Selim Kuzucu

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Education

- **Middle East Technical University** — Ankara, Turkey
  Bachelor of Science - Computer Engineering; GPA: 3.69/4.00 — *Aug 2019 - June 2023*
  Courses: *Deep Learning, Guided Research, Software Engineering, Operating Systems, Algorithms, Computer Organization, Data Management and File Structures, Data Structures, Formal Languages and Automata Theory, Programming Languages, Statistics, C Programming*
  Activities: *Co-Founder of Management Consulting Club, Member of ACM Student Chapter, Former Swarm Team Member at Robotics Club*

Publications

- **Selim Kuzucu**, Siyang Song, Hatice Gunes, " Supervising Facial Activation Unit Recognition Through Link Prediction", work in progress, 2023
- **Selim Kuzucu**, Jiaee Cheong, Sinan Kalkan, Hatice Gunes, " Aleatoric Uncertainty As A Measure for Fairness and Bias Mitigation", work in progress, 2023
- Jiaee Cheong, **Selim Kuzucu**, Sinan Kalkan, Hatice Gunes, "Bias and Fairness in Mental Wellbeing Analysis", will be submitted to **IJCAI AI for Social Good**, 2023
- Zeynep Sonat Baltacı, Kemal Öksüz, **Selim Kuzucu**, Kıvanç Tezören, Berkin Kerim Konar, Alpay Özkan, Emre Akbaş, Sinan Kalkan, "Class Uncertainty: A Measure to Mitigate Class Imbalance", under review at **Nature Machine Intelligence**, 2023
- Siyang Song, Yuxin Song, Cheng Luo, Zhiyuan Song, **Selim Kuzucu**, Xi Jia, Zhijiang Guo, Weicheng Xie, Linlin Shen, Hatice Gunes, "Deep Learning Graph Representation with Task-specific Topology and Multi-dimensional Edge Features", under major revision following the reviews at **T-PAMI**, 2022, available at Arxiv

Experience

- **AFAR Lab at University of Cambridge** — February 2022 - Present
  Undergraduate Student Researcher
  - **Research Topic - Investigating and Mitigating Bias Across Mental Health Datasets Through Uncertainty**: Working under the supervision of Assoc. Prof. Sinan Kalkan and Prof. Hatice Gunes and PhD Student Jiaee Cheong.
  - **Contributions:**: Currently investigating the results obtained through Deep Deterministic Uncertainty (DDU, Mukhoti et al., 2021) and Deep Ensembles (Lakshminarayanan B. et al., 2017) on Depresjon, Psykose and D-Vlog datasets.
  - **Research Topic - Deep Learning Graph Representations with Task-specific Topology and Multi-dimensional Edge Features**: Working under the supervision of Prof. Hatice Gunes and Dr. Siyang Song.
  - **Contributions:**: Devised a task called link prediction that considers the co-occurrence patterns of facial activation units that are used for emotion recognition. Also took part in developing the Multi-Dimensional Edge Feature Generation module. Utilized **G-GCN** and **GAT** to achieve top notch predictions in BP4D and DISFA non-graph datasets. Used **PyTorch** and various visualization methods such as **Grad-CAM** and other saliency-based mappings. Submitted this work to **IEEE T-PAMI** as a co-author.
- **METU Image Lab** — October 2021 - Present
  Undergraduate Student Researcher
  - **Research Topic - Class Uncertainty: A Measure to Mitigate Class Imbalance**: Working under the supervision of Assoc. Prof. Sinan Kalkan, Asst. Prof. Emre Akbaş and Dr. Kemal Öksüz.
  - **Contributions**: Worked with various uncertainty quantification methods such as Deep Ensembles (Lakshminarayanan B. et al., 2017) and DUQ (van Amersfoot et al., 2021) to overcome the class imbalance problem. Furthermore, took part in forming a novel semantically-imbalanced dataset called "SVCI'20" while also performing various imbalance mitigation techniques on it. This work is submitted to **Nature Machine Intelligence Journal** with me as a co-author.
- **General Electric** — June 2021 - December 2021
  Software Engineer Intern
  - **Onboarding Documentation with a Bash Script**: Designed and created an onboarding documentation with a multi-purpose bash script for the team that reduced the average technical onboarding time for new members from 10+ days to about 2 days.
  - **User Stories and Other Work**: Earned about 10 story points on average of 58 average total points of the entire team of 11 people during the sprints. Enhanced 15+ different features, from minor UI changes to entire component changes and resolved 10+ bugs.
  - **Angular Version Updates**: Updated the Angular version of all 4 micro-apps, while combined, a large project by Angular standards, from 8.0 to 12.0.

