Faculty of Geodesy
University of Zagreb

Ministarstvo znanosti i obrazovanja

Croatian Science Foundation

Projects:
GEMINI
3D-FORINVENT

Advanced remote sensing for land cover detection and green infrastructure monitoring

Assist. Prof. Mateo Gašparović

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Introduction

- Green infrastructure (GI) is a network of natural and semi-natural areas, features and green spaces in rural and urban areas that collectively provide society sustainable, healthy living environment
- 2/3 Europe population live in urban areas
- GI provides various benefits such as:
  - environmental (air pollutants, land quality)
  - social (health and human well-being, green cities, tourism and recreation opportunities)
  - adaptation and mitigation to climate change (heat island)

Research projects and groups

- GEMINI – Geospatial monitoring of green infrastructure using terrestrial, airborne and satellite imagery
  - Prof. Damir Medak
  - 2017 – 2021

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- 3D-FORINVENT – Retrieval of Information from Different Optical 3D Remote Sensing Sources for Use in Forest Inventory
  - Ivan Balenović, PhD
  - 2017 – 2021

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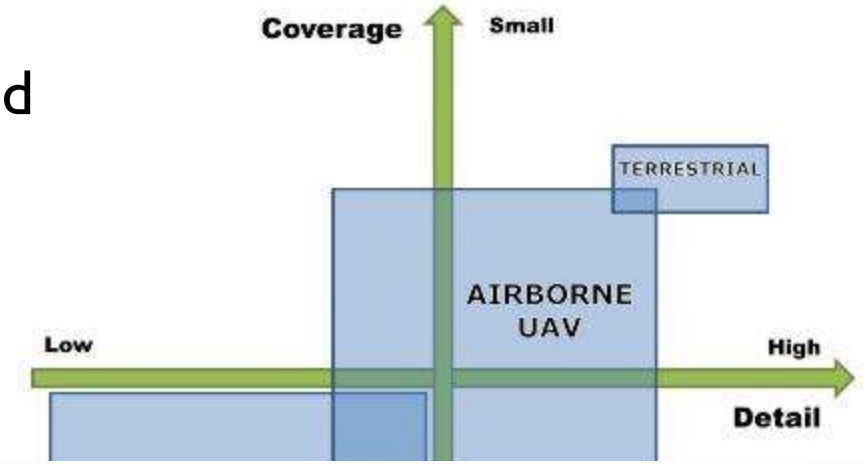
- MySustainableForest – Operational sustainable forestry with satellite-based remote sensing
  - Ivan Pilaš, PhD
  - 2018 – 2021

Horizon 2020
European Union Funding
for Research & Innovation

My Sustainable Forest

Current GEMINI project status

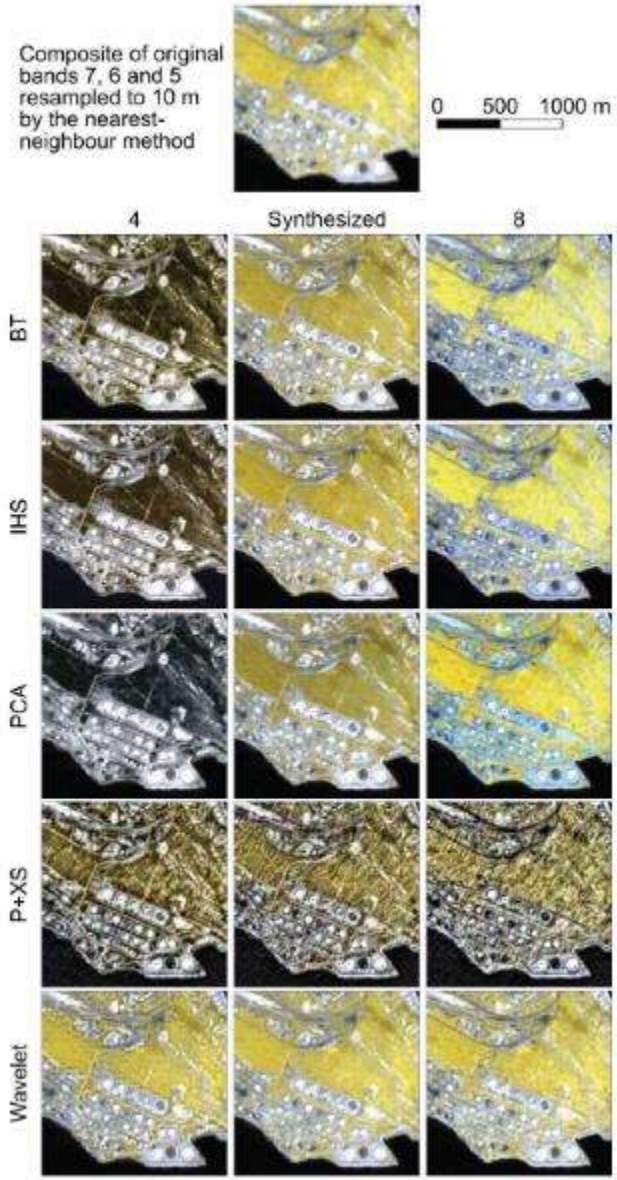
- Fusion of satellite, UAV, terrestrial imagery and ground data and measurements
- Satellite imagery
  - Sentinel, Landsat, PlanetScope, RapidEye, WorldView 1-4
- UAV aerial imagery
  - Multispectral and thermal c
- Terrestrial ground data an measurements
  - Multispectral and thermal c collected from automotive vehicle
  - Ground measurements (e.g data from meteorological stations) for acquisition sys calibration

