AI4COVID: Artificial intelligence and geographical information for monitoring and prediction of Covid-19 outbreak

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A geospatial Team

- Geographic Information Science
- Earth observation
- Citizen science
- Environmental analysis

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Objectives

- a data-driven approach for harvesting open geographic data (socio-economic data, biophysical data, mobility network, climatological data) coming from open data initiatives, citizen science projects, and earth observation data in order to **uncover the relationship between the outbreak and its geographical dimension**.

Reviewing state of the art

- A large number of studies investigating correlation between Covid-19 and climatic/weather factors
  - Limited correlations - no common conclusions found

- Studies on socio-economic and distribution of Covid-19 infections in the population
  - Studies have found that low income and poverty are correlated to number of infections, and this can lead to further studies in cityscapes and the physical environment around different groups of people.

- Few, but impactful, studies on mobility, using cellular tracing data
  - Proved how movement patterns affect the spread of the virus, and how lockdown measures can be used most effectively.

Our Focus

- Model connectivity at different levels of scale
  How well are countries, regions and cities connected to each other?
- Model interconnectivity at European metropoles
  How are citizens covered by public transport facilities?
- Map points of interest (bars, restaurants, shops) at city level

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- Analyse the spread of Covid-19 through these geographic measures
- Predict the spread through the levels of connectivity

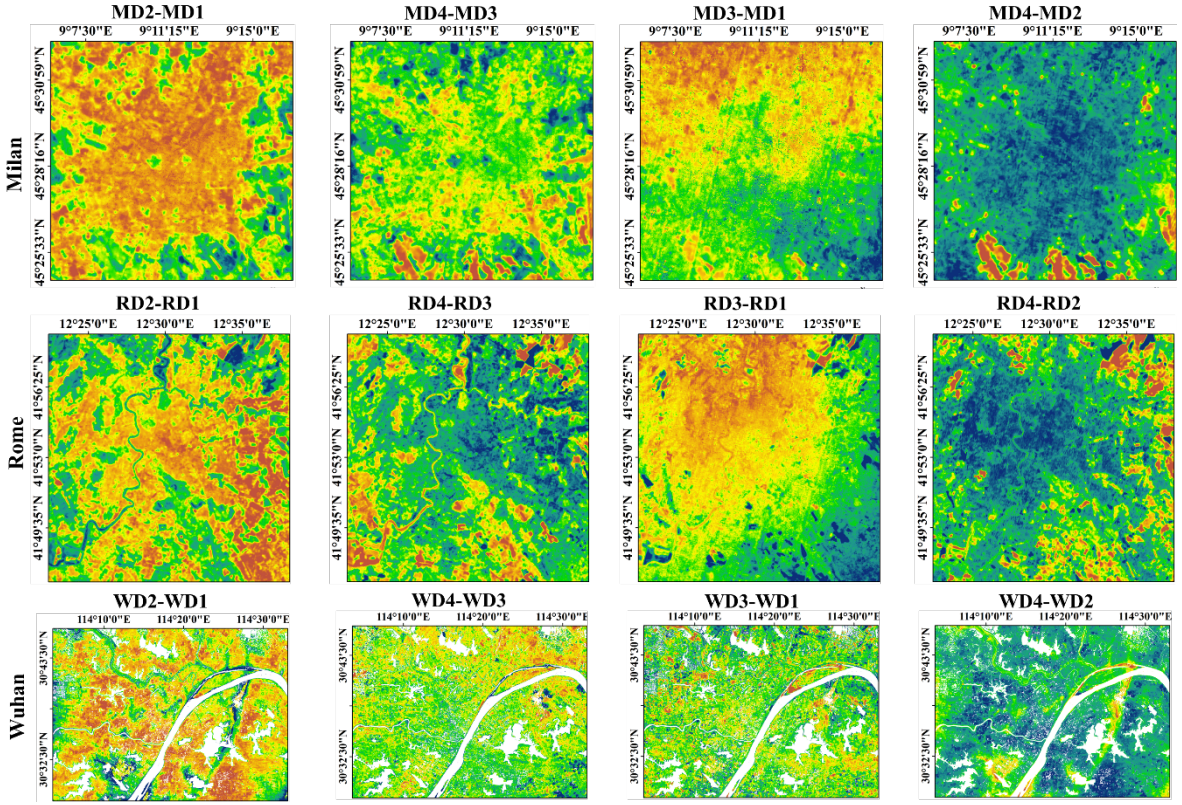
Ongoing tasks

- Extensive analysis of European transportation networks, modelled using graph theory
- Gather Covid-19 infection numbers, spatially distributed equally to connectivity levels
- Point of Interest analysis, correlate POI service areas to Covid-19 infection rate
- Exploring the impact of spatial scale to the results (municipality, church, regular grid scale)
- Setting up a machine learning model for uncovering the relationship between the outbreak (infection rate) and mobility;
- Using open source technologies and Python programming, which will be shared on Github.
- Aiming at 2 research articles

Parallel studies (the environmental impacts)

- Modelling the impact of the COVID-19 lockdowns on urban surface ecological status: A Case Study of Milan and Wuhan (submitted to Journal of EM)

- Exploring the impact of COVID-19 lockdowns on the environment (to be submitted)



Normalized LST difference maps of Milan, Rome and Wuhan for different dates (°C)

Thank you for your attention

Questions and comments shoud be directed to:

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