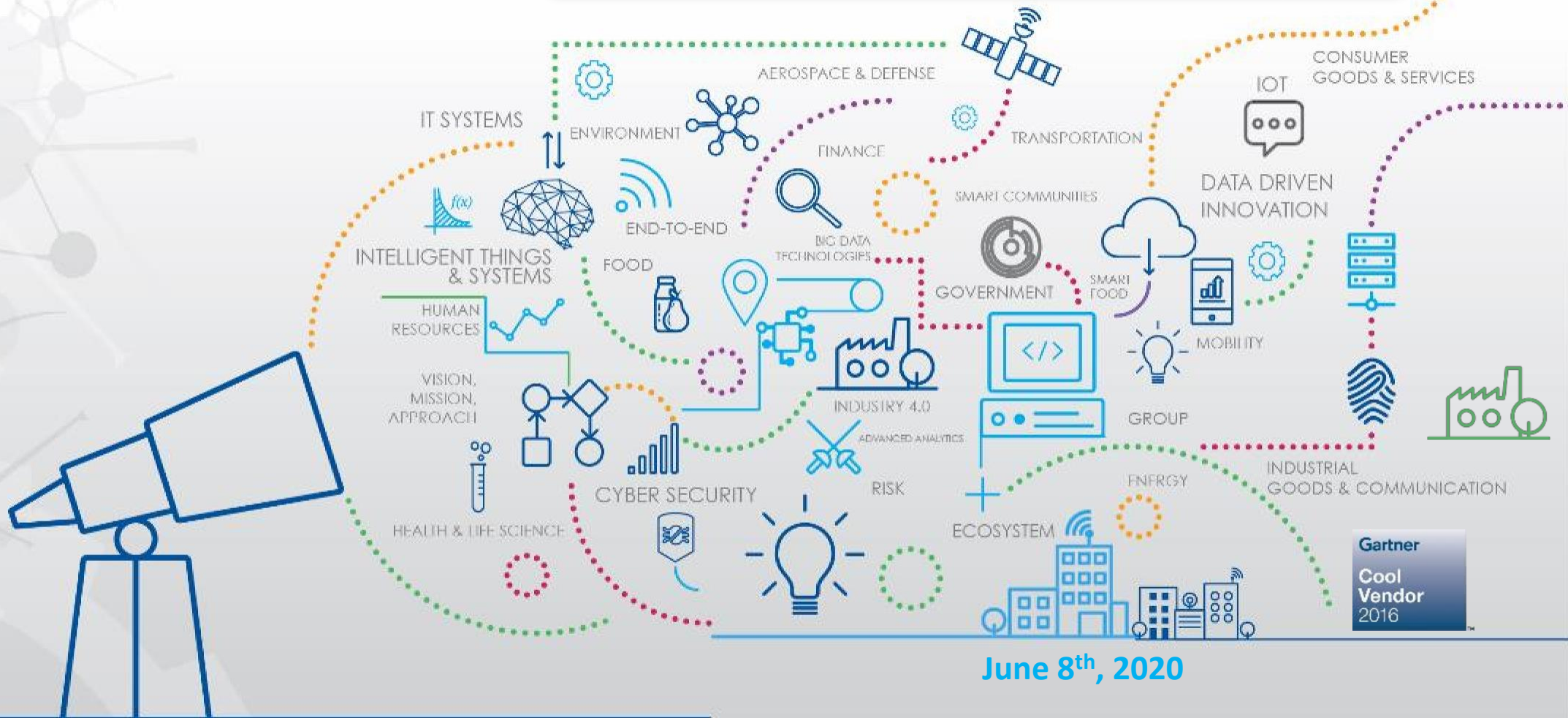
