Patrick Kasl he/him

pkasl@ucsd.edu | (651) 343-5118 | https://patrick-kasl.github.io/

EDUCATION

University of California–San Diego Expected: May 2024
PhD Student – Shu Chien-Gene Lay Department of Bioengineering

University of Wisconsin–Madison May 2020 3.97
Biomedical Engineering (BS)

WORK EXPERIENCE

Smarr Lab, Halıcıoğlu Data Science Institute **La Jolla, CA**

Fever Onset Detection Using Wearable Device Data March 2021 – Present

- Translated knowledge of human physiology to select 527 well-labeled instances of self-reported fevers, allowing the development of a fever onset detection algorithm (gradient boosted tree classifier {Sklearn})
- Applied dimensionality reduction technique (PCA) to understand the classifier's decision boundary and identify key features of training and test data that contributed to classification of test cases as positive for fever
- Demonstrated the classifier's ability to generalize to a larger dataset, consisting of 1,825,295 wearable night/questionnaire pairs from 42,712 participants not included in the initial training set
- Submitted to npj Digital Medicine

Benchmarking State-of-the-Art Illness Detection Algorithms across Open Source Datasets

- Currently compiling benchmark datasets from literature that employs algorithms for illness onset detection
- Dataset/algorithm pairs: 102 Apple or FitBit/Finite state model, 5,009 FitBit/CNN to transformer model, ~45,000 Oura ring/Histogram gradient boosting model
- Evaluating the performance of these models on their own training data and benchmark datasets, utilizing metrics standardized across datasets

Metrics from Wearable Devices as Candidate Predictors of Antibody Response Following Vaccination against COVID-19

- Spearheaded the data engineering pipeline, overseeing the conversion of company-provided files on an AWS server to standardized formats on a shared server
- Investigated the application of correlation methods that account for censored data, adapting survival analysis techniques to the field of antibody measurements
- Applied appropriate non-parametric correlational analyses and data visualization for final publication

General Electric **Madison, WI**

Validation & Verification Co-op March 2020 - August 2020

- Identified hardware and software issues in a COVID-19 emergency ventilator, leading to manufacturing design change
- Developed and performed testing protocols to determine accuracy and repeatability of tidal volume delivered during ventilation

EXTRACURRICULAR ACTIVITIES

Bioengineering Graduate Society (BEGS) **La Jolla, CA**

President May 2022 - Present

- Coordinated meetings between executive board and planned Fall quarter meetings
- Ongoing work includes coordinating budget meetings with the Bioengineering Department and facilitating interactions between sub-committees

SKILLS

- *General Python development:* Pandas, Numpy, Multiprocessing
- *Data visualization:* Matplotlib, Seaborn, Plotly, Bokeh
- *Machine learning and algorithm development*: PyTorch, PyTorch Lightning, Sklearn
- *Statistical analysis:* SciPy, Statsmodels, bespoke as needed
- *Familiarity:* AWS, SQL, R