Basak Celik

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Availability: January 2023-August 2023, May 2023-September 2023

EDUCATION

- **Northeastern University**, Boston, MA
  PhD Student in Electrical & Computer Engineering, 2020 – 2024 (Expected)

- **Middle East Technical University**, Ankara, Turkey
  Bachelor of Science in Electrical & Electronics Engineering, 2012 – 2017

COMPUTER SKILLS

- **Programming Languages:** Python (4+ years), C (5+ years), C++ (1+ years)
- **Machine Learning Toolkits:** PyTorch, Tensorflow, Scikit-Learn (2+ years)
- **Tools/Framework:** MATLAB (6+ years), HTML, Git, Altium Designer, PSpice, COMSOL, VHDL

RESEARCH SKILLS

Deep Neural Network Design for Human Machine Interfaces (HMI), Training Pipeline and Software Development, Human-in-the-loop AI, Domain Adaptation, Transfer Learning, Applied Machine Learning for Intent Inference from Neuromotor Signals, Anomaly Detection

RESEARCH AND WORK EXPERIENCE

- **Graduate Research Assistant, Cognitive Systems Laboratory**, Northeastern University, 2020 - Present
  - CAMBI: EEG-based target prediction for Human Machine Interfaces. (NIH funded, paper in review)
    - Training pipeline and software development of deep neural networks for real-time target prediction on EEG signals. **(Python, PyTorch, Tensorflow)**
    - Developing domain adaptation methods to reduce the calibration time of the assistive communication system. **(Python, Scikit-learn)**
    - Developing multimodal sensor fusion (EEG, EOG, eye tracking) for real-time communication interfaces. **(Python)**
    - Developing automated anomaly detection and artifact rejection models for the EEG signal. **(Python, Scipy, Matlab)**
  - GEST: EMG-based gesture classification project for online, real-time device control. (Industry funded, paper in preparation)
    - Developed discriminative models for online, real-time prediction of hand gestures using EMG-based signals. **(Python, Scikit-learn, Cvxpy).**
    - Developing population models and transfer learning applications for discriminative gesture classification. **(Python, PyTorch, Tensorflow)**
  - VZ: Cognitive Load Assessment using Brain-Computer Interfaces. (Industry funded)
    - Developed machine learning algorithms to compute the cognitive workload of the user during critical mental tasks. **(Python, Scikit-learn)**

- **Hardware & Software Design Engineer, Turkish Aerospace**, Ankara / Turkey, 2018 - 2020
  - Developed airborne electronic hardware and software subjected to aviation standards. Including: Bootloader development on Real-Time Operating Systems (RTOS) for airborne electronics, Board Support Package (BSP) & device driver development **(C/C++),**

communication peripheral development for aircraft central control computers, custom board bring-up, digital design **(VHDL)** for flight displays.

- **Graduate Research Assistant, Heart Research Laboratory,** Middle East Technical University, 2019 - 2020
    - Conducted research on wavelet-sparsity based estimation methods for inverse problem of Electrocardiographic Imaging (ECGI). Developed methods to reconstruct the epicardial (heart surface) electrical activity from attenuated body surface potentials **(MATLAB)**. Primary objective of the project was to detect cardiac arrhythmias and other serious electrical abnormalities of the heart using the reconstructed potentials.

- **Graduate Research Assistant, Magnetic Resonance Imaging Research Lab,** Middle East Technical University, 2017 - 2019
    - Conducted research on Magnetic Resonance Conductivity Tensor Imaging (MRCTI). Generated unique contrast images of in-vitro biological tissues with MRCTI method, and distinguished healthy tissue from the abnormal using the variation in tissue conductivity property. Designed pulse sequences **(C++),** performed computer simulations **(COMSOL)** and conducted MRI experiments with imaging phantoms **(3T MRI).**

- **Undergraduate Research Assistant, Brain Research Laboratory,** Middle East Technical University, 2016 - 2017
    - Collaborated on the development of a complete Brain Computer Interface (BCI) system. Main responsibilities were: EEG data acquisition and signal processing **(MATLAB),** feature extraction and target frequency detection **(MATLAB),** and the development of typing interface display **(C#).**

- **Engineering Intern, Turkish Aerospace**, Ankara / Turkey, Summer 2016
    - Completed a comprehensive mobile game development project, consisting of schematic capture and printed circuit board (PCB) design of IC boards **(Altium Designer),** mobile Android app development **(JavaScript),** and communication system development between IC boards and Field Programmable Gate Arrays **(VHDL).**

PUBLICATIONS

- Smedemark-Margulies, N., **Celik, B.**, Imbiriba, T., Kocanaogullari, A., Erdogmus, D. (In Review). Recursive Estimation of User Intent from Noninvasive Electroencephalography using Discriminative Models. 2023 IEEE International Conference on Acoustics, Speech and Signal Processing.
- Gonzalez-Navarro, P., **Celik, B**., Moghadamfalahi, M., Akcakaya, M., Fried-Oken, M., & Erdoğmuş, D. (2022). Feedback Related Potentials for EEG-Based Typing Systems. Frontiers in Human Neuroscience, 15.
- Klee, D., Memmott, T., Smedemark-Margulies, N., **Celik, B**., Erdoğmuş, D., & Oken, B. (2022). Target-Related Alpha Attenuation in a Brain-Computer Interface Rapid Serial Visual Presentation Calibration. Frontiers in Human Neuroscience.

AWARDS & SCHOLARSHIPS

- Northeastern University College of Engineering, ECE Fellowship for PhD Program in Electrical & Computer Engineering, 2020 - 2024.
- TUBITAK Scholarship Program for MSc Students, 2017 - 2018. Funded by Turkish Scientific Research Council for the Magnetic Resonance Imaging studies.