

Selim Kuzucu

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EDUCATION

- **Middle East Technical University** Ankara, Turkey
Bachelor of Science - Computer Engineering; GPA: 3.66/4.00, **top 5% of the class** Aug 2019 - June 2023
Activities: Founder of Management Consulting Club, Member of ACM Student Chapter, Former Member at Robotics Club

PUBLICATIONS

- Kemal Oksuz, **Selim Kuzucu**, Tom Joy, Puneet K. Dokania, "Are your Experts Calibrated? Significantly Improving Object Detection with a Mixture of Calibrated Experts", submitted to **CVPR 2024**, available here, 2023
- **Selim Kuzucu**, Jiaee Cheong, Sinan Kalkan, Hatice Gunes, "Uncertainty-based Fairness Measures", under review at **AAAI 2024 AI for Social Impact Track**, 2023
- Jiaee Cheong, **Selim Kuzucu**, Sinan Kalkan, Hatice Gunes, "Bias and Fairness in Mental Wellbeing Analysis", accepted to **IJCAI 2023 AI and Social Good Track**, published in the proceedings, 2023, available here
- Zeynep Sonat Baltacı, Kemal Öksüz, **Selim Kuzucu**, Kıvanç Tezören, Berkin Kerim Konar, Alpaz Özkan, Emre Akbaş, Sinan Kalkan, "Class Uncertainty: A Measure to Mitigate Class Imbalance", under review at **IEEE Computational Intelligence Magazine**, 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 review at **T-PAMI**, 2022, available here

EXPERIENCE

- **Five AI (Bosch)- Oxford Applied Research Center** September 2023 - Present
Intern Research Scientist **Supervisor: Dr. Puneet K. Dokania**
 - **Research Topic - Mixture of Calibrated Experts for Object Detection**
 - **Contributions:** Conducted all of the robustness experiments, improved the performance of existing methods up to +3 APs under natural and synthetic corruptions. Proposed to utilize the suggested technique with vision-language foundation models and improved the ODinW-35 open-vocabulary object detection performance up to +1.1 AP.
- **AFAR Lab at University of Cambridge** February 2022 - August 2023
Undergraduate Student Researcher **Supervisor: Prof. Hatice Gunes**
 - **Research Topic - Uncertainty-based Fairness Measures**
 - **Contributions:** Lead the project and showed that the existing point-based fairness measures can cause potential pitfalls to miss the existing biases. Proposed a new notion for fairness gap based on uncertainty discrepancies across subgroups, and evidenced the need for them through extensive experiments on three proposed synthetic datasets and three real-life datasets.
 - **Research Topic - Investigating Fairness in Mental Well-being Through Bias Mitigation**
 - **Contributions:** Investigated the fairness issues in mental well-being as one of the first comprehensive studies in the field, such as D-Vlog Depression Detection Video Dataset. Experimented with an highlighted the inefficiency of the existing bias mitigation techniques.
 - **Research Topic - Deep Learning Graph Representations with Task-specific Topology and Multi-dimensional Edge Features**
 - **Contributions:** Devised the link prediction task for the co-occurrence patterns of facial activation units 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.
- **METU Image Lab** October 2021 - September 2022
Undergraduate Student Researcher **Supervisor: Prof. Sinan Kalkan**
 - **Research Topic - Uncertainty As A Measure to Mitigate Class Imbalance**
 - **Contributions** Worked with various uncertainty quantification methods such as Deep Ensembles (Lakshminarayanan B. et al., 2017) and DUQ (van Amersfoort et al., 2021) to overcome the class imbalance problem. Furthermore, curated a novel semantically-imbalanced dataset called "SVCI'20" and performed various imbalance mitigation techniques on it.
- **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.

PROJECTS

- **Code Implementation for Uncertainty-Aware Learning Against Label Noise on Imbalanced Datasets (AAAI'22)** Provided the unofficial implementation for the methods described in the work as the official code was not released. Conducted as part of the graduate course CENG502: Advanced Deep Learning. Available at GitHub (June, 2023)
- **Code Implementation for Uncertainty Quantification in CNN Through the Bootstrap of Convex Neural Networks (AAAI'21)** Provided the unofficial implementation for the methods described in the work as the official code was not released. Available at GitHub (June, 2022)
- **Gomoku San - Gomoku Player** Used the ultimate solution proposed by Allis et al. to implement an artificially 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 % (270th) at Turkish university entrance exam amongst 2.5 million test takers - July 2019

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