Metehan Cekic   PhD Candidate

CONTACT
INFORMATION
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EDUCATION

University of California Santa Barbara, Santa Barbara, US   **2017 - Present**
Ph.D. and M.S., *Electrical and Computer Engineering*
- Supervisor: Prof. Upamanyu Madhow
- Area: Machine Learning, Deep Learning and Signal Processing
- GPA: 4.0/4.0

Bogazici University, Istanbul, Turkey   **2012 - 2017**
B.S., *Electrical & Electronics Engineering*, **B.S.** *Physics*
- CGPA: 3.7/4.0, Dean's High Honors List

University of California Los Angeles, Los Angeles, US   **2015 - 2016**
B.S. Study Abroad, *Electrical and Computer Engineering*
- GPA: 3.9/4.0

PROFESSIONAL
EXPERIENCE

Amazon, Alexa AI, Sunnyvale, US   **Summer 2021**
Supervisor: Dr. Ruirui Li

- *Applied Scientist Intern*: Presented systematic studies to use Alexa Dialogue Session dataset to pretrain a Speaker ID model without labels.
- Proposed and implemented a novel rejection mechanism to effectively eliminate low-quality dialogues in self-supervised fashion which provides around 15% EER improvements on the speaker recognition task.

Graduate Research Assistant, UCSB, Santa Barbara, US   **2018 - Present**
Advisor: Prof. Upamanyu Madhow

- *Radio Frequency (RF) Machine Learning (ML)*: Showed that complex-valued CNNs can learn RF signatures to distinguish between devices sending exactly the same message. Demonstrated effectiveness for two different wireless protocols: WiFi and ADS-B. Studied robustness to spoofing, and to channel variations, noise and frequency drift occuring in data collected over different days/locations.

- *Adversarial Machine Learning*: We investigate neuro-inspired defense mechanism, starting from the observation that human vision is virtually unaffected by adversarial examples designed for machines. We aim to reject ℓ_∞ bounded adversarial perturbations before they reach a classifier DNN, using an autoencoder with characteristics commonly observed in biological vision: sparse overcomplete representations, randomness due to synaptic noise, and drastic nonlinearities.

Speech Enabled Software Technologies (SESTEK), Istanbul, Turkey   **Summer 2015**

- *Speech Processing Engineer*: Worked on how to detect edited tapes and speech processing techniques used in forensic incidents.

SIDE PROJECTS

Reinforcement Learning for Turkish Card Game Called "Batak"   **2019**
- Programmed the game and the environment from scratch, and developed a competitive AI by utilizing LSTM and fully connected neural networks specifically designed for the game.
- Compared different architectures and got a performance close to human-level.

COMPUTER
SKILLS

Languages: Python, MATLAB, C/C++, Bash.
Libraries: Pytorch, Tensorflow, Scikit-learn, Numpy, Pandas.

RELEVANT
COURSEWORK

- Machine Learning: A Signal Processing Perspective
- Deep Learning for NLP
- Theoretical Machine Learning
- Pattern Recognition
- Advanced Topics in Computer Vision
- Information Theory
- Optimal Estimation and Filtering
- Game Theory
- Convex Optimization

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<tr><td>PUBLICATIONS</td><td>

1. C. Bakiskan, **M. Cekic**, U. Madhow, "Early Layers Are More Important For Adversarial Robustness", to appear in *International Conference on Machine Learning (ICML) 2022 Workshop – New Frontiers in Adversarial Machine Learning*, Baltimore, USA, Jul 2022.

2. **M. Cekic**, C. Bakiskan, U. Madhow, "Layerwise Hebbian/anti-Hebbian (HaH) Learning In Deep Networks: A Neuro-inspired Approach To Robustness", to appear in *International Conference on Machine Learning (ICML) 2022 Workshop – New Frontiers in Adversarial Machine Learning*, Baltimore, USA, Jul 2022.

3. **M. Cekic**, C. Bakiskan, U. Madhow, "Towards Robust, Interpretable Neural Networks via Hebbian/anti-Hebbian Learning: A Software Framework for Training with Feature-Based Costs", *Software Impacts* (2022).

4. **M. Cekic**, C. Bakiskan, U. Madhow, "Neuro-Inspired Deep Neural Networks with Sparse, Strong Activations", to appear in *IEEE International Conference in Image Processing (ICIP)*, Bordeaux, France, Oct 2022.

5. **M. Cekic**, R. Li, Z. Chen, Y. Yang, A. Stolcke, U. Madhow, "Self-Supervised Speaker Recognition Training Using Human-Machine Dialogues", *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Singapore, May 2022.

6. **M. Cekic**, S. Gopalakrishnan, U. Madhow, "Wireless Fingerprinting via Deep Learning: The Impact of Confounding Factors", *IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2021.

7. C. Bakiskan, **M. Cekic**, A. D. Sezer, U. Madhow, "Sparse Coding Frontend For Robust Neural Networks", *International Conference on Learning Representations (ICLR), Workshop on Security and Safety in Machine Learning Systems*, May 2021.

8. C. Bakiskan, **M. Cekic**, A. D. Sezer, U. Madhow, "A Neuro-Inspired Autoencoding Defense Against Adversarial Perturbations", *IEEE International Conference on Image Processing (ICIP)*, Anchorage, Sept. 2021.

9. S. Gopalakrishnan, **M. Cekic**, U. Madhow, "Robust Wireless Fingerprinting via Complex-Valued Neural Networks", *IEEE Global Communications Conference (Globecom)*, Hawaii, Dec. 2019.

10. S. Gopalakrishnan, Z. Marzi, **M. Cekic**, U. Madhow, R. Pedarsani, "Robust Adversarial Learning via Sparsifying Front Ends", Preprint, arXiv:1810.10625.

11. C. Bakiskan, S. Gopalakrishnan, **M. Cekic**, U. Madhow, R. Pedarsani, "Polarizing Front Ends For Robust CNNs", *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Barcelona, Spain, May 2020.

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TEACHING

Teaching Assistant experience in UCSB: Assisted lead professors with tasks related to administering college level courses and led problem solving class discussions.

– *Graduate level courses*: ECE 283: Machine Learning
– *Undergraduate level courses*: ECE 130B: Signal Analysis, ECE 139: Probability Theory

HONORS AND AWARDS

ECE Dissertation Fellowship, University of California, Santa Barbara	2022
ECE Outstanding Teaching Assistant Award, University of California, Santa Barbara	2018
Outstanding Success Scholarship, Turkish Education Association	2012
87th Place in National University Entrance Exam amid 2 million takers in Turkey	2012
High School Valedictorian, Turkey	2012
Silver Medal in 13rd National Mathematics Olympiads, TUBITAK	2008

COMMUNITY SERVICE

Reviewer for *IEEE* TDSC, *IEEE* TWC, *IEEE* ICIP.