, **Oracle database**, and **Tomcat** to build, manage, and service a dynamic and expandable loan control management system.

FULL STACK DEVELOPER, Shanghai Greenpool Environmental Tech Co., Ltd. — Jun 2017 - Sep 2018

- Plan, build, and maintain the entire architecture of a dynamic website with **LAMP** model and **responsive UI design** from scratch.

RELAVANT PROJECTS AND COMPETITIONS

HAND GESTURE MOUSE @gesture.zhukaihan.com**,** Philadelphia, PA — Aug 2021 - Now

- Used **Mediapipe**'s Hand pipeline and **Pynput** to create a gesture-controlled mouse/trackpad/touchpad using a camera.
- Method 1 (Completed): Used **MLP** to estimate gesture from hand landmark data. Trained with **active learning**. Works very well.
- Method 2 (Failed): Transferred weights from Mediapipe's BlazePalm (a **Single-Shot Detector with ResNet**) TFLite model into PyTorch model, finetune on custom gesture data, and redeploy model into Mediapipe pipeline as TFLite. Failed due to incompatibility of NCWH and NWHC.
- Method 3 (In Progress): Transferred weights from Mediapipe's BlazePalm TFLite model into reimplemented Tensorflow Graph (done), finetune on custom gesture data, and redeploy model into Mediapipe pipeline as TFLite.

MUSIC RECOMMENDATION, Philadelphia, PA — Aug 2021 - Dec 2021

- Predict whether the user would churn on a music given how they were presented with the music and the music's basic information.
- Engineered probabilistic features, embeddings, dimensional reduction, and various categorical variables.
- Tested various machine learning methods: **Logistic Regression**, **Gradient Boosting Trees**, **LightGBM**, **Neural Networks**, and their ensembles.

TOTAL WEALTH PREDICTION, La Jolla, CA — Jan 2021 - Mar 2021

- Predict the total wealth given quantitative and categorial features about individuals with Survey of Income and Program Participation data in **R**.
- Used machine learning and statistical methods including **Polynomial Transformation**, **GAM**, **Spline**, **Stepwise Selection**, **ANOVA**, etc.

STOCK PREDICTION USING TRUMP'S TWEET, La Jolla, CA — Sep 2019 - Dec 2019

- Assess stock market's reaction to Donald Trump's tweet with **Tensorflow**, using word embeddings and **LSTM**.
- Level 2 data of S&P 500 sourced from Wharton Research Data Service (WRDS). Trump's tweets sourced from thetrumparchive.com.
- Our experiment shows improvement in accuracy when using LSTM instead of our baseline model, Linear Regression. We can show that stock's reaction is not random such that Trump's tweets do have impacts on the stock market.

OBSTACLE DETECTION (ECE DESIGN COMPETITION) @od.zhukaihan.com**,** La Jolla, CA — Feb 2019 - Jun 2019

- Used technologies to help detect obstacles that may cause patients with Parkinson's disease to fall.
- Co-lead the team to partition workloads, manage collaboration strategy, advise appropriate technologies.
- Programmed an iOS data collection software that encoded disparity map from dual-camera system to the alpha channel of an PNG image, stored in local storage and can be exported as a zip archive. Used **UIKit**, **Core Graphics**, and **AVFoundation** with **Swift**.
- Finetuned a **single shot detector** with **MobileNet v2** as backbone using **Tensorflow** to detect obstacles including obstacles, potholes, stairs, edge of sidewalks, etc.
- Deployed the model onto an iOS application with sound alert and visualization using **Tensorflow Lite** with **Objective-C++**.

SKILLS

Languages (Advanced Proficiency): Python, Java, C++, C
Languages (Beginner Proficiency): SQL, R
Tools (Advanced Proficiency): NumPy, SciPy, OpenCV, Git, Linux
Tools (Intermediate Proficiency): Tensorflow, PyTorch, SKLearn, MongoDB2