

Mohammed Sabri, Ph.D.

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RESEARCH INTERESTS

- Statistical machine learning and high-dimensional classification
- Functional data analysis and complex data structures
- Similarity measures for complex structured data
- Optimization of machine learning algorithms
- Optimal transport

ACADEMIC APPOINTMENTS

- **Postdoctoral Researcher, focusing on statistical learning for sustainability and climate risk** Caserta, Italy
Dept. of Mathematics and Physics, Università degli Studi della Campania “Luigi Vanvitelli”. Dec 2024 - present
PNRR PE GRINS—MPM4ASE; 2025. Host: Prof.ssa Rosanna Verde
- **Full-time Research Assistant, Data Science Research Group** Caserta, Italy
Dept. of Mathematics and Physics, Università degli Studi della Campania “Luigi Vanvitelli”. Sep 2021 - Dec 2024
- **Member, Bachelor’s Final Project Defense Committee** Caserta, Italy
Dept. of Mathematics and Physics, Università degli Studi della Campania “Luigi Vanvitelli”. Jan 2024 - Dec 2024
- **Auxiliary Professor (full-time), Department of Computer Science** Fez, Morocco
Sidi Mohamed Ben Abdellah University Sep 2020 - Sep 2021

EDUCATION

- **Università degli studi della Campania Luigi Vanvitelli** Caserta, Italy
Ph.D. degree in Statistical Machine Learning under Rosanna Verde September 2020 - December 2024
Title: Integrating Supervised and Unsupervised Learning for Enhanced Classification in High-Dimensional Data Analysis and Fraud Detection
- **Paris Nord (Paris XIII) University** Paris, France
M.Sc Data Science and Machine Learning (double degree). September 2018 - June 2019
- **Sidi Mohamed Ben Abdellah University** Fez, Morocco
M.Sc Applied Mathematics and Data Science Septembre 2018 – Juillet 2019
- **Chouaib Doukkali University** EL Jadida, Morocco
Bachelor’s Degree in Applied Mathematics September 2016 - June 2017

EXPERIENCE

- **PNRR – GRINS Program** Caserta, Italy
Researcher – CO2 Emissions Prediction, GRIN-D Project April 2024 – July 2024
 - **Contributions:**
 - * Developing indicators for CO2 emissions monitoring using machine learning and environmental data.
 - * Focused on high-granularity, data-driven models for Southern Italy to assess environmental and health impacts.
- **BMCE Bank Of Africa Group - SALAFIN** Casablanca, Morocco
Data Scientist September 2019 - June 2020
 - **Financial Risk Management:** As a data scientist, I designed and deployed new machine learning system for Credit Default Risk and Credit Loss Evaluation. I accomplished performance of 80% for Credit Risk, and I achieved 90% for Credit Loss on some financial products and at least 70% on most of them. Resulted in cutting \$1.0M in financial credit losses.
 - **Tools:** Auto-ML with H2O, Spark, R, Python, ETL programming, Shell scripting.
- **EVEAD Group** Casablanca, Morocco
Machine Learning - Graduate Research March 2019 – July 2019
 - **Subject:** Development of an AI system capable of segmenting users according to their areas of interest.
 - **Tools:** Python.
- **OCP Group** Casablanca, Morocco
Final Practicum Master August 2018 - September 2018
 - **Subject:** Implementation of a decision support solution allowing the construction of KPI's.
 - **Tools:** Microsoft BI (SSIS, SSAS SSRS).

RESEARCH EXPERIENCE

- **Extending Fused Gromov-Wasserstein distance for functional data and graph analysis**
 - *Aiming to create unified frameworks for measuring similarities across complex structured data*
- **Novel Classification Algorithm Based on Dynamic Clustering and K-Nearest Neighbors**
 - *Developed a classification method combining adaptive distance dynamic clustering with K-Nearest Neighbors*
- **Advanced Credit Card Fraud Detection**
 - *Invented a novel classification method incorporating a priori class partitioning*
- **Functional Data Classification with Example Data Refining Strategy**
 - *Created a new classification approach for functional data using a refining strategy of example data*
- **Functional Local Mean K-Nearest Neighbor Algorithm**
 - *Introduced a novel metric to enhance algorithm performance in functional data analysis*
- **ECG Signal Classification Using Functional Data Analysis and Machine Learning**
 - *Applied functional data analysis techniques to classify ECG signals*
- **Clustering-Enhanced Functional Classification for ECG Data**
 - *Developed a method exploiting clustering to improve functional classifier performance*