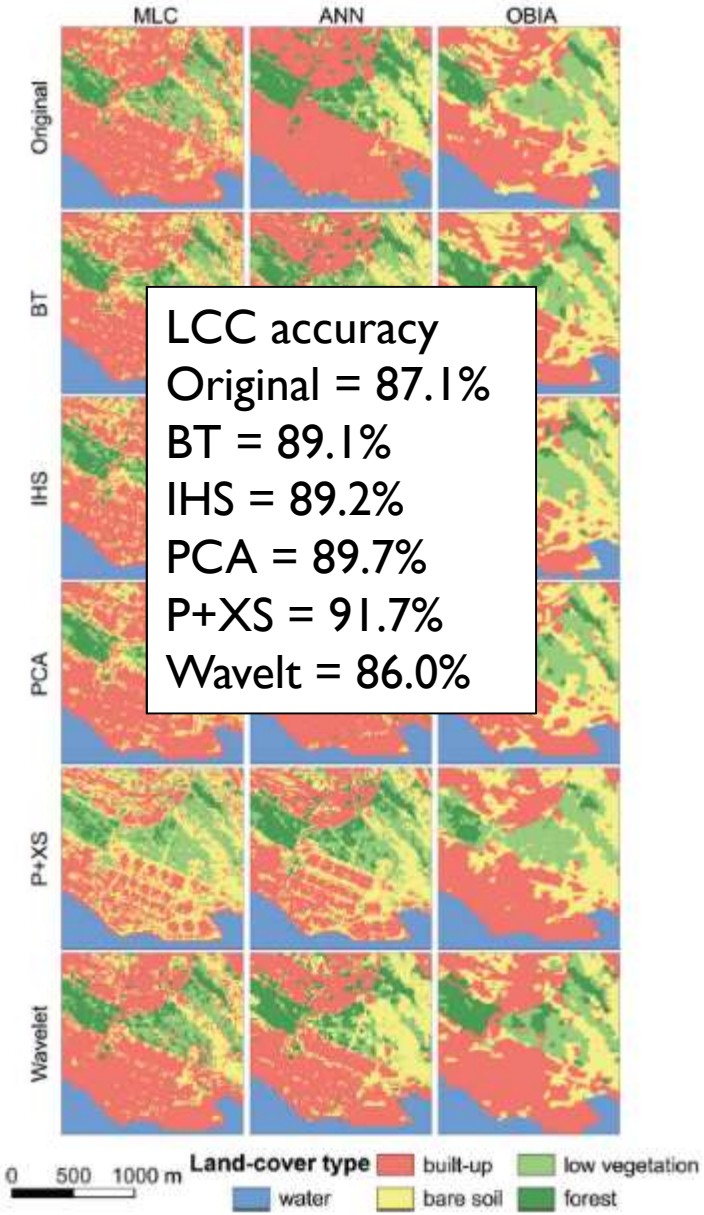


Can Sentinel-2 improve itself?

