Funding Opportunities and Artificial Intelligence

The M.O.D.A.L case study

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Mathematical mOdelling and Data AnaLysis - M.O.D.A.L
(June 18, 2021)

Outline

01 **The M.O.D.A.L reserarch group**
- Mathematical mOdelling and Data AnaLysis

02 **Funding Oppotunities**
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- P.O.R.
- P.O.S.
- F.R.A.

03 **Challenges, Advantages and Limitations**

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Department of Mathematics and Applications “R. Caccioppoli”
University of Naples Federico II

M·O·D·A·L

Mathematical mOdelling and Data Analysis Laboratory

This research group integrates the mathematical, statistical and computer science knowledge to develop new Data Analysis and Machine Learning techniques for complex phenomena.

Active Members

M·O·D·A·L
Mathematical mOdelling and Data Analysis Laboratory

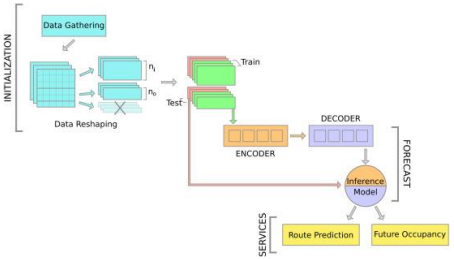
Personale strutturato

Personale non strutturato

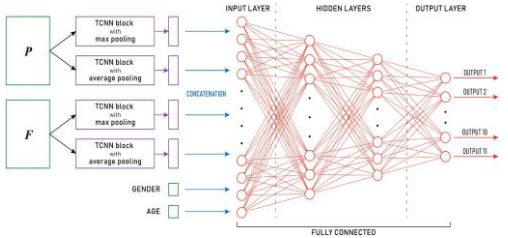
- **Fabio Giampaolo** - Laureato in Ingegneria Matematica (Ph.d Student)
- **Eduardo Prezioso** - Laureato in Ingegneria Matematica (Ph.d Student)
- **Vincenzo Schiano di Cola** - Laureato in Matematica (Ph.d. Student)
- **Federico Gatta** - Laureato Magistrale in Matematica (Research Fellow)
- **Stefano Izzo** - Laureato Magistrale in Matematica (Research Fellow)
- **Daniele Ferone** - Laureato Magistrale in Matematica (Research Fellow)

Research Activities (1/3)

- Modelling of Deep Learning architectures

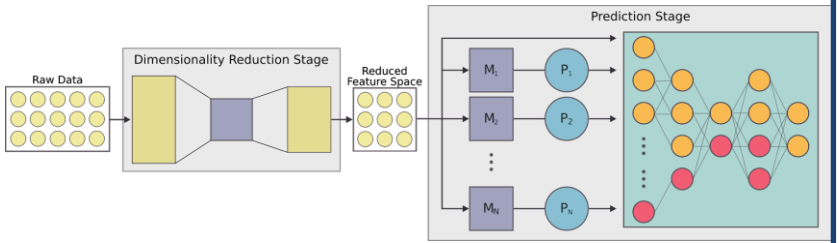


(Encoder – Decoder Network)



(TCNN - Temporal Convolutional Neural Network)

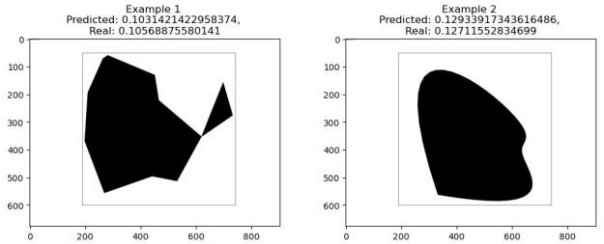
- Time-series forecasting through Deep Learning



(Deep Learning for Time-Series Analytics)

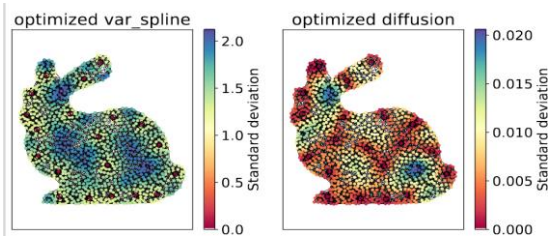
Research Activities (2/3)

- Deep Learning approaches to an optimal insulation problem



(Torsion computation - Deep Learning)