PUBLICATIONS AND PRESENTATIONS

- **Bridging Distributional Clustering and Spatial Coherence: The Wasserstein-Semivariogram Framework for Environmental Regionalization:** Sabri M., Verde R., Balzanella A., Spatial Statistics Journal (2025), [Under review](#).
- **AIxB2025:** Balanced Spatial Clustering of Carbon Emissions Using Wasserstein Distance and Nighttime Lights-Based Similarity. Sabri M., Verde R., Balzanella A., Artificial Intelligence x Business (AIxB), 1-3 October 2025, California (USA).
- **SIS2025:** A Clustering Method for Distributional Data Based on a Mahalanobis-Like Distance. Sabri M., Verde R., Balzanella A., Scientific Meeting of the Italian Statistical Society (SIS), 16-18 June 2025, Genova (Italy). [\[Paper\]](#)
- **FWLMkNN: Efficient functional K-nearest neighbor based on clustering and functional data analysis:** Sabri M., Verde R., Balzanella A., Expert Systems with Applications, 128567 (2025). [\[Paper\]](#)
- **A Novel Classification Algorithm Based on the Synergy Between Dynamic Clustering with Adaptive Distances and K-Nearest Neighbors:** Sabri M., Verde R., Maturo F., Balzanella A., Tairi H., Yahyaouy A., and Riffi J., Journal of Classification 41, 264–288 (2024). [\[Paper\]](#)
- **K-Fuse: Credit card fraud detection based on a classification method with a priori class partitioning and a novel feature selection strategy.** : Sabri M., Verde R. and Balzanella A., Applied Stochastic Models in Business and Industry (2024). [\[Paper\]](#)
- **SFC2024:** A Classification method for functional data based on a refining strategy of the example data. Verde R., Sabri M., Balzanella A., 29èmes Rencontres de la Société Francophone de Classification (SFC), 11-13 September 2024, Marseille (France).
- **ISCV2024:** Functional Local Mean K-Nearest Neighbor: introducing a novel metric for improved algorithm performance Sabri M., Yahyaouy A., Balzanella A., Verde R., Riffi J. and Tairi H., International Conference on Intelligent Systems and Computer Vision (ISCV), 08-10 May 2024, Fez (Morocco). [\[Paper\]](#)
- **SDS2024:** Advancing credit card fraud detection with innovative class partitioning and feature selection technique Sabri M., Verde R., Balzanella A., Statistics for Data Science and Artificial Intelligence (SDS), Page: 618-623, 11-12 April 2024, Palermo (Italy). [\[Paper\]](#)
- **ISBIS2023:** An Integrated Unsupervised and Supervised Classification Strategy: an application to Credit Card Fraud Detection Verde R., Sabri M., Balzanella A., International Society for Business and Industrial Statistics (ISBIS), 13-14 July 2023, St. Catharines, (Canada).
- **SDS2023:** A new supervised classification technique based on the joint use of K-nearest neighbors and weighted K-means to discover new patterns in the data Sabri M., Verde R., Maturo F., Balzanella A., Tairi H., Yahyaouy A., and Riffi J., SDS 2023 Statistics for Data Science and Artificial Intelligence (SDS), Page: 618-623, 27-28 April 2024, Pavia (Italy).
- **IES 2022:** Invited Talk at the Innovation and Society 5.0: statistical and economic methodologies for quality assessment, January 27, 2022 – January 28, 2022, Capua (Italy). Presentation: Classification of ECG signals based on functional data analysis and machine learning techniques. [\[Paper\]](#)
- **DSSV-ECDA 2021:** Data Science, Statistics and Visualisation (DSSV) and the European Conference on Data Analysis (ECDA), July 7 – July 9, 2021. Presentation: Exploiting clustering to improve the performance of a functional classifier: An application to ECG data using a new semi-metric.

TEACHING EXPERIENCE

- **Instructor:** Statistical Learning, University of Campania Luigi Vanvitelli.
- **Instructor:** Seminar, Credit Card Fraud Detection: Strategies and Solutions Understanding and Mitigating the Risks in the Digital Age, University of Campania Luigi Vanvitelli.
- **Instructor:** Seminar, Introduction to Recommender Systems: Principles and Applications, University of Campania Luigi Vanvitelli.
- **Teaching Assistant:** Machine Learning — Prof. Rosanna Verde, University of Campania Luigi Vanvitelli.
- **Teaching Assistant:** Machine Learning — Prof. Ali Yahyaouy, University of Sidi Mohamed Ben Abdellah.
- **Teaching Assistant:** Python — Prof. Ali Yahyaouy, University of Sidi Mohamed Ben Abdellah.

SKILLS SUMMARY

- **Technical Skills:** Machine Learning, Data Visualization, Big Data, Data Mining
- **Programming Languages:** Python, R, Matlab, Java, C++, Scala, AWS Cloud (SageMaker, EC2)
- **Data Integration:** Talend (TOS, TAC), Stack Microsoft (SSIS, SSAS), Informatica V9
- **Data Analysis:** Data Cleaning with Python; Data Exploratory Analysis with R Python
- **DataViz:** Tableau, Power BI, SSRS
- **Soft Skills:** Leadership, Event Management, Writing, Public Speaking, Time Management

LANGUAGES

- Arabic: Native proficiency
- English: Full professional proficiency
- French: Professional working proficiency
- Italian: Elementary

REFERENCES

1. Prof. Rosanna Verde Professor of Statistics, Università degli studi della Campania Luigi Vanvitelli Email: rosanna.verde@unicampania.it
2. Prof. Antonio Balzanella Associate Professor of Statistics, Università degli studi della Campania Luigi Vanvitelli Email: antonio.balzanella@unicampania.it
3. Prof. Fabrizio Maturo Professor of Statistics, Università Mercatorum Email: fabrizio.maturo@unimercatorum.it
4. Prof. Ali Yahyaouy Professor of Computer Science, University of Sidi Mohamed Ben Abdellah Email: ali.yahyaouy@usmba.ac.ma