

GEO Earth Observations for Health (EO4HEALTH 2020-2022)

Health Care Facility Infrastructure progress and actions for 2023

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Goals for this Area (Dec 6, 2022):

1. Integrate images **Earth Observations** (open and commercial sources) in order to develop an informational resource that **assesses the vulnerability** of health care facilities,
2. Develop methods to assess the **adequacy** of these facilities under regional acute catastrophes or during escalating chronic pandemics.
3. To assess their infrastructures **risks to local environmental stressors** (during seasonal loads and local population needs).
4. This has implications of their **functional status** both real-time operations and for long-term health adaptation planning.

1. Progress on the automation challenge: how to extract the HCF ...



Demand for object recognition in multispectral satellite imagery.

Full earth visual coverage of RGB and panchromatic accuracy of >25 cm per pixel.

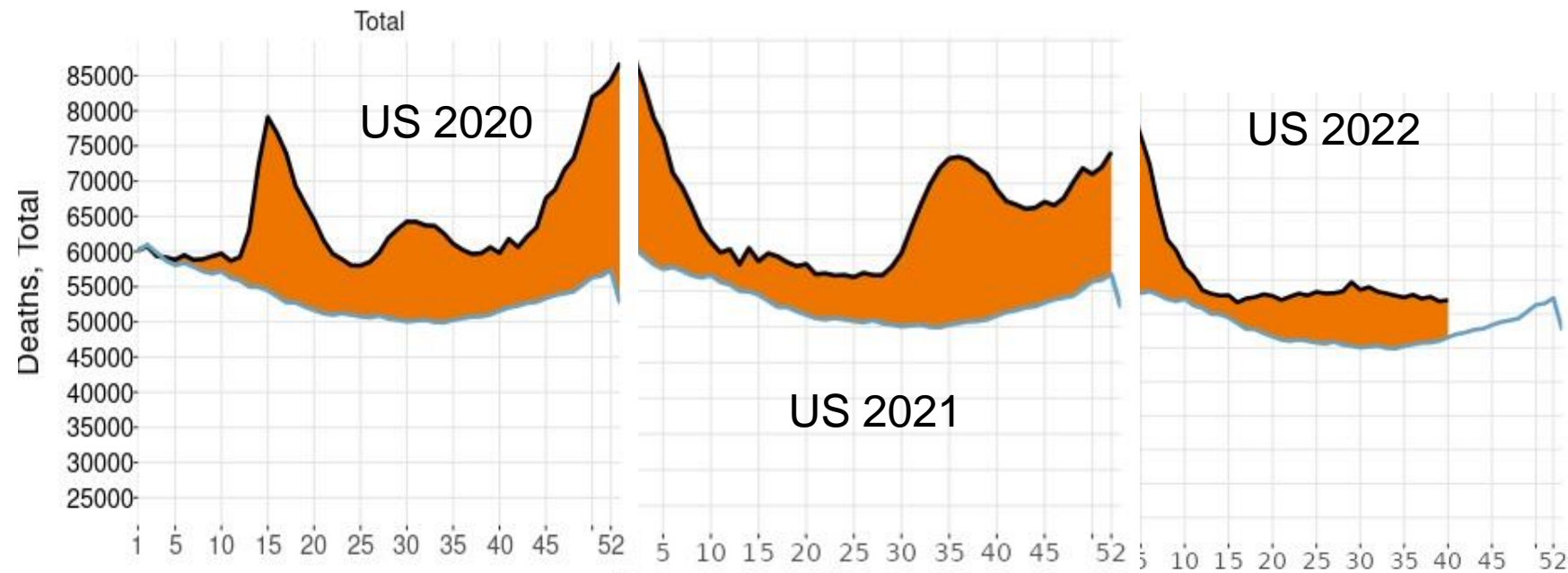
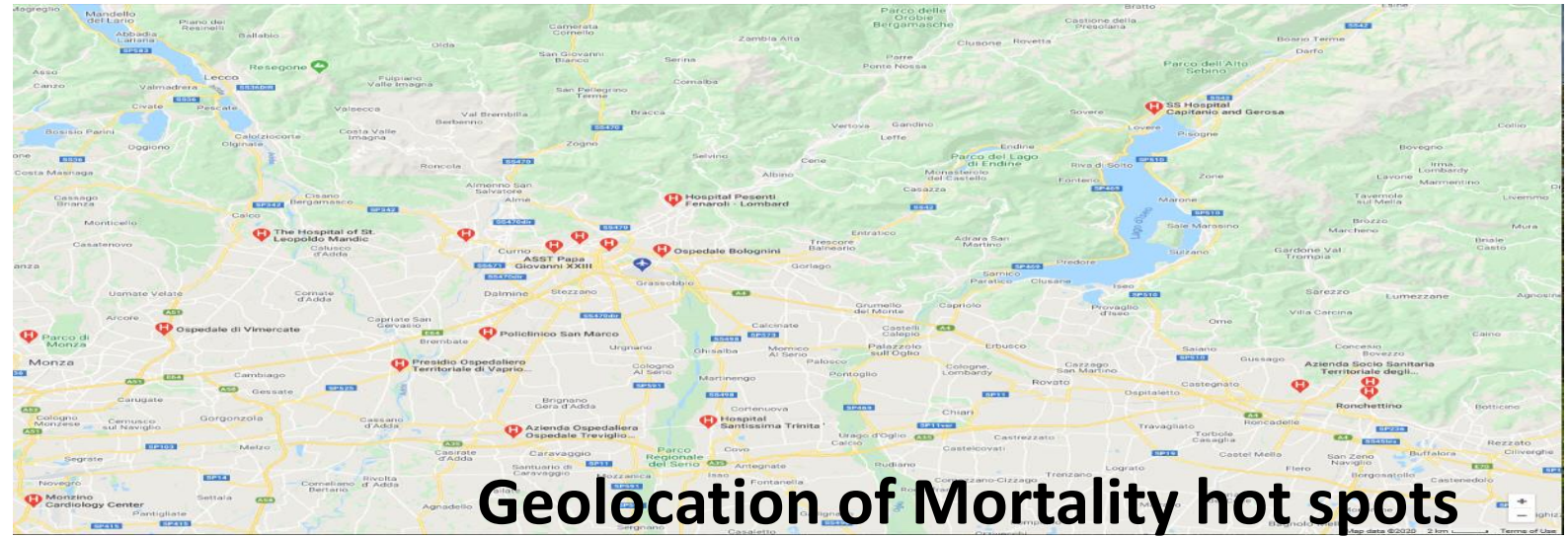
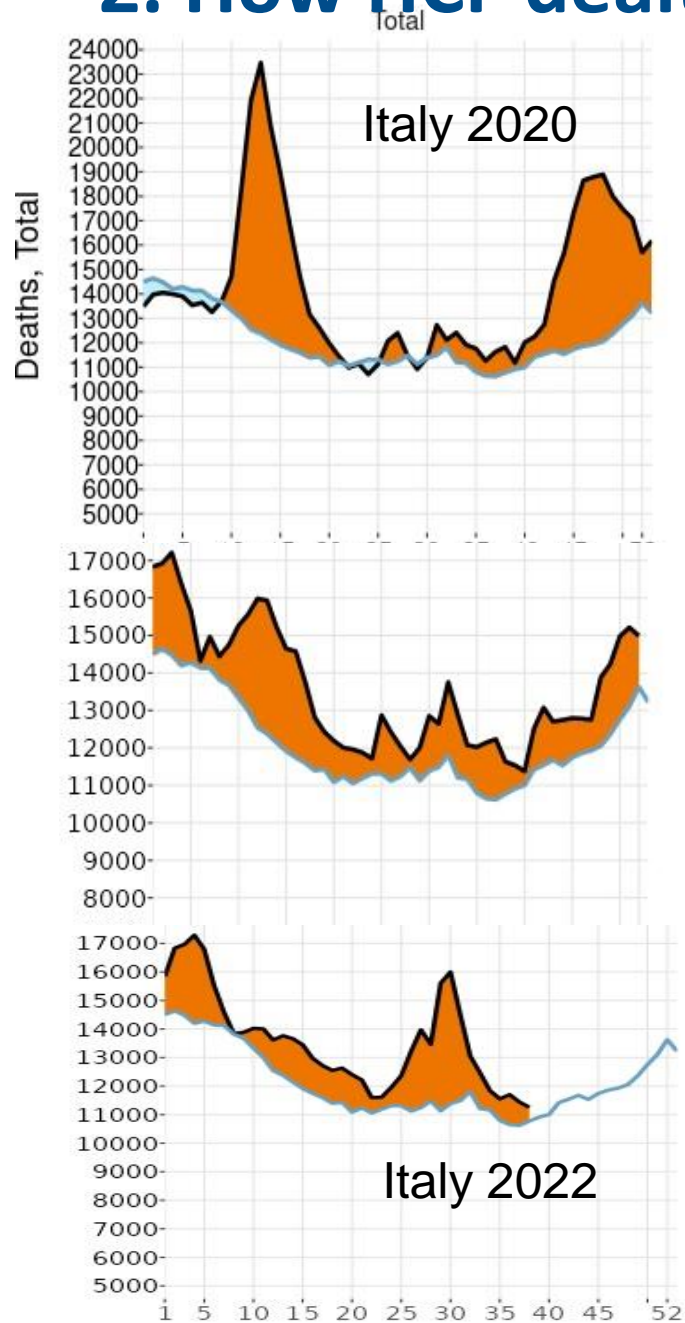
Examined for object recognition with FastFCN, DeepLabv3, UNET, and MACU.

The machine learning process with better performance, especially in a low-information intensity environment.

... and no trivial GPU or CPU capacity.

- Accuracy Assessment in Convolutional Neural Network-Based Deep Learning Remote Sensing Studies: Environmental Science: Remote. Sens. 2021
- <https://github.com/topics/deeplab-v3-plus>
- Multi-scale skip connected and asymmetric-convolution-based U-Net <https://github.com/lironui/MACU-Net>

2. How HCF dealt with: Covid-19 Pandemic Excessive Loads



3. Manually examine events and their risks

When the operational capabilities of HCF are becoming important (**and their infrastructure critical**):

- Earthquakes, floods, atmospheric events (e.g. **Kentucky, Berkshire**) landslides (**Ischia**) are regular **natural** extremes with significant effects on population.
- **Man-made** caused toxic releases and radioactive accidents are rare, but with large population exposures.
- Epidemics (and the ongoing **pandemic**) are causing escalating demands for hospitalizations that can raise acute needs beyond the normal capabilities.



Projected Future (2040s) Climate Risks for HCF