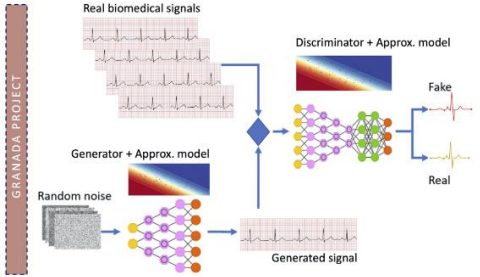
- Kernel-Based Models for Influence Maximization on Graphs based on Gaussian Process Variance Minimization



(Kernel Methods - Machine Learning)

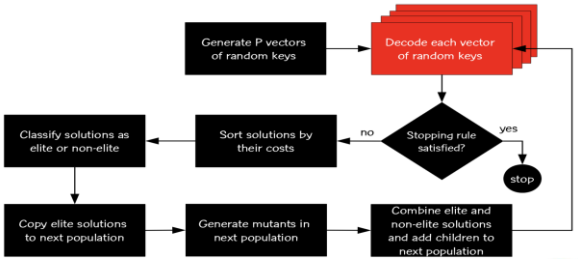
Research Activities (3/3)

- Generative Adversarial Networks with Rational Approximants and Nonlinear Approach for Deep learning Analysis of biomedical signals



(Rational Approximation - Genrative Adeversarial networks)

- Hybrid Learning Optimization Methodologies for time-series forecasting through Deep Learning



Dataset and Applications

Healthcare and Medicine

- Dataset contenente tutte le prenotazioni di visite mediche del servizio sanitario regionale per le ASL NA1, NA2, e NA3 dal 2015 al 2019. Circa 30 milioni di prenotazioni per oltre 5 milioni di pazienti distinti.
- Dataset pazienti celiaci (400), follow-up di 10 anni, 100 features.
- Dataset Pazienti (200) per Parotid Cancer Detection

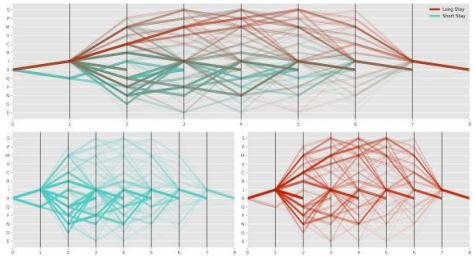
Smart Mobility

- Dataset IoT contenente lo storico dell'occupazione di oltre 1000 stalli IoT, posizionati su strisce blu, disposti in molteplici comuni della Regione Campania, dal 2017 al 2020.
- Dataset Veicolare compagnia assicurativa (4 Milioni di veicoli, 2019-2020)

Applications and related dataset

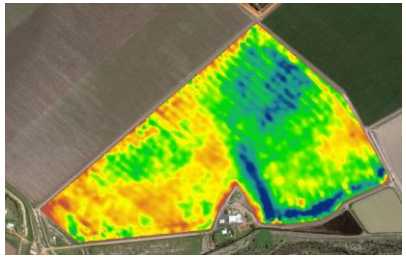
Cultural Heritage

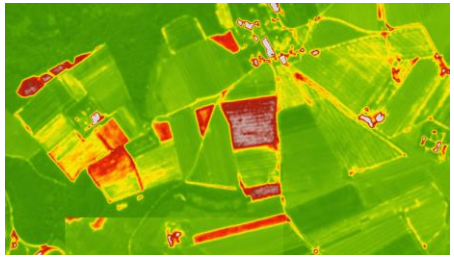
- Dataset contenente il tracking IoT BLE di oltre 50000 visitatori del Museo Archeologico Nazionale di Napoli (MANN), nel periodo temporale Agosto – Dicembre 2018.
- Dataset relativo all'utilizzo di applicazioni mobile in scenari culturali.



