

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

**PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

PHD PROGRAM IN INFORMATION AND TECHNOLOGY FOR HEALTH

Seminar announcement

Wednesday 26th June 2024, Time: 12:30 - 13:30

Room I4, via Claudio 21 - Naples



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Using support vector machines for feature selection and outlier detection

Abstract: We focus our attention on studying support vector machine (SVM) models. Although classical SVM models have high predictive power compared to other state-of-the-art classifying methods, some drawbacks also arise from their use. In this talk, we discuss two of them: the influence of outliers and feature selection. First, we consider various models of support vector machines with ramp loss, which are efficient and robust tools to limit the influence of outliers in the classifier. The goal is to develop algorithms that provide efficient methodologies to exactly solve these optimization problems. These approaches are

tested and compared with existing solution methods in simulated and real-life datasets, showing the efficiency of the developed methodology. Later, we propose a robust classification model, based on support vector machines, which simultaneously deals with outliers detection and feature selection. The classifier is built considering the ramp loss margin error and includes a budget constraint to limit the number of selected features. The search of this classifier is modeled using a mixed-integer formulation. Two different approaches (exact and heuristic) are proposed to solve the model.

Lecturer short bio: *Marta Baldomero Naranjo is assistant professor at the Universidad de Cádiz. She is a researcher in the area of Mathematical Optimization. Her research focuses on developing models and algorithms for data science and location theory problems. Predominantly, she works on methodological advances to obtain optimal solutions but has also developed some heuristic algorithms. Additionally, she explores the complexities of optimization problems. Thanks to the results obtained, she received the Accésit and Special CSIC Award in the XVI Certamen Universitario Arquímedes 2017, the Ramiro Melendreras 2022 Award from the Society of Statistics and Operations Research and was named YoungWomen4OR 2022 by WISDOM. She is a member of the editorial board of the Boletín de Estadística e Investigación Operativa (BEIO).*

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