TUM Campus Heilbronn
Technische Universität München

HEILBRONN DATA SCIENCE CENTER (HDSC)

Bridging data, AI, and business – the TUM Heilbronn Data Science Center drives innovation through interdisciplinary research and real-world impact. Its mission is to transform data into knowledge and knowledge into solutions that empower academia, industry, and society.

INVITED TALK

TUM CAMPUS HEILBRONN

Prof. Mostafa Reisi Gahrooei

University of Florida

Department of Industrial and Systems Engineering

“Distributed Multimodal and High-Dimensional Data Analytics”

WHEN

Wednesday, 11 November 2026 · 14:00 – 15:00

WHERE

D.0.01, Seminarraum (1901.EG.001)
Bildungscampus 2, 74076 Heilbronn
Online Meeting link: Distributed Multimodal and High-Dimensional Data Analytics | Passcode: Rf9BU7Lo

ABSTRACT

Data privacy concerns in machine learning have intensified in recent years and have driven the demand to store and analyze data at the edge of networks. Federated learning frameworks have been introduced as a solution to these concerns. These frameworks allow local clients to train models locally and collaborate to develop more generalizable aggregated models without sharing raw data with centralized servers. At the same time, complex systems generate ever-increasing multimodal and high-dimensional data, such as images and profiles, collected using diverse sensing instruments. This talk discusses several data-analytical approaches for modeling decentralized multimodal, high-dimensional data under three scenarios. First, we consider the case where data modalities can be combined and represented as a tensor, and we present the federated generalized tensor-on-scalar (ToS) regression framework. Next, we consider the case where data modalities have tabular structures with different numbers of features and discuss the federated cooperative generalized linear model framework. Lastly, we introduce the case where data modalities may have different forms and present the federated multiple tensor-on-tensor (MToT) regression framework. The proposed methods are evaluated using simulation and case studies from various applications, including agriculture and healthcare.

BIOGRAPHY

Dr. Mostafa Reisi Gahrooei is an Associate Professor in the Department of Industrial and Systems Engineering at the University of Florida and a co-director of the DISIDE Laboratory. He received his Ph.D. in Industrial and Systems Engineering in 2019 and his M.S. in Computational Science and Engineering in 2018 from the Georgia Institute of Technology. He also holds master’s degrees in Applied Mathematics and Civil and Environmental Engineering from Southern Illinois University Edwardsville. His research focuses on developing statistical learning methods and computational algorithms for modeling and monitoring complex systems using high-dimensional and multimodal data. His work encompasses tensor-based modeling, multimodal data fusion, and privacy-preserving federated learning, with applications in precision agriculture, manufacturing, healthcare, and transportation systems.

Hosted by the Prof Ziyue Li, Professorship of Transportation Analytics, Heilbronn Data Science Institute, Munich Data Science Institute