Ulaş İbrahim Ayyılmaz

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EDUCATION

Pomona College, Claremont, CA   **Dec 2024**
BA Computer Science | GPA: 3.8

Coursework: Artificial & Biological Vision, Mobile Robotics, Affective Neuroscience, Machine Learning, Computational Statistics, Algorithms, Electronics, Managing Complex Systems

PRESENTATIONS

"Excitatory and inhibitory neurons exhibit distinct roles for task learning, temporal scaling, and working memory in recurrent spiking neural network models of neocortex." Contributed Talk at the Spiking Neural Networks as Universal Function Approximators (SNUFA) 2024 Conference (Online) and presented at the Bernstein Conference 2024, Frankfurt, Germany.   **Nov & Oct 2024**

"Investigating the Effect of Shared Gaze on Multi-Person Teams." Presented at the Harvey Mudd Computer Science REU Symposium. Claremont CA, USA.   **Jul 2024**

RESEARCH EXPERIENCE

Lab Manager, Enkavi Lab Claremont McKenna College, Claremont, CA   **Jan 2025 – Present**
• Reading and presenting on novel fMRI papers to my lab group, building the lab website, managing a group of 3 undergraduate students, devising an action plan

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 such as sine wave generation and robot arm movement
• 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 for realism
• Participated in weekly discussions on recent Computational Neuroscience papers

Research Assistant, HciLab Pomona College, Claremont, CA   **Jun 2024 – Oct 2024**
• Designed an experimental pipeline to investigate the impact of partner gaze visualizations on group collaborations
• Conducted 90-minute experiments with 4 and 6-people groups, managing protocols and equipment
• Analyzed and cataloged data (CSV, JSON, MP4) stored in Firebase
• Conducted interviews and documented participant feedback on gaze visualization experiences

PROJECTS

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) using the X.ON headset
- Preprocessed the EEG data to include timestamps and labels using Python's Pandas and Numpy
- Developed and trained Convolutional and Recurrent Neural Networks in TensorFlow on the preprocessed data to classify left vs right arm movements
- Conducted EEG when the participant observed someone else execute left vs right arm movements
- Predicted the motor cortex activity of the observer with an above average accuracy, indicating high mirror neuron activity in the observer's motor cortex

Project: Curated datasets and created VSL1-inspired architecture with Random Forest Classifiers and Neural Networks to identify intrinsically disordered proteins **Jan – May 2022**
- Cleaned and analyzed 20,000+ genetics data points using Numpy, Matplotlib and Scikit-learn
- Predicted disordered protein sequence up to 97% accuracy by implementing 5 Machine Learning Algorithms including Random Forests, KNNs and Neural Networks
- Visualized and presented the key genetic characteristics of disordered proteins to 50+ students

TEACHING EXPERIENCE

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

Teaching Assistant, Computer Science Pomona College, Claremont, CA **Sep – Dec 2021**
- Mentored 30 students in weekly Python projects, fostering collaboration and critical thinking
- Explained the class material thoroughly and answered students' questions in weekly office hours

English Teacher, Amerikan Kultur Dil Okullari, Izmir, Turkey **Jun – Jul 2023**
- Led a class of 14 students; taught grammar, vocabulary, speaking, and writing

INDUSTRY EXPERIENCE

Product Manager, Digiboard, Claremont, CA **Sep 2022 – Mar 2023**
- Developed and deployed a mobile app that provided a platform for 8,000+ college students to organize, share and submit events
- Developed the code to translate frontend user input to backend algorithms using Dart and Firebase
- Designed technical process flowcharts for marketing, design, and programming teams
- Interviewed 50+ students and local businesses, and extracted insights to understand user pain points

Front Desk Agent, Marriott International, Izmir, Turkey **May 2023 – Aug 2023**
- Managed check-in, check-out processes; handling cash and valuables
- Partnered with local businesses to recommend guest entertainment options
- Streamlined the check-in/check-out processes into a 10-page operations manual

LEADERSHIP EXPERIENCE

Founder Captain, All Gender Volleyball Club, Claremont, CA **Aug 2022 – Dec 2024**
- Founded an inclusive volleyball club to provide a non-competitive volleyball learning environment

- Led stretches, drills, and tournaments with 50+ participants, growing membership to 180+ students

Peer Advisor, Pomona College Career Office, Claremont, CA   **Aug 2022 – May 2023**
- Hosted drop-in hours to review resumes and cover letters for 30+ students weekly
- Planned and moderated panels with alumni, led workshops for international and first-gen students

President, Turkish Student Association, Claremont, CA   **Aug 2021 – May 2023**
- Plan and lead on and off campus events for 15+ Turkish students, fostering community
- Spearheaded a $16,000+ donation campaign for the 2023 Turkish Earthquake relief efforts

AWARDS
Ted Gleason Award   **May 2024**
Awarded to a graduating senior demonstrating exceptional community support and leadership.

REFERENCES
A Zeynep Enkavi
Assistant Professor of Integrated Sciences: Neuroscience at Claremont McKenna College
Email: zenkavi@cmc.edu

Yuqing Zhu
Visiting Assistant Professor of Neuroscience at Pomona College
Email: Yuqing.Zhu@pomona.edu

Alexandra Papoutsaki
Associate Professor of Computer Science at Pomona College
Email: Alexandra.Papoutsaki@pomona.edu

SKILLS & INTERESTS

Technical: Python, PyTorch, TensorFlow, Java, C++, R, MySQL, Stata, MS Excel
Languages: Turkish (Native), Spanish (Conversational)
Interest: Volleyball Coaching, Turkish Folk Dance, Piano, Swimming, Language Learning