- Improving the
  synsynthesizec
  - Gašparović, M. and
    classification. *Interno*
- Study area Rij

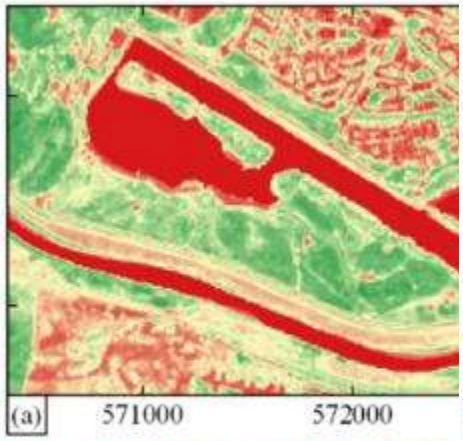
- Gašparović, M.: Advanced ren





Can Sentinel-2 improve

- Sentinel-2 (10 m) & PlanetScope



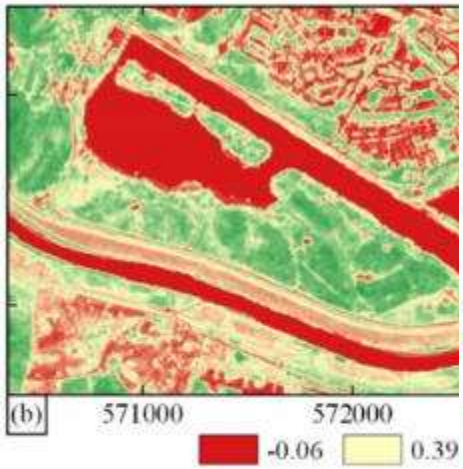
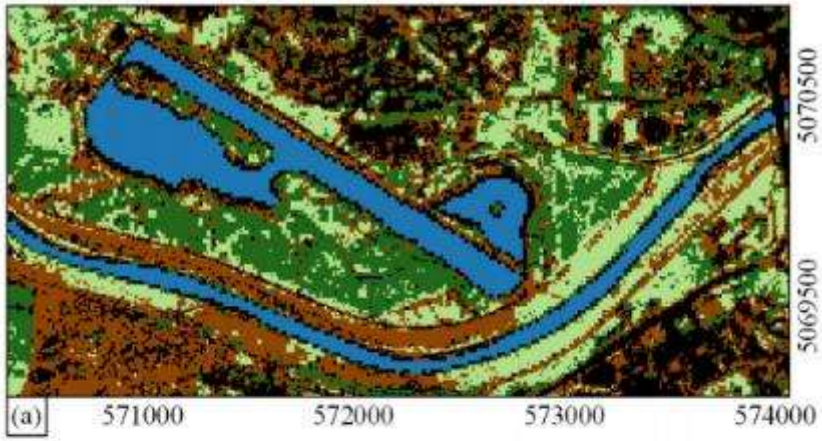


Figure 4. "True-colour" composite of
on the: (a) S-2 (4–3–2) and (b) fu

Figure 7. NDVI value of the exampl
2 and (b) fused



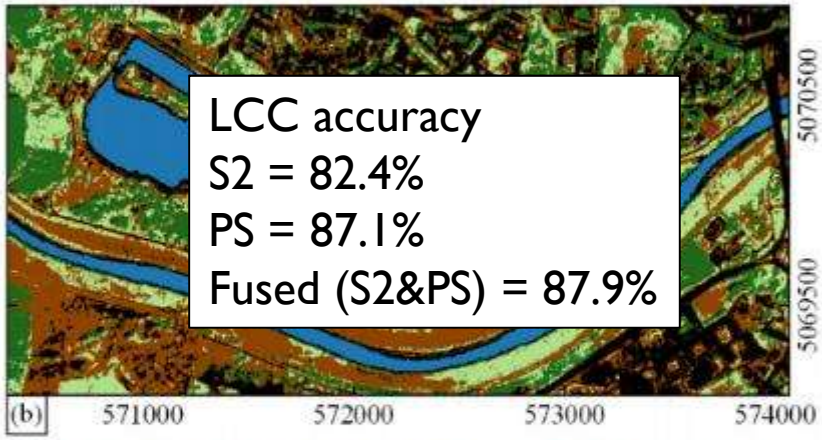


Figure 5. RF classification results of the example subset based on the: (a) S-2, (b) PS and (c) fused imagery

- Gašparović, M.: Advanced remot

Environmental impact of a fire near Split

- Sentinel-2 (17th July 2017 – fire; 7th July 2017; 6th August 2017)

