

CS PhD Seminar Series

May 5th

| 14:30-15:30

| Room 214

Leveraging Smartphone Inertial Data for User Authentication

Walking is a fundamental human activity, and gait patterns exhibit distinctive characteristics across individuals, making them suitable for biometric authentication. Recent advances in mobile technology have enabled the integration of Inertial Measurement Unit sensors in smartphones, allowing unobtrusive user authentication using personal devices.

In this work, we propose a gait-based authentication framework leveraging inertial data, including acceleration, angular velocity, and gravity, acquired from a smartphone. The multimodal time series are fused and encoded into a latent representation using an LSTM-based Auto-Encoder. A One-Class Support Vector Machine is then trained on this latent space to model the unique walking patterns of each user.

Experimental results demonstrate the effectiveness of the proposed approach and highlight its robustness to variations in walking conditions, including scenarios involving gait alterations due to injuries. These findings support the potential of smartphone-based gait authentication as a practical and reliable biometric solution.



Speaker: **Gabriele Bortolai**

Gabriele Bortolai is a third-year PhD student in Computer Science at the University of Genoa. He earned his Bachelor's degree in Physics, followed by a Master's degree in Theoretical Physics, both from the University of Genoa, in 2020 and 2023, respectively. Currently, he is listed with the Machine Learning Genoa Centre (MaLGe), where he is supervised by Prof. Nicoletta Noceti and Prof. Francesca Odone. His research focuses on human motion analysis and authentication.

Exploring Data Visualization Strategies to Study Academic Research

The growing hyper-specialization of the academic world creates a paradox: the deeper one's expertise, the more quickly one becomes a non-expert when venturing into a related field. At the same time, modern research is increasingly interdisciplinary and requires effective ways to communicate knowledge across the boundaries of individual fields. This poses a fundamental challenge: how can we enable researchers and students to meaningfully explore a field unfamiliar to them without requiring prior expertise? In this presentation, I will introduce an interactive visualization tool developed during my time at Northeastern University's Data Visualization Lab, designed to facilitate the exploration of academic fields directly through their research outputs. We implemented the tool with a data-driven pipeline to extract and visualize the latent content of textual data into keywords. We use agglomerative clustering to construct a hierarchical structure around these keywords, allowing users to navigate a field at various levels of granularity. The result is an intuitive interface that lowers the barrier to entry for anyone seeking to find their way within an unfamiliar domain. In this case study, we are working on a dataset that consists of NSF grants data in the Directorate for Computer and Information Science and Engineering (CISE).

Speaker: **Ilaria Stanzani**

Ilaria Stanzani is currently a third-year PhD student in Computer Science at the University of Genova. After a Physics bachelor's degree at the University of Bologna and a master's in Physics of Complex Systems at the University of Turin, she was awarded a Lagrange Fellowship at the ISI Foundation in Turin, where she worked on electoral and socio-economic data in urban Italian contexts. She just completed a six months period as Fulbright Visiting Student Researcher at Northeastern University in Boston. Her research aims to develop new methods for assessing research quality beyond traditional citation methods, finding strategies to support open science, focusing on effectively exploring and evaluating research through data visualization.

