

Ibrahim Ulas Ayyilmaz

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EDUCATION

Pomona College, Claremont, CA
BA Computer Science | GPA: 3.8

Dec 2024

RESEARCH EXPERIENCE

Research Assistant, Zhu Lab Pomona College, Claremont, CA **Jan 2024 – Present**

- Built Recurrent Spiking Neural Network(RSNN) models with biological constraints, such as 4:1 excitatory-to-inhibitory ratio and 20% sparse connectivity, to explore cortical dynamics on PyTorch
- Developed RSNN models incorporating three distinct interneurons types: PValb, SST, and 5Htr3a, based on types found in V1 and primary somatosensory cortex
- Designed temporal tasks like sine wave generation and robot arm movement to train on
- Simulated working memory and noise processing in cortex by altering temporal task structures
- Analyzed roles of inhibitory and excitatory neurons in temporal scaling, phase-tuning, signal amplification, and disinhibition, by examining changes in connectivity, spiking behavior and accuracy
- Integrated metrics like synchrony, firing rate and criticality into learning algorithms to maintain realism

Research Assistant, HciLab Pomona College, Claremont, CA **Jul – Oct 2024**

- Designed an experimental pipeline to investigate the impact of partner gaze visualization on collaborations
- Conducted 90-minute experiments with groups of 2, 4, and 6 people, managing protocols and lab equipment
- Analyzed and cataloged data (CSV, JSON, MP4) stored in Firebase
- Conducted interviews and document participant feedback on gaze visualization experiences

WORK EXPERIENCE & PROJECTS

Product Manager, Digiboard, Claremont, CA **Sep 2022 – Mar 2023**

- Developed and deployed an app that provided a platform for 8,000+ students to organize and share events
- Developed the code to translate frontend user input to backend algorithms using Dart and Firebase
- Interviewed 50+ students and local businesses, and extracted insights to understand user pain points

Teaching Assistant, Physics Department Pomona College, Claremont, CA **Jan – May 2022**

- Led weekly Electronics lab sessions, mentored 5 students on projects, and maintained lab equipment
- Provided weekly feedback on students' learning and graded homework of 20 students

Project: Predicting Mirror Neuron Activity in Motor Cortex using Neural Networks **Sep – Dec 2023**

- Recorded EEG data from a participant performing motor tasks (left vs right arm movements)
- Preprocessed the EEG data, and trained Convolutional and Recurrent Neural Networks in TensorFlow on the preprocessed data to classify left vs right arm movements
- Conducted EEG as a participant was observing left vs right arm movements by others
- Predicted the observer's motor cortex activity with high accuracy, indicating mirror neuron activation

LEADERSHIP EXPERIENCE

Founder Captain, All Gender Volleyball Club, Claremont, CA **Aug 2022 – Dec 2024**

- Founded the club to provide a non-competitive volleyball learning environment
- Organized tournaments and drills with 50+ participants, growing membership from 0 to 180+

President, Turkish Student Association, Claremont, CA **Aug 2021 – May 2024**

- Plan and lead on and off campus events for 15+ Turkish students and foster a culture of inclusivity
- Spearheaded a \$16,000+ donation campaign for the 2023 Turkish Earthquake relief efforts

AWARDS & SKILLS

Ted Gleason Award: Awarded to a senior demonstrating exceptional community support and leadership

Technical Skills: Python, PyTorch, TensorFlow, Java, C++, R, MySQL, Stata, MS Excel