Automatic burned areas detection

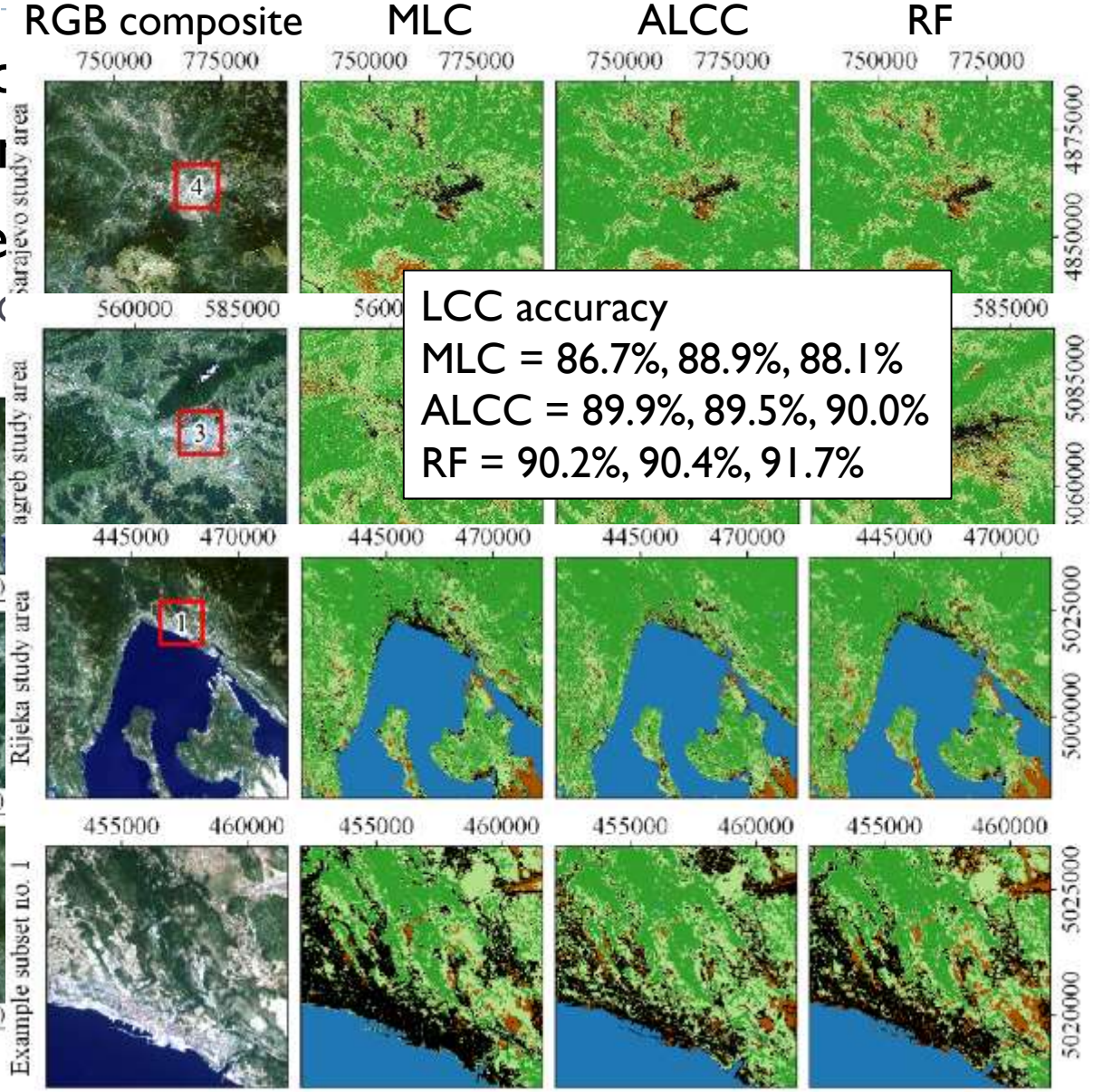
- Two Sentinel-2 sets (month before fire, month after fire)

Wind damage in forests near Vrbovsko

- 11th-12th December 2017
- Sentinel-2
  - Summer 2017
  - Summer 2018
  - Automatic LCC

Automatic cost-effective method for land cover classification (ALCC)

- ALCC does not rec
  and training polygo
- Various optical sate
  - Gašparović, M., Zrinjski, M., (
    cover classification (ALCC)



Conclusions

- The importance of protected GI areas is continuously growing
- To preserve them for future generations is necessary to implement a concept of sustainable development in their management
- Copernicus Programme allows free data for continuous monitoring of the Earth
- The GEMINI project enables development of new methods and systems for monitoring the urban GI
- UAV-based remote sensing offers great possibilities to acquire field data for GI monitoring within the urban areas in a fast and easy way
- Future analysis will be of great importance in fields such as forestry, arboriculture, urban and geospatial science

Bundek Lake in City of Zagreb on VHRSI

Thank you for attention

Assist. Prof. Mateo Gašparović (mgasparovic@geof.hr)