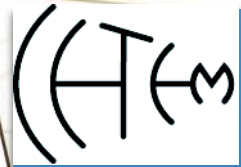# School on Artificial Intelligence applications for Earth Observation
19-23 May 2025 – Florence (IT)

**Welcome to all participants and teachers
of the School on Artificial intelligence applications for EO**

The school is organized by the Microwave Remote Sensing Center (Ce.Te.M.) in cooperation with the CNR Institute of Applied Physics (IFAC-CNR), the support of IEEE GRS29-CNI and GRS29-S I Italian chapters, and the patronage of the Italian Society of Remote Sensing (AIT) and the Union Radioscientifique Internationale (URSI).

We wish to thank the Accademia delle Arti e del Disegno (AADFI) and in particular the President (Prof. Cristina Acidini) and her collaborators (Dr. Enrico Sartoni and Laura Turchi) for making the organization of the school possible

Organizing committee:
Simonetta Paloscia (s.paloscia@ifac.cnr.it)
Simone Pettinato (s.pettinato@ifac.cnr.it)
Emanuele Santi (e.santi@ifac.cnr.it)

A self-made definition of artificial intelligence

Nell'ombra dei circuiti, una mente nasce, senza cuore, ma con logica che abbraccia.

Tra mille dati, un pensiero si forma, intelligenza che cresce e si trasforma.

Non ha sogni, non ha paure, ma può scrivere storie, risolvere scelte oscure.

Un'eco di creatività, un riflesso di realtà, l'intelligenza artificiale, un futuro che va.

In the shadows of the circuits, a mind is born, heartless, but with embracing logic.

Among a thousand data, a thought is formed, intelligence that grows and transforms.

It has no dreams, it has no fears, but it can write stories, solve dark choices.

An echo of creativity, a reflection of reality, artificial intelligence, a future that is moving.

Purposes of the AI School

The main purpose of the school is to provide the adequate tools for managing AI techniques in a correct way in order to achieve the best results within the limits of physical constraints, taking in mind that correlation is not causation

Viewership of "The Big Bang Theory"
correlates with
Google searches for 'how to make baby'
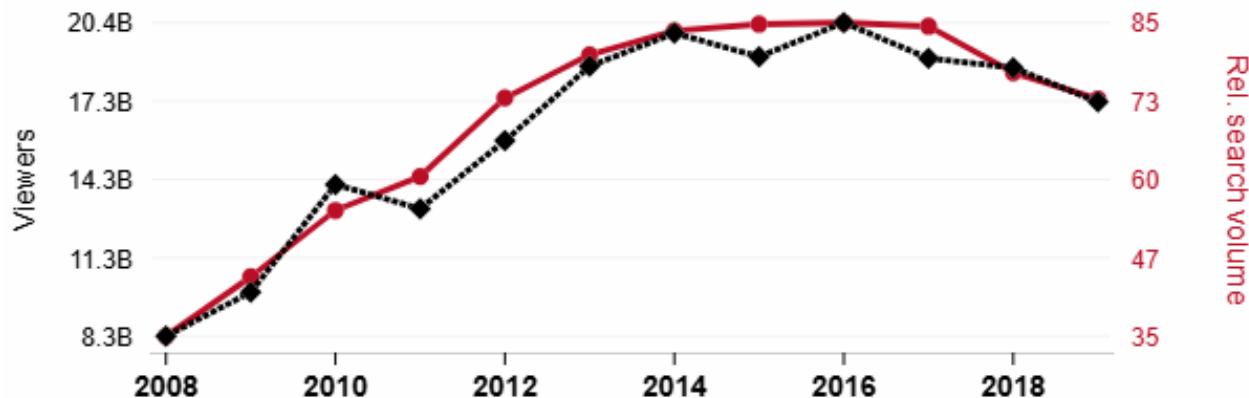
Viewers — Average viewership of "The Big Bang Theory" by season · Source: Wikipedia

Rel. search volume — Relative volume of Google searches for 'how to make baby' (Worldwide), with quotes) · Source: Google Trends