- **Kovan Research Lab** July 2021 - October 2021
  Undergraduate Student Researcher
  - **Research Topic - Implementing and Designing Algorithms for UAV Swarms**: Worked under the supervision of Assoc. Prof. Erol Şahin, jointly with METURONE Swarm Team.
  - **Contributions**: Implemented the formation algorithms for creating the appropriate formations (star, V, poligon formations etc.) and their conversion from one to other, through **ROS**, **Gazebo**, **Python** and **C++**. Also enhanced the abilities of swarm through adding rotation, displacement and trajectory following functionality.
- **Scientific and Technological Research Council of Turkey** Jan 2021 - Jun 2021
  Undergraduate Student Researcher
  - **Research Topic - Developing A Domain-Specific Language for RF Calibration Devices**: Worked under the supervision of Prof. Halit Oğuztüzün
  - **Contributions**: Designed and developed a domain-specific scripting language for automatically calibrating RF devices in Turkey. Prior to this work, every single RF device had to be shipped across the ocean to The US for biannual calibration sessions. Utilized **ANTLR** and **Python** during the development.

Projects

- **Code Implementation for Uncertainty Quantification in CNN Through the Bootstrap of Convex Neural Networks (AAAI'21)** : Implementation of the models and approaches presented in the paper. The official code was not released, so I implemented it with a friend of mine for anyone who is willing to reproduce the results and verify the validity of approaches. Used **Torch Python**. Available at GitHub (June, 2022)
- **Gomoku San - Gomoku Player**: Used the ultimate solution proposed by Allis et al. to implement an artifically intelligent gaming bot that would beat anyone daring to play the game. Developed with **Python** and **C++** (July, 2021)
- **Log File Examiner**: A log file examiner that examines errors (by using regular expressions) and users from log files (syslog etc.) and stores them in a reverse sorted order with respect to their frequency to 2 separate csv files, developed with **Python** and **Bash**. (March, 2020)

Honors, Awards & Test Scores

- Scored 328/340 in GRE (Verbal: 160 (85%), Quantitative: 168 (90%), Analytical Writing: 4.5 (79%)) - October 2022
- First place in Guided Research Symposium at METU Computer Engineering Department out of 30 different undergraduate research projects with my work in developing a novel one-pass uncertainty quantification method - June 2022
- Scored 118/120 in TOEFL (R: 30, L: 29, S: 30, W: 29) - August 2021
- Earned METU Development Foundation's Academic Merit Scholarship - September 2019
- Ranked in top 0.01 % (270^{th}) at Turkish university entrance exam amongst 2.5 million test takers - July 2019
- Won FIRST Robotics Competition Shanghai Regionals Rookie Allstar Award out of about 50 other rookie teams as the founder team captain of Turkish province of Aydin's first competitive robotics team - March, 2018
- Earned Volunteer Service Award by US Department of State for volunteering for more than 250 hours - June, 2017
- Earned YES Scholarship by the US Department of State to spend an academic year at US - 2016-2017

Teaching and Volunteer Experience

- **METU Computer Engineering Department**: Been volunteering as an undergrad teaching assistant in CENG310-Algorithms and Data Structures with Python course during Fall'22 semester. Currently taking part in homework preparations and recitations.
- **METU Computer Engineering Department**: Volunteered as an undergrad teaching assistant in CENG240-Python Programming for Engineers course during Spring'21 semester. Held live QnA and recitation sessions and provided offline support.
- **METU Robotics Club**: Volunteered to teach fellow club members robotics basics, ROS and deep learning for computer vision. Held online tutoring sessions and provided offline support.
- **American Field Service**: Been volunteering since 2017, taking part in various events such as being an interviewer at the selection steps of the new generation of exchange students and fundraising nights.
- **FIRST**: Taught robotics basics at Centralia Middle School in Centralia, WA in 2017 and also robotics basics and Robot-C programming language at 6 different middle schools in Aydin, Turkey in 2018.

Skills Summary

- **Fluent Languages**: Python, C++, JavaScript, C#, C, Bash, MySQL
- **Frameworks and Platforms**: PyTorch, Angular, Flask, Linux, ROS, LaTeX, Intellij, Google Colab
- **Miscellaneous**: Playing bass and electric guitar, playing Baduk (or Go-Weiqi), learning about Chinese language and culture (Mo Yan, Yu Hua and Cixin Liu are some of my favorite), reading-researching on gothic and far-eastern literatures