Mert Onur Cakiroglu

PhD Student · Computer Science

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Research Interests

My research focuses on the intersection of machine learning, temporal data, video learning, and representation learning. I develop advanced models to improve video understanding, particularly in compressed domains and through self-supervised techniques. Additionally, I explore novel methods for representing low-dimensional sequential data, such as protein sequences and univariate time series, using de Bruijn graphs to enhance model performance in classification and forecasting tasks.

Education

Indiana University, Luddy School of Informatics, Computing, and Engineering — *Bloomington, Indiana*
PhD Computer Science — *Fall 2023 – present*

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

TOBB University of Economics and Technology — *Ankara, Turkey*
BS Computer Science — *2017 – 2021*

Publications

Conferences

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)*. 2024 IEEE 11th International Conference on Data Science and Advanced Analytics (DSAA), San Diego, CA, USA, pp. 1-3.

Peer Reviewed Journals

Mert Onur Cakiroglu, Hasan Kurban, Parichit Sharma, M. Oguzhan Kulekci, Elham Khorasani Buxton, Maryam Raeeszadeh-Sarmazdeh, Mehmet Dalkilic (2024). *An Extended De Bruijn Graph for Feature Engineering Over Biological Sequential Data*. Machine Learning: Science and Technology **(Impact Factor: 6.8)**

Mert Onur Cakiroglu, Hasan Kurban, Elham Khorasani Buxton, Mehmet Dalkilic. (2024). *A Reinforcement Learning Approach to Effective Forecasting of Pediatric Hypoglycemia in Diabetes I Patients: an extended de Bruijn Graph.* Nature – Scientific Reports **(Impact Factor: 3.8)**

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* - Machine Learning Journal (Under Review)

Research Experience

Texas A&M University at Qatar – *Temporary Research Associate* — *Doha, Qatar*
Advisor: Dr. Hasan Kurban — *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`

CSCI-C 200 Introduction to Computers and Programming

Associate Instructor (TA) *Spring 2023 – Ongoing*

- Instructor: Prof. Dr. Mehmet M Dalkilic

Awards and Recognition

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