2008-2019, r=0.983, r²=0.965, p<0.01 · tylervigen.com/spurious/correlation/1402

UFO sightings in Ohio
correlates with
Total Number of Successful Mount Everest Climbs
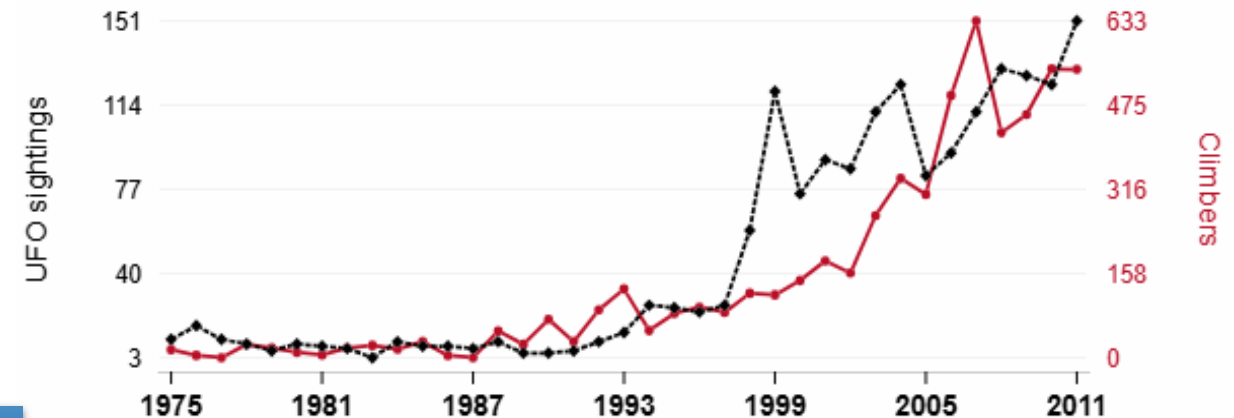
UFO sightings ···· UFO sightings reported in Ohio · Source: National UFO Reporting Center

Climbers — Total Number of Successful Mount Everest Climbs · Source: CBC

1975-2011, r=0.875, r²=0.765, p<0.01 · tylervigen.com/spurious/correlation/1515

R=0.98
R=0.87

Program

- The school will focus on AI applications for land and sea monitoring, including urban applications and geophysical parameters estimation, with a focus on most recent techniques as the quantum computing. Most important excellent teachers of Italian university and research institutes are involved in this school.

- In particular, according to the program we have two general presentations at the beginning concerning the Era of Artificial Intelligence (Dr. Barucci) and an overview of Artificial Intelligence techniques and applications (Dr. Montaghi). In the following days, a Bayesian approach of parameter retrieval will be described by Prof. Pierdicca. Later on, Quantum ML Applied to EO will be investigated by Prof. Ullo. On Wednesday Prof. Gamba will talk about Deep Learning methods for characterizing urban areas using radar and optical sensors and Prof. Del Frate about Physics Based AI in EO.

- Machine Learning Applications for remote sensing of soil moisture, vegetation biomass and snow will be described by Dr.Eng. Emanuele Santi on Thurday morning. In the afternoon a method for marine macroalgae extraction using remote sensing and AI will be shown by Dr. Yuan Guo. Finally on Friday the application of AI method to snow cover will be described by EURAC institute (Drs. Marin and Barella)

Some useful logistic information

The coffee-breaks is in the cafeteria next to AADFI. At the registration coupons for morning and afternoon breaks have been given to you.

A dinner will be organized on Thursday in a restaurant nearby. The registration to the dinner is open up to Tuesday only (please inform us about your dietary requirements, if any)

For lunch you can go wherever you want (there is a lot of cafeterias, restaurants and so on nearby)

Some other information

ON TUESDAY, THE LESSONS WILL BE IN ANOTHER ROOM IN THE SAME BUILDING (UPPER FLOOR).

ON THURSDAY THE AFTERNOON SESSION WILL END AT 16.54 (NO COFFEE-BREAK)

FOR LUNCH YOU CAN GO WHEREVER YOU WANT (THERE IS A LOT OF CAFETERIAS, RESTAURANTS AND SO ON NEARBY)

Enjoy your week, full of interesting information and fun, I hope