Selim Furkan Tekin

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Research Interests

Current Interests.

- My research goal is to decrease the data dependency of the models and enhance their performance, stability, and robustness. In that sense, I am working on few-shot learning in diverse contexts, including federated learning, natural language processing, and computer vision.

Previously Studied.

- Time series analysis and forecasting, Systems for Machine Learning, and Large Language Models.

Education

Aug 2022-Present **Georgia Institute of Technology**, *Atlanta, US*
Ph.D., School of Computer Science
Program Advisor: Prof. Ling Liu.

Jul 2019-Aug 2022 **Bilkent University**, *Ankara, Turkey*
M.Sc., Department of Electrical and Electronics Engineering
Program Advisor: Prof. Suleyman Serdar Kozat.

Sep 2015-Jun 2019 **Bilkent University**, *Ankara, Turkey*
B.Sc., Department of Electrical and Electronics Engineering.

Honors and Awards

2010-2022 **Bilkent University Scholarship**: full tuition waiver during H.S., B.Sc., and M.Sc. Studies.

2020-2021 **2 journal papers**: published on Signal, Image and Video Processing and Monthly Weather Review of American Meteorological Society.

2019-2020 **5 conference proceedings**: presented in IEEE conference proceedings.

Industrial Experience

Data Scientist, Databoss Security & Analytics Inc., Ankara, Turkey

2021–2022 **Forecasting The Natural Gas Consumption of Turkey for Each Actor: Residential, Electricity, and Industry**.
I developed an AutoML framework for forecasting with conventional machine learning, time-series, and deep learning algorithms, allowing data and model level ensemble. The model can forecast with up to 2.5 mean AP for electricity, industrial, and household consumption. The official natural gas provider of Turkey, Petroleum Pipeline Corporation(BOTAS), licensed the product.

2020–2021 **Spatiotemporal Event Prediction**.
My goal was to predict crime events happening in an adversarial environment by exploiting multiple data sources. The crime data contains spatial, temporal, categorical covariates with high sparsity. Thus, I designed a novel model architecture that divides the problem into sub-problems and exploits the side-information, e.g., weather, geography, and demography. Furthermore, we designed a framework that can perform online learning, ensemble of multiple predictions and visualization. The Presidency of Defense Industries of Turkey licensed the developed software.

2019–2020 **Social Media Analysis and Reporting**.
We developed a social media analysis tool to present shared text and media analysis and predicted social media anomalies. I designed a Scikit-Learn pipeline that performs Named Entity Recognition on 20 different categories leveraging the features of the BERT language model.

Internship

2018–2018 **ASELSAN, Ankara, Turkey**.
It is the biggest defense company in Turkey. Here, I created a Wireshark plugin in a specific domain language for hexadecimal digits parsing inside Radar systems.

2017–2017 **Mekatro, Istanbul, Turkey**.
I designed a PID controller on MATLAB for an actuator that controls water flow.

Programming Skills

Programming Python, R, C/C++, Java, Matlab, VHDL, Assembly

Libraries PyTorch, TensorFlow, Scikit-Learn, Pandas, Numpy, Flask, Spark, Elasticsearch, Scrapy, NetCDF, GRIB

Tools Docker, Git, Bitbucket, Jira

Publications

Papers

[9] **S. Tekin** and S. S. Kozat, "Crime Prediction with Graph Neural Networks and Multivariate Normal Distributions," published *Signal Image and Video Processing*, Aug. 2022. DOI: `https://doi.org/10.1007/s11760-022-02311-2`.

[8] **S. Tekin**, O. Karaahmetoglu, F. Ilhan, I. Balaban, and S. S. Kozat, "Spatio-Temporal Weather Forecasting and Attention Mechanism on Convolutional LSTMs," under second round revision *Monthly Weather Review*, 2021. [Online]. Available: `https://arxiv.org/abs/2102.00696`.

Conference Proceedings

[7] **S. Tekin**, F. Ilhan, H. Sihao, H. Tiansheng, K. Ho, and L. Liu, "Fusion of Perspectives: The Strength of Multiple Few-Shot Learners," in under submission to *AAAI*, Aug. 2023.

[6] **S. Tekin** and B. Aksoy, "Multi-step Spatio-Temporal Numerical Weather Data Forecasting," in *2020 28th Signal Processing and Communications Applications Conference (SIU)*, Oct. 2020, pp. 1–4. DOI: `10.1109/SIU49456.2020.9302113`.

[5] S. F. Yilmaz, I. Balaban, **S. Tekin**, and S. S. Kozat, "Hybrid framework for named entity recognition in turkish social media," in *2020 28th Signal Processing and Communications Applications Conference (SIU)*, 2020, pp. 1–4. DOI: `10.1109/SIU49456.2020.9302335`.

[4] H. Sihao, H. Tiansheng, **S. Tekin**, *et al.*, "Ethereum Account Profiling and De-anonymization via Pseudo-Siamese BERT," in under submission to *AAAI*, Aug. 2023.

[3] H. Tiansheng, H. Sihao, **S. Tekin**, *et al.*, "Lockdown: Backdoor Defense for Federated Learning with Isolated Training Subspace," in under submission to *NeurIPS*, May 2023.

[2] F. Ilhan, H. Sihao, **S. Tekin**, *et al.*, "Hierarchical Deep Neural Network Inference for Device-Edge-Cloud Systems," in under submission to *NeurIPS*, May 2023.

[1] K. Ho, F. Ilhan, **S. Tekin**, *et al.*, "PMask: Diversity-driven Privacy Protection Masks Against Unauthorized Face Recognition," in under submission to *CVPR*, Sep. 2023.

Academic Duties

2021-2022 **Reviewer at TNNLS, and TSIPN**.

2022-Present **Teachning assistant at Collage of Computing for CS 6675**.

2019-2021 **Teachning assistant at EEE for MATH 241-242 and EEE 391**.

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