

Fatih İlhan

Resume

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RESEARCH INTERESTS	Efficient Inference/Fine-tuning for Large Language/Multi-modal Models, Computer Vision, Distributed/Federated Learning, Ensemble Learning, AI Safety and Alignment	
ACADEMIC EXPERIENCE	Georgia Institute of Technology	Atlanta, GA, USA
	Ph.D. in Computer Science, CGPA: 3.84/4.00, Supervisor: Prof. Ling Liu	August 2021 – Present
	<ul style="list-style-type: none">- Published 13 papers (5 as first author) in top venues such as CVPR, NeurIPS, ICLR, EMNLP- Served as reviewer for CVPR, ICCV, AAAI, ICML, ICDCS, IEEE PAMI and IEEE TOIT.- Head TA for the Advanced Internet Systems course with 5 TAs and 100-150 students, selected as the outstanding Head TA for OMSCS program.	
	Bilkent University	Ankara, Türkiye
	M.Sc. in EEE, CGPA: 3.58/4.00, Supervisor: Prof. Serdar Kozat	September 2019 – August 2021
	<ul style="list-style-type: none">- Thesis: Nonstationary Time Series Prediction with Markovian Switching RNNs- Published 3 papers in top IEEE journals, served as reviewer for IEEE TNNLS and IEEE TSP.- Served as TA for the courses: Statistical Learning and Data Analytics, Neural Networks.	
	B.Sc. in Electrical and Electronics Engineering, CGPA: 3.81/4.00	January 2018 – June 2019
	<ul style="list-style-type: none">- Senior Project: GPS-independent outdoor localization system- Specialization in signal processing, machine learning, communications- Attended exchange program at Nagoya University, Japan (Spring 2018) and studied intelligent automobile systems.	
	Ankara Science High School	Ankara, Türkiye
	High School Degree, Science Track, CGPA: 95.26/100	September 2010 – June 2014
WORK EXPERIENCE	IBM Thomas J. Watson Research Center	Yorktown Heights, NY
	Researcher Intern, Mentors: Dr. Gong Su, Dr. Donna Dillenger	May-Aug 2022/2023/2024
	<ul style="list-style-type: none">- I worked on memory-efficient decoding with KV cache compression for long-context inference with LLMs, filed a patent application.- I researched efficient pruning for LLM fine-tuning in resource-constrained environments. Our work led to a publication at CVPR24.- I worked on computation-efficient federated learning under heterogeneous settings with on-premise deployments, filed a patent. Our work led to two publications at CVPR23 and ICDCS23.	
	DataBoss Analytics	Ankara, Türkiye
	Machine Learning Engineer	August 2018 – July 2021
	<ul style="list-style-type: none">- Built Predy.AI, an end-to-end pipeline for real-time spatio-temporal prediction and anomaly detection, within a team of three engineers. Analyzed retail data from customer businesses to provide procurement and logistics insights, reduced consumption forecast errors by up to 40%.	
	Roketsan	Ankara, Türkiye
	Electronics Engineer Intern	June 2017 – July 2017
	<ul style="list-style-type: none">- Integrated GPS and INS data using Extended Kalman Filter for navigation systems and enhanced localization precision by 85%. Built a Labview application for fast and simultaneous communication with eight GPS receivers.	

Source codes with more details are available on: github.com/git-disl and github.com/fatih-ilhan

Efficient Inference/Fine-tuning:

- Memory-efficient federated learning/fine-tuning: ScaleFL [C12, C13], RECAP [C18], Fed4LM [P1]
- Adaptive inference: HiDEC [C11], EENet [C17]
- KV cache compression for long-context inference [P2, P3]
- Efficient ensemble learning: LLM-TOPLA [C15]

Robust Deep Learning Systems:

- Defense algorithms against adversarial attacks. [C8, C9, C10, C14]
- LLM safety and alignment [C16, C19]

Time Series Prediction and Anomaly Detection:

- Online time series analysis [J3, C1, C2, C5]
- Spatio-temporal event prediction [J1, C6]
- Anomaly detection [J2, C3]