Agritech – Precision Agricolture

- Classificazione multi-classe (SML + Convolutional NN + DNN delle aree dell'immagine secondo etichette predefinite dallo standard AGEA

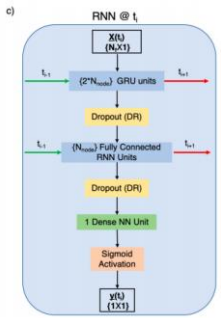


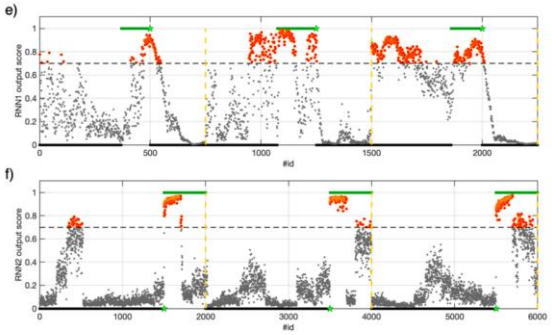


Applications and related dataset

Seismology: Earthquakes' classification and forecasting

- The Geysers geothermal field in California. The Geysers hosts a high quality, dense seismic network to monitor the high seismicity rate since 2003.





Industry 4.0: Predictive Maintenance

- CTI FoodTech case study: Winter and Summer campaigns

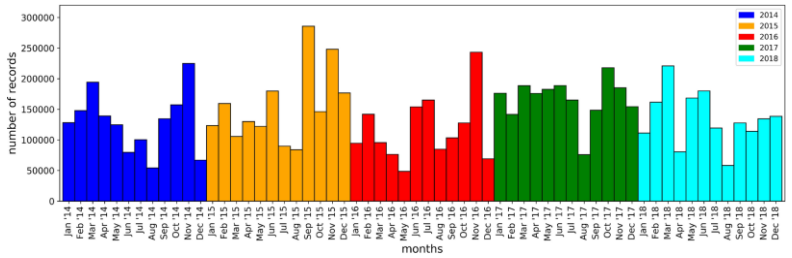
Funding Opportunities

(supporting the fundation of a novel research group)

P.O.R. CAMPANIA FESR 2014-2020

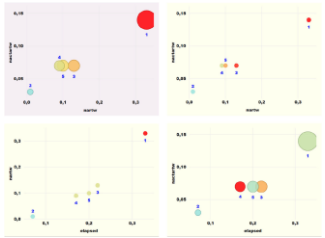
Title: CUP-i-ONE

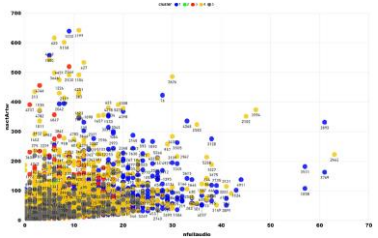
(2017-2020 , POR Regione Campania) - Machine and Deep Learning methodologies for Healthcare



Title: C.E.T.R.A. - Cultural Equipment with Transmedial Recommendation Analytics

(2017-2020 , POR Regione Campania) - Machine Learning and Data Analysis for CH





PON Imprese e Competitività 2014-2020

Title: 4I - Mixed Reality, Machine Learning, Gamification and Educational for Industry

(2021-2023 , M.I.S.E) - Machine and Deep Learning methodologies for *Quality Assurance* and *Predictive Maintainence*

Title: S.I.S.S.I. - SISTEMA INFORMATIVO SOCIAL PER STABIAE INTELLIGENTE

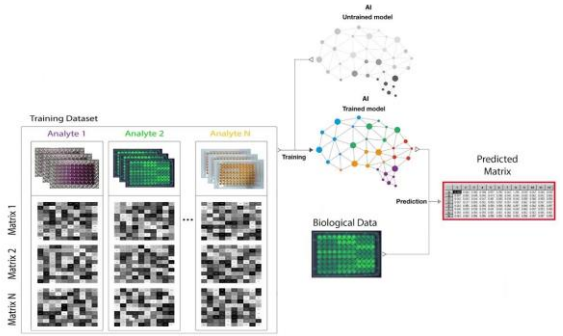
(2021-2023 , M.I.S.E) - Machine and Deep Learning methodologies for Cultural Heritage

SISSI

PON – MIUR – F.R.A.

Title: BIOCHIP - Intelligent biosensors based on chimeric proteins

(2021-2023 , F.R.A.) - Machine and Deep Learning methodologies for analysing data coming from biological experiments



Title: C.H.I.S. – Cultural Heritage Information Systems

(2013-2018 , M.I.U.R – PON03) - Users' Behaviour Analysis inside cultural spaces

CHIS CULTURAL HERITAGE INFORMATION SYSTEM

What’s next?

