Kaneel Senevirathne

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EDUCATION

University of Delaware – Newark, DE   May 2021
Master of Science in Biomedical Engineering
GPA: 3.61

Drexel University - Philadelphia, PA   December 2018
Bachelor of Science in Mechanical Engineering & Mechanics
GPA: 3.57
Dean's List: Winter 2016, Spring 2016, Winter 2017

University of Kentucky - Lexington, KY   May 2016
Bachelor of Science in Mechanical Engineering
GPA: 3.9
Dean's List: Fall 2014, Spring 2015, Fall 2015, Spring 2016

EXPERIENCE

CoreadAI, Inc
AI/ML Programming Consultant   October 2021 to Present

- Train & test NLP algorithms and run ablation procedures on erroneous medical reports to optimize performance of existing models.
- Collaborate with other AI engineers to design & test medical image segmentation models and tune hyperparameters to improve models.
- Create automated scripts to download, visualize & perform statistical analysis on deep learning model performance data and generate detailed reports to the CEO.

Sensorimotor Learning Lab, University of Delaware
Graduate Research Assistant   December 2019 to May 2021

- Used computational models to examine calculations performed by the brain during various psychophysical assessments.
- Built task programs using MATLAB simulink/stateflow, collected behavioral data from human subjects, critically analyzed them and presented in lab and project meetings.
- Trained state of the art machine learning algorithms to make predictive analysis on behavioral and clinical datasets.
- Mentored undergraduate students by teaching programming, statistical analysis, critical reading and helped them with preparations for research and journal club presentations.

Human Motion Lab, University of Pennsylvania, Philadelphia, PA
Clinical Research Assistant   April 2018 to September 2018

- Operated gait analysis, ultrasound & EMG equipment, tracked muscle fascicles & tendons and interacted with study participants daily to collect data for ongoing research studies.

- Wrote MATLAB programs to process data and presented weekly updates to the project supervisor.

RESEARCH PROJECTS

Personal Projects

Stock Trading Bot   November 2021 to present
- Collected historical stock data using TD Ameritrade API and used the scikit learn package to train & validate a logistic regression model that predicts stock movements.
- Created a stock simulator & a back-testing algorithm and tested the model with different hyperparameters to investigate the values maximizing the profitability of the model.
- Used AWS cloud platform to deploy the model and run it on real time stock data.
- Published a digital blog article with a description of the methods and a detailed analysis of the model results. (https://medium.com/p/3ba981a2ffc2)

Tic-tac-toe using Reinforcement Learning   April 2021 to present
- Trained agents to play tick-tack-toe using Reinforcement Learning (RL) and self-play.
- Compared the performance of the agent to other random players and evaluated the performance of the RL agent.
- Currently developing a similar Deep RL model architecture to DeepMind's AlphaGo Zero by using Monte Carlo Tree Search to train a convolutional neural network.

Multimodal Video Classification   September 2021 to November 2021
- Combined principals inspired by computational models of multisensory integration and current deep learning models for gender classification.
- Used a spatial & temporal convolutional neural network model to perform video only classification.
- Used a 2D convolutional neural network to perform audio only classification by extracting spectrograms from the audio data.
- Used multisensory integration principals inspired by the brain to create a multi-modal architecture and compared its performance with the unimodal architectures.
- Wrote a detailed report about the background, methods, and results in a digital blog article. (https://medium.com/analytics-vidhya/combining-principals-from-cognitive-psychology-with-deep-learning-part-1-e3e4ef174403)

Brain Tumor Radiogenomic Classification   July 2021 to September 2021
- Participated and won a silver medal in the Kaggle RSNA-MICCAI Brain Tumor classification competition.
- Applied 2D & 3D convolutional neural networks to detect the presence of MGMT promoter methylation in the brain using MRI scans.

Sensorimotor Learning Lab, University of Delaware

Stroke & Multisensory Integration   December 2019 to May 2021
- Designed an experiment to study how the healthy and stroke affected brain integrate visual and proprioceptive sensory information to localize the hand.
- Coupled a touch screen panel with an existing robotic device (KINARM Endpoint) and calibrated/validated the system to collect behavioral data from subjects.
- Collected behavioral data from the subjects and used computational models to investigate how our central nervous system combine visual and proprioceptive sensory information.

- Used Bayesian statistics to investigate computational models that describe how the stroke affected brain integrate vision and proprioception.

Predicting Parkinson's disease using machine learning   April 2020 to December 2020
- Applied machine learning (ML) techniques to a large data set containing gait variables collected from LRRK2 genetic mutation carriers without PD and neurologically normal adults.
- Wrangled participant data from multiple spreadsheets and created a single dataset.
- Trained different ML algorithms to predict disease status and to identify a subset of important predictors to classify the participants of the study.
- Co-authored the poster that won the best poster in the Combined Sections Meeting 2021 organized by the American Physical Therapy Association.