- [C19] T. Huang, S. Hu, **F. Ilhan**, S. F. Tekin, and L. Liu, “Booster: Tackling Harmful Fine-tuning for Large Language Models via Attenuating Harmful Perturbation”, *International Conference on Learning Representations (ICLR)*, 2025. (oral)
- [C18] **F. Ilhan**, G. Su, S. F. Tekin, T. Huang, S. Hu, and L. Liu, “Resource-Efficient Transformer Pruning for Fine-tuning of Large Models”, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.
- [C17] **F. Ilhan**, KH. Chow, S. Hu, T. Huang, S. F. Tekin, W. Wei, Y. Wu, M. Lee, R. Kompella, H. Latapie, G. Liu, L. Liu, “Adaptive Deep Neural Network Inference Optimization with EENet”, *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2024.
- [C16] T. Huang, S. Hu, **F. Ilhan**, S. F. Tekin and L. Liu, “Lazy Safety Alignment for Large Language Models against Harmful Fine-tuning”, *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*, 2024.
- [C15] S. F. Tekin, **F. Ilhan**, T. Huang, S. Hu and L. Liu, “LLM-TOPLA: Efficient LLM Ensemble by Maximising Diversity”, *ACL Conference on Empirical Methods in Natural Language Processing (EMNLP Findings)*, 2024.
- [C14] KH. Chow, Sihao Hu, Tiansheng Huang, **Fatih Ilhan**, Wenqi Wei, and Ling Liu, “Diversity-driven Privacy Protection Masks Against Unauthorized Face Recognition”, *Privacy Enhancing Technologies Symposium (PETS)*, 2024
- [C13] **F. Ilhan**, G. Su, Q. Wang and L. Liu, “Scalable Federated Learning with System Heterogeneity”, *IEEE International Conference on Distributed Computing Systems (ICDCS)*, 2023. (demo)
- [C12] **F. Ilhan**, G. Su and L. Liu, “ScaleFL: Resource-Adaptive Federated Learning with Heterogeneous Clients”, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.
- [C11] **F. Ilhan**, S. F. Tekin, S. Hu, T. Huang, KH. Chow, L. Liu, “Hierarchical Deep Neural Network Inference for Device-Edge-Cloud Systems”, *ACM International World Wide Web Conference (WWW)*, 2023. (poster)
- [C10] T. Huang, S. Hu, KH. Chow, **F. Ilhan**, S. F. Tekin and L. Liu, “Lockdown: Backdoor Defense for Federated Learning with Isolated Subspace Training”, *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*, 2023.
- [C9] KH. Chow, L. Liu, W. Wei, **F. Ilhan** and Y. Wu, “STDLens: Securing Federated Learning Against Model Hijacking Attacks”, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.
- [C8] W. Wei, L. Liu, KH. Chow, **F. Ilhan** and Y. Wu, “Model Cloaking against Gradient Leakage”, *IEEE International Conference on Data Mining (ICDM)*, 2023.
- [C7] S. Hu, T. Huang, **F. Ilhan**, S. F. Tekin, L. Liu, “Large Language Model-Powered Smart Contract Vulnerability Detection: New Perspectives”, *IEEE International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (IEEE TPS-ISA)*, 2023.

