

CS PhD Seminar Series

April 29th

| 14:30-15:30

| Room 214

Gait-based human analysis and authentication

Gait analysis is a key element in many tasks and application domains, including sports bio-mechanics, people re-identification and authentication, robotics, clinical evaluations and Rehabilitation. In particular, human authentication from gaits has attracted increasing interest in recent years, for different reasons: gait is difficult to precisely replicate, and it allows for authentication in unobtrusive and ecological conditions. However, current approaches have limitations in real-life applications, especially when wearable devices such as smartphones are used. In this seminar, I will present our recent efforts to develop and validate novel, robust methodologies for authenticating individuals through gait analysis, using primary inertial data collected from their mobile phones.



Speaker: **Gabriele Bortolai**

Gabriele Bortolai is a second-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.

Diffusing DeBias: Synthetic Bias Amplification for Model Debiasing

Deep learning model effectiveness in classification tasks is often challenged by the quality and quantity of training data whenever they are affected by strong spurious correlations between specific attributes and target labels. This results in a form of bias affecting the trained model, which typically leads to unrecoverable weak generalization in prediction. In this seminar, we will see how facing this problem can be done by leveraging bias amplification with generated synthetic data: we introduce Diffusing DeBias (DDB), a novel approach acting as a plug-in for common methods of unsupervised model debiasing exploiting the inherent bias-learning tendency of diffusion models in data generation. Specifically, our approach adopts conditional diffusion models to generate synthetic bias-aligned images, which replace the original training set for learning an effective bias amplifier model that can be incorporated in SOTA debiasing methods. By tackling the fundamental issue of bias-conflicting training samples memorization in learning auxiliary models, typical of this type of techniques, we show improved results and discussion on the effectiveness of this approach, as well as promising future directions.

Speaker: **Massimiliano Ciranni**

Massimiliano Ciranni is a PhD candidate at the Department of Informatics, Bio-engineering, Robotics, and Systems Engineering (DIBRIS) of the University of Genova, at the Machine Learning Genoa (MaLGe) Center. He received his MSc in Computer Science and Artificial Intelligence in 2023. His main research interests lie in learning with imperfect data, with a keen eye on dataset and model bias. His interest also spread to biological and medical domains, thriving to foster deep learning applicability in critical domains.