Human Motion Lab, University of Pennsylvania

Staircase for Gait Analysis   April 2018 to September 2018
- Built a staircase, a calibration tool, and a calibration algorithm, to analyze human motion during stair climb.
- Validated the output data generated by the custom-built staircase using the developed calibration algorithm and the calibration tool.

PUBLICATIONS

Jacob Johnson, **Kaneel Senevirathne**, and Lawrence Ngo, "Development and Validation of Suspicious Liver Lesion Deep Learning Algorithm for Computed Tomography," MedRxiv, [Preprint] 12.15.2021, https://doi.org/10.1101/2021.12.15.21267873

Jacob Johnson, **Kaneel Senevirathne**, and Lawrence Ngo, "Development of a Natural Language Processing Algorithm for the Classification of Suspicious Liver Lesions from Radiology Reports," MedRxiv, [Preprint] 12.15.2021, https://doi.org/10.1101/2021.12.15.21267875

TEACHING EXPERIENCE

Biomedical Engineering Department, University of Delaware

Teaching/Grading Assistant   September 2020 to December 2020
- Taught/graded Biomedical modeling and simulation, an undergraduate course averaging 100 students per semester.
- Held office hours for students, weekly graded assignments and provided solutions for the homework assigned in the class.

Mechanical Engineering & Mechanics Department, Drexel University

Teaching/Grading Assistant   September 2017 to December 2017
- Graded, Mechanics of Materials, an undergraduate course averaging 120 students per semester.
- Held office hours and weekly graded papers, exams & homework assignments assigned for the class.

MENTORING EXPERIENCE

Suzannah Hoguet – University of Delaware, DE   September 2020 to May 2020
- Mentored Suzannah Hoguet, a sophomore at UD from the Biomedical Engineering department (Honors program).
- Held weekly meetings, assisted with critical analysis of journal articles, taught programming & statistics and helped to prepare for monthly lab presentations.

Megan Phillips – Wayne State University   June 2020 to August 2020
- Mentored Megan Phillips, a senior undergraduate student at Wayne State University, who joined the UD undergraduate summer research program.
- Helped to visualize & analyze a stroke clinical dataset and apply Logistic Regression to classify the behavior of the patients during a behavioral task.
- Assisted with the final research paper, poster, and presentation.

ACADEMIC HONORS AND AWARDS

Drexel University, Philadelphia, PA

AJ Drexel Scholarship   September 2016 to December 2018
- This is awarded for Drexel Transfer students with outstanding academic performance. I was awarded this scholarship for my 3.9 GPA at the University of Kentucky.

University of Kentucky, Lexington, KY

UK International Ambassador Scholarship   August 2014 to May 2016
- This award is given for incoming international students for outstanding leadership skills, academic performance, and extracurricular activities.

TECHNICAL SKILLS

- Programming - Python (scikit-learn, TensorFlow/Keras, Pytorch), MATLAB simulink/stateflow.
- Computational Biology - BKIN Dexterit-E, Cortex, Opensim.
- Engineering Design - PTC Creo, Solidworks, Autocad, ANSYS Workbench, LabVIEW.
- Other - MS Office.

PROFESSIONAL CERTIFICATES

Coursera, Inc.

Tensorflow: Advanced Techniques Specialization   July 2021 to October 2021
- Successfully completed the TensorFlow: Advanced Techniques Specialization offered by DeepLearning, AI on coursera online education platform.
- Learnt how to use the Tensorflow functional API to build exotic non sequential models, custom loss functions and layers.

Visual Perception and the Brain   August 2021 to September 2021
- Successfully completed the course offered by Dr. Dale Purves from Duke University.
- Learned how what we see is generated by the visual system, discussed some problems of vision science, and examined what visual perception indicates about how the brain works.

Deep Learning Specialization, DeepLearning AI.   April 2021 to July 2021
- Completed the DeepLearning Specialization taught by Professor Andrew Ng.
- Learnt how to build neural network architectures such as Convolutional Neural Networks, Recurrent Neural Networks and learnt how to make them more efficient by adding techniques such as Dropout and BatchNorm.

ACTIVITIES

National Weightlifting Pool, Sri Lanka
Athlete
- Currently a member of the National Weightlifting pool of Sri Lanka. I was added to the pool for my first-place performance in the 2016 and 2017 National Weightlifting Championship in Sri Lanka.

Trinity College Kandy, Sri Lanka
Rugby Player/Coach
- Captained the Trinity Rugby team in 2012 and represented the junior national rugby team in Sri Lanka.
- Was appointed as the junior rugby coach at Trinity College Kandy. I trained children aged 10-12. Responsibilities included introducing rugby basics, leadership training and mentoring.