- Bando P.O.S – Piano Operativo Salute – Ministero della Salute – 4 trajectories
- Bando STAR PLUS 2020 – F.R.A. – Ateneo e Compagnia di San Paolo
- Horizon Europe
- Patent

Challenges, Advantages and Limitations

Funds: Looking at the overall budget items

- Personnel
- Travel
- Equipment (under 516€ VAT included)
- Open Access
- Disseminations
- Consumables and supplies

- Equipment (over 516€ VAT included)
- Personnel (Research Fellow)
- Amortization
- Notary cost

Funds Management and Crucial Points

- Reporting process
- The importance of the project leader institute/company
- The importance of the administration staff
- Co-financing the project
- Generating “overhead”
- The role of the Companies

Towards Horizon Europe

Europe fundings: new opportunities

Horizon Europe is the European Framework Program for Research and Innovation for the period 2021-2027, officially started on January 1, 2021.

The European Parliament has defined the budget of approximately **100 billion euros** for the most ambitious research and innovation program ever, funded by the traditional European common budget and the new Recovery Instrument, Next Generation EU.

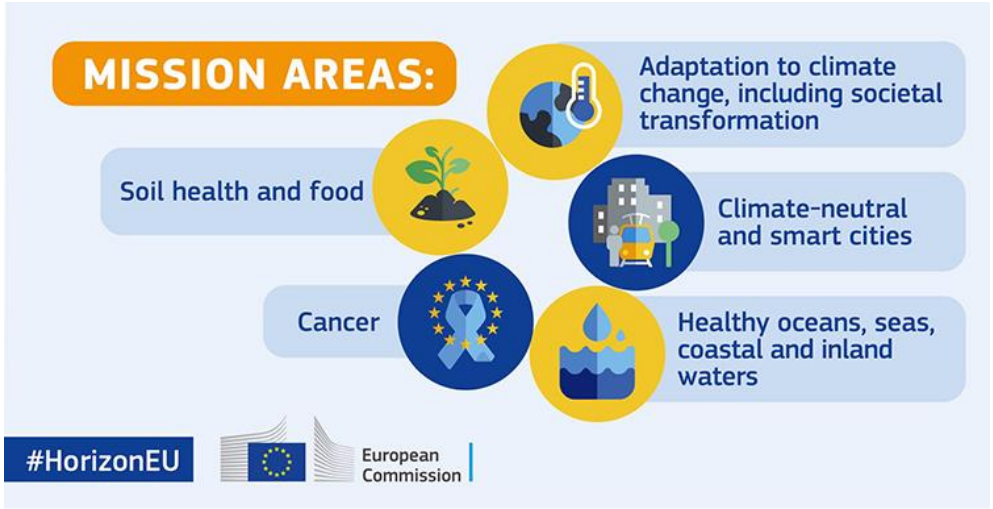
It includes some of the crucial themes for development and growth in Europe, such as **research, energy, space, transport, telecommunications and digital Europe**.

A novel approach

Based on the successful experience of Horizon 2020, the new Framework Program will continue to support and promote scientific excellence in Europe with a new approach based on the **mission**, in order to achieve a greater impact in the social, economic and environmental.

What is a mission ?

- EU missions are commitments to solve some of the greatest challenges facing our world like fighting cancer, adapting to climate change, protecting our oceans, living in greener cities and ensuring soil health and food.
- Each mission will operate as a portfolio of actions – such as research projects, policy measures or even legislative initiatives - to achieve a measurable goal that could not be achieved through individual actions.
- EU missions will contribute to the goals of the European Green Deal, Europe's Beating Cancer Plan as well as the Sustainable Development Goals.



The program aims to:

Based on the successful experience of Horizon 2020, the new Framework Program will continue to support and promote scientific excellence in Europe with a new approach based on the **mission**, in order to achieve a greater impact in the social, economic and environmental.

- Strengthen and disseminate **excellence**, frontier and basic research of excellence,
- Support the implementation of EU intervention priorities and address global challenges affecting the quality of life,
- Increase **collaboration links in European R&I**, across sectors and disciplines, with wider international cooperation and seeking to attract talented researchers through actions to support mobility.
- Develop more competitive **research infrastructures** in the European Research Area
- Implement a more active and inclusive **dissemination** to encourage the systematic use of R&I results,
- Establish and achieve ambitious goals, through the use of **missions**, to stimulate R&I activities in SMEs and increase the number of innovative companies.
- Encourage **industrial competitiveness**, innovative capacity and employment in Europe by improving access to risk capital.

Thanks for your attention

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http://www.labdma.unina.it/index.php/modal