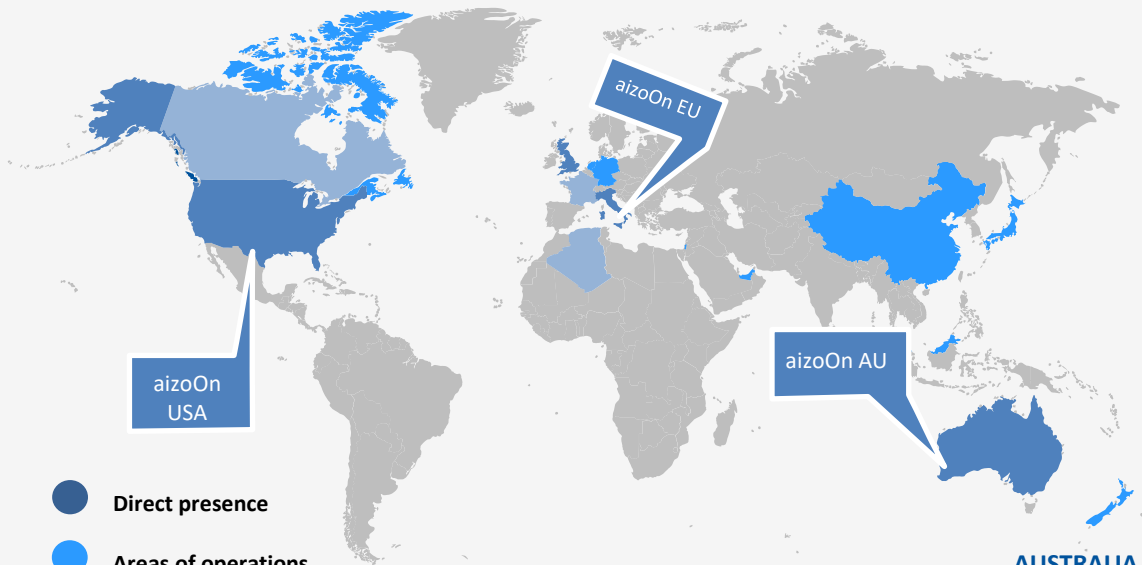