	<p>[C6] F. Ilhan, S. F. Tekin and B. Aksoy, “Spatio-Temporal Crime Prediction via Temporally Hierarchical Convolutional Neural Networks”, <i>28th IEEE Signal Processing and Communications Applications Conference</i>, 2020.</p> <p>[C5] F. Ilhan, N. M. Vural and S. S. Kozat, “LSTM-Based Online Learning with Extended Kalman Filter Based Training Algorithm”, <i>28th IEEE Signal Processing and Communications Applications Conference</i>, 2020.</p> <p>[C4] F. Ilhan and E. Mumcuoglu, “Performance Analysis of Semi-Supervised Learning Methods under Different Missing Label Patterns”, <i>28th IEEE Signal Processing and Communications Applications Conference</i>, 2020.</p> <p>[C3] F. Ilhan, S. F. Yilmaz and S. S. Kozat, “A Two-Stage Multi-Class Classification Approach Based on Anomaly Detection”, <i>28th IEEE Signal Processing and Communications Applications Conference</i>, 2020. (<i>poster</i>)</p> <p>[C2] N. M. Vural, B. Altas, F. Ilhan and S. S. Kozat, “Shortest Path Learning in Non-Stationary Environments via Online Convex Optimization”, <i>28th IEEE Signal Processing and Communications Applications Conference</i>, 2020.</p> <p>[C1] N. M. Vural, B. Altas, F. Ilhan and S. S. Kozat, “Online Shortest Path Learning via Convex Optimization”, <i>28th IEEE Signal Processing and Communications Applications Conference</i>, 2020.</p>
JOURNAL PAPERS	<p>[J3] F. Ilhan, O. Karaahmetoglu, I. Balaban and S. S. Kozat, “Markovian RNN: An Adaptive Time Series Prediction Network with HMM-based Switching for Nonstationary Environments”, <i>IEEE Transactions on Neural Networks and Learning Systems</i>, 2021.</p> <p>[J2] N. M. Vural, F. Ilhan, S. F. Yilmaz, S. Ergüt and S. S. Kozat, “Achieving Online Regression Performance of LSTMs with Simple RNNs”, <i>IEEE Transactions on Neural Networks and Learning Systems</i>, 2021.</p> <p>[J1] F. Ilhan and S. S. Kozat, “Modeling of Spatio-Temporal Hawkes Processes with Randomized Kernels”, <i>IEEE Transactions on Signal Processing</i>, 2020.</p>
PREPRINTS	<p>[P3] F. Ilhan, S. F. Tekin, S. Hu, T. Huang and L. Liu, “Neural Cache Compression for Memory-Efficient Inference with Large Vision-Language Models”, <i>in progress</i>, 2025.</p> <p>[P2] F. Ilhan, G. Su and L. Liu, “Memory-Efficient Decoding with KV Cache Compression for Long-Context LLMs”, <i>in progress</i>, 2025.</p> <p>[P1] F. Ilhan, S. F. Tekin, S. Hu, T. Huang and L. Liu, “Fed4LM: Efficient Federated Fine-tuning under Data and Resource Heterogeneity with a Mixture of Masked Adapters”, <i>in progress</i>, 2025.</p>
PATENTS	<p>[T2] F. Ilhan, G. Su, “Memory-Efficient Decoding with KV Cache Compression for Large Language Models”, (<i>filed</i>), 2025.</p> <p>[T1] F. Ilhan, G. Su, “Computation-Efficient Federated Learning System for Resource Heterogeneity”, P20240403701, 2023.</p>
AWARDS AND HONORS	<ul style="list-style-type: none"> - Outstanding Head TA Award in OMS CS program by Georgia Tech (2024) - Full Scholarship from the Scientific and Technological Research Council of Türkiye for M.Sc. studies. - Full Scholarship from Bilkent University during B.Sc. and M.Sc. Studies. - 80th among 0.2M university graduates in ALES (National GRE). - JASSO Scholarship for Exchange Program at Nagoya University. - Bilkent University High Honor Student during B.Sc. Studies. - 191st among 2M high school graduates in University Entrance Examination.
SKILLS	<p>Programming: Python, C++, CUDA, SQL, R, Java, MATLAB, Assembly (8051), VHDL</p> <p>Tools: Deep Learning Libraries (Tensorflow, PyTorch, Keras), MLOps Tools (Kubernetes, Polyaxon, MLFlow), Other Tools (Docker, Flask, Django, Kafka, Spark), Agile (Gitlab, Atlassian Tools)</p> <p>Test Scores: TOEFL iBT: 108, GRE: 149/170/3.5</p>

- SOCIAL
ACTIVITIES
- Bass Guitarist in “Parallel Park” (2022-2023)
 - Bilkent University Music Club Member (2014-2017)
 - Bass Guitarist in “Freud Goes Technical” (2014-2017)
 - Bilkent IEEE Student Branch Member (2014-2016)
 - Bilkent University Open Software and Internet Technologies Club Member (2014-2015)
 - Ankara Science High School Electronics Club Member (2012-2014)
 - Ankara Science High School Physics Olympiads Team Member (2010-2012)
- HOBBIES
- Backpacking, overnight camping, being on the road
 - Playing bass, discovering new music genres