Mert Onur Cakiroglu

PhD Student · Computer Science

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Summary

PhD student in Computer Science with strong focus on machine learning for video understanding and time series forecasting. Experienced in self-supervised learning, compressed-domain video analysis, and graph-based sequence modeling, with multiple peer-reviewed publications in top-tier venues.

Core Skills

Machine Learning, Deep Learning, PyTorch, Computer Vision, Video Understanding, Time Series Forecasting, Self-Supervised Learning, Representation Learning, Graph Neural Networks, De Bruijn Graphs, Multimodal Learning, Federated Learning, Neural Networks, Sequence Modeling, Forecasting Models, Research and Experimentation

Publications

Conferences and Workshops

Mert Onur Cakiroglu, Idil Bilge Altun, Mehmet Dalkilic, Elham Buxton, Hasan Kurban. (2025). *Multivariate de Bruijn Graphs: A Symbolic Graph Framework for Time Series Forecasting*. International Conference on Machine Learning (ICML 2025), 1st Workshop on Foundation Models for Structured Data (FMSD). URL: https://arxiv.org/abs/2505.22768

Mert Onur Cakiroglu, Idil Bilge Altun, Shahriar Rahman Fahim, Hasan Kurban, Mehmet M. Dalkilic, Rachad Atat. (2025). *De Bruijn Graph-Enhanced Time Series Models for Electricity Load Forecasting*. International Symposium on Signals, Circuits and Systems (ISSCS 2025), Iasi, Romania, pp. 1–4. doi: https://doi.org/10.1109/ISSCS66034.2025.11105646

Mert Onur Cakiroglu, Hasan Kurban, Elham Khorasani Buxton, Mehmet Dalkilic. (2024). *A Novel Discrete Time Series Representation with De Bruijn Graphs for Enhanced Forecasting Using TimesNet (Extended Abstract)*. IEEE 11th International Conference on Data Science and Advanced Analytics (DSAA 2024), San Diego, CA, USA, pp. 1–3. doi: https://doi.org/10.1109/DSAA61799.2024.10722826

Peer-Reviewed Journals

Mert Onur Cakiroglu, Idil Bilge Altun, Shahriar Rahman Fahim, Hasan Kurban, Mehmet Dalkilic, Rachad Atat, Abdulrahman Takiddin, Erchin Serpedin. (2025). *An Extended Frequency-Improved Legendre Memory Model for Enhanced Long-Term Electricity Load Forecasting*. *IEEE Open Access Journal of Power and Energy*, 12, 691–701. doi: https://doi.org/10.1109/OAJPE.2025.3615513

Mert Onur Cakiroglu, Hasan Kurban, Elham Buxton, Mehmet Dalkilic. (2025). *A Novel Discrete Time Series Representation with De Bruijn Graphs for Enhanced Forecasting Using TimesNet*. *IEEE Access*, 13, 123182–123198. doi: https://doi.org/10.1109/ACCESS.2025.3588507

Mert Onur Cakiroglu, Hasan Kurban, Parichit Sharma, M. Oguzhan Kulekci, Elham Khorasani Buxton, Maryam Raeeszadeh-Sarmazdeh, Mehmet M. Dalkilic. (2024). *An Extended de Bruijn Graph for Feature Engineering Over Biological Sequential Data*. *Machine Learning: Science and Technology*, 5(3), Article 035020. doi: https://doi.org/10.1088/2632-2153/ad5fde

Mert Onur Cakiroglu, Hasan Kurban, Lilia Aljihmani, Khalid Qaraqe, Goran Petrovski, Mehmet M. Dalkilic. (2024). *A Reinforcement Learning Approach to Effective Forecasting of Pediatric Hypoglycemia in Diabetes I Patients Using an Extended de Bruijn Graph*. *Scientific Reports*, 14, Article 31251. doi: https://doi.org/10.1038/s41598-024-82649-4

Under Review

Mert Onur Cakiroglu, Idil Bilge Altun, Zhihe Lu, Mehmet Dalkilic, Hasan Kurban. (2025). *Temporal Realism Evaluation of Generated Videos Using Compressed-Domain Motion Vectors*. arXiv:2511.13897 [cs.CV]. Under review at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2026). doi: https://doi.org/10.48550/arXiv.2511.13897

Research Experience

Texas A&M University at Qatar – *Research Associate*

Advisor: Dr. Hasan Kurban ● *Doha, Qatar* *May. 2024 – Jul. 2024*

- Developing a self-supervised learning framework for video data, enabling the model to learn meaningful representations without labeled data, improving video understanding tasks such as classification and segmentation.
- Implementing federated video learning in the compressed domain, optimizing the model's performance while preserving user privacy and reducing communication overhead in distributed learning environments.

Student Researcher – *Kurban Intelligence Labs*

Advisor: Dr. Hasan Kurban *Aug. 2023 – Ongoing*

- Conducted research and authored academic papers on time series forecasting, Type 1 Diabetes hypoglycemia detection, and protein classification.
- Currently conducting research on video learning, self-supervised learning, and representation learning using de Bruijn graphs.

- *Laboratory Website:* `kurbanintelligencelab.com`

Work Experience

Innova IT Solutions

Full-Stack Software Developer *Jul. 2021 – Apr. 2023*

- Contributed to the development of the "Centralized Fault Management System (MARS)," designed to provide end-to-end fault detection, diagnosis, and resolution for telecommunication networks and IT infrastructures.
- Improved legacy codebase and developed new functionalities based on functional specifications and business requirements.
- Gained experience working in an agile development environment.
- Developed microservices using Spring Boot, interacting with PL/SQL and MongoDB databases in a microservice architecture.
- Worked on front-to-backend interactions using React.js and Vaadin frameworks, utilizing RESTful services for seamless integration.

- *Project Website:* `https://www.innova.com.tr/en/centralized-fault-management-system-mars`

Teaching

CSCI-C 200 Introduction to Computers and Programming

Associate Instructor (TA) *Spring 2023 – Ongoing*

- Instructor: Prof. Dr. Mehmet M Dalkilic

CSCI-B 657 Computer Vision

Associate Instructor (TA) *Spring 2024*

- Instructor: Prof. Dr. David Crandall

Education

Indiana University, Luddy School of Informatics, Computing, and Engineering

PhD Computer Science ● *Bloomington, Indiana* *Fall 2023 – present*

- **Advisor:** Prof. Dr. Mehmet M Dalkilic
- **Co-Advisor:** Dr. Hasan Kurban

TOBB University of Economics and Technology

BS Computer Science ● *Ankara, Turkey* *2017 – 2021*

Awards and Recognition

2023 **Fall 2023 Luddy Doctoral Associate Instructor Fellowship**, Luddy School of Informatics, Computing, and Engineering