aizoOn Technology Consulting



June 8th, 2020

Proposte di tesi magistrali
Fisica - Sistemi Complessi



- Direct presence
- Areas of operations

AUSTRALIA
Sydney NSW

EUROPE
Torino ITA | Cuneo ITA | Milano ITA | Genova ITA
Bologna ITA | Roma ITA | Bari ITA | Sheffield UK

USA
New York NY | Troy MI | Cambridge MA | Lewiston ME



aizoOn Cool Vendor 2016

Operational Technology in a Digital Business

Our Vision

use **scientific methods** and focus on **data driven decisions** to enable a more responsible and **sustainable society**

Our Mission

support our customers in their journey through the digital era, bringing strong know-how in technology and innovation

The **500+** engineers and specialists support our customer through the **end-to-end digital innovation** process, also backed up by **investment in cutting edge technology product companies**.



Trustech, specialised in micro and nano technologies laboratories, develop high tech devices from design to prototype and manufacturing.



CSP acts as an externalized research lab for RTD activities in the IoT and it is an aizoOn participated company.



Digital Engineering & Innovation Division



**Digital
Engineering
&
Innovation**

Problem solving through
unconventional
approaches and a
comprehensive exploitation
of the digital data journey

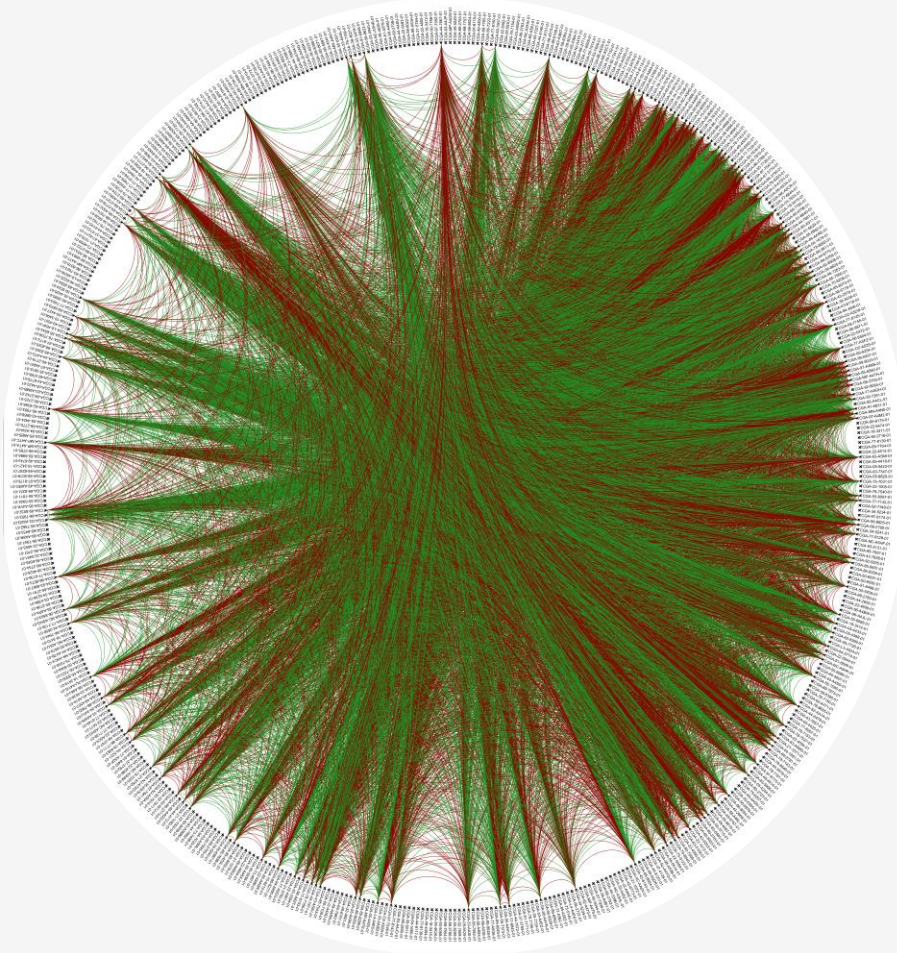
DigEI develops advanced data driven solutions, covering the entire digital data transformation chain, with a specific focus on Data Science excellence.

DigEI is a strategic partner for the digital transformation of our Clients on the various readiness levels (R&D, Proof of Concept and Prototypes, Integrated Solutions).



Digital Technology for Lung Cancer Treatment

Patients' concordance index



BACKGROUND

Worldwide, lung cancer affects 1.82 million people; being responsible for 1.6 million deaths per year, it is considered one of the “big killers” among cancers.

Next Generation Sequencing (NGS) technology is enabling the new paradigm of precision medicine, but NGS-based models have to deal with complex and high-dimensional data

AIMS OF THE PROJECT

- Molecular characterization of non-small-cell lung cancer (NSCLC) & biobanking
- Clinical/Molecular modelling of cancer
- Lab-on-chip & Organ-on-chip technology for pharmaceutical screening

PURPOSE OF THE THESIS

Development of clustering and predictive models for precision medicine based on:

- NGS data from multi-omic analyses (DNA/RNA)
- Clinical data from hospital

APPROACH

- Supervised/Unsupervised machine learning
- Network theory (gene expression networks)



Corporate COVID-risk management

BACKGROUND

COVID-19 pandemic is affecting our lives and behaviours, both at home and working places. Companies need to be reorganized and to adopt strict rules to ensure safety of workers and customers, while not sacrificing productivity

PURPOSE OF THE THESIS

To develop innovative solutions and tools, satisfying companies requirements, which define reorganization (*e.g.* entrance regulation, front office, production areas, ...) based on optimization of risk-based metrics such as:

- Minimal contacts
- Minimal interactions
- Minimal co-presence
- Limited access

APPROACH

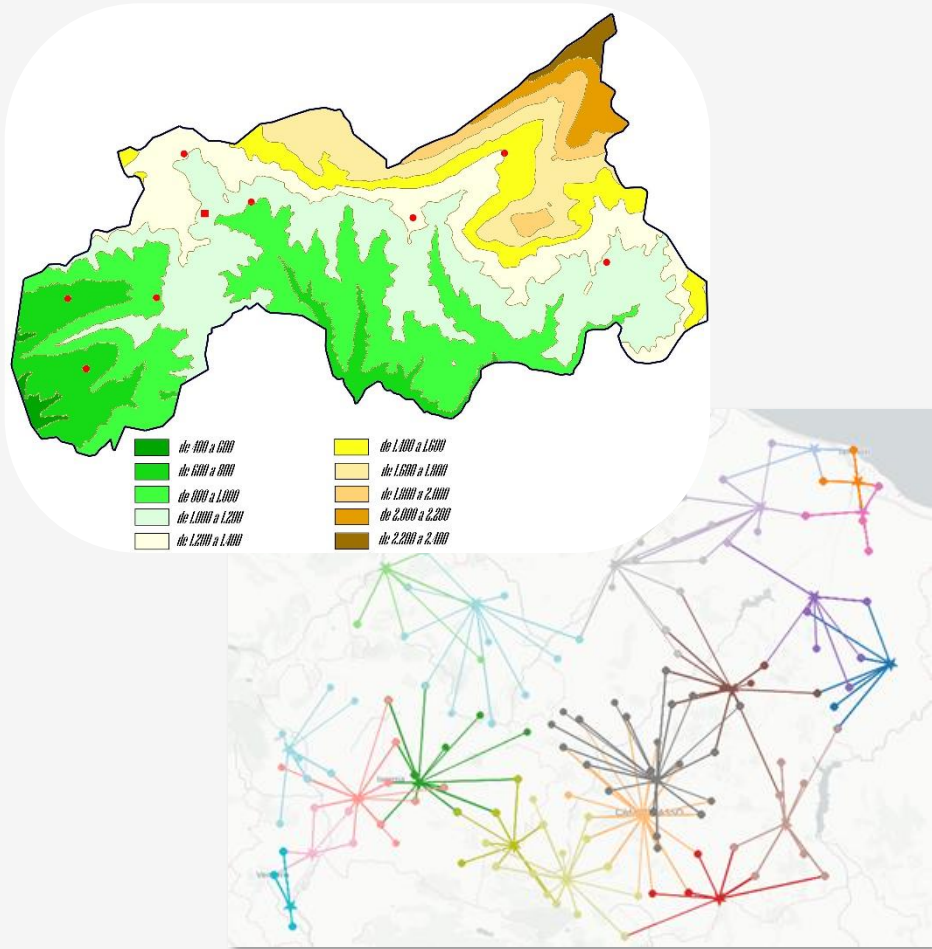
Integration of:

- State-of-the-art scheduling: Planning Domain Definition Language (PDDL)
- Supervised machine learning for PDDL parameters estimation and auto-adaptive behaviour



Distributed Energy Generation Observability

Orography & Energy network



BACKGROUND

Power generation and supply need to be constantly balanced with energy demand to ensure the stability of the overall electrical network.

A delocalized self-generation capacity is increasingly growing and its contribute must be correctly estimated to ensure the overall energy balance. Most of the additional capacity comes from renewable sources. These are sometimes easily predictable (*e.g.* solar production) but sometimes very unstable (*e.g.* wind production)

PURPOSE OF THE THESIS

The main goal of the thesis is the “observability” of the distributed self-generation renewable energy, with a specific focus on the complex correlation between orography and wind energy production. Such a model, could be integrated in a wider machine learning architecture aggregating single production families estimations to the network point of energy exchange

APPROACH

- Supervised machine learning
- Use of time-series based data lakes
- Network theory

Automated Malware Detection

BACKGROUND

Malicious software, or malware, plays a part in most computer intrusion and security incidents. Despite the significant improvement of cyber security mechanisms and their continuous evolution, malware are still among the most effective threats in the cyber space. In this context, traditional (e.g., signature-based) detection methods are easily evaded and machine learning-based approaches are the most promising.

The major obstacles in building effective ML models for malware detection include data gathering and labelling, and the fact the malware and obfuscation methods evolve rapidly and adapting to new detection methods.

PURPOSE OF THE THESIS

The candidate will work on unsupervised and semi-supervised methods for automatic malware family classification and explore the *concept drift* of machine learning models for malware detection.

APPROACH

- Semi-supervised machine learning
- Feature learning and dimensionality reduction.
- Network theory and community analysis

Failure prevention & Predictive maintenance

BACKGROUND

Failure or breakdown of critical component in industrial machinery has relevant impact on production. However, thanks to industry digitalization more and more data from machinery , both static and real time, are nowadays available for analysis

TYPICAL DATA

Process data, design features, production high frequency data, engineering technical test and validation data, PLCs data, quality data, videos and process analysis, physical samples of materials

PURPOSE OF THE THESIS

Depending on the specific problem, development of predictive models for failure/breakdown anticipation

APPROACH

- Supervised/Unsupervised machine learning
- Time-series analysis
- Correlation analysis
- Digital twin comparison

Let's keep in touch!



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