

EGU21-1482

<https://doi.org/10.5194/egusphere-egu21-1482>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



GeoAI:artificial intelligence for interpretation and processing of complex geomatic data

Roberto Pierdicca

Università Politecnica delle Marche, Department of Civil Building Engineering and Architecture (DICEA), Ancona, Italy,
r.pierdicca@staff.univpm.it

Nowadays, the exploitation artificial intelligence approached is overwhelming in several domains. As well, geomatic data are becoming more and more complex and heterogeneous, as they are collected with multi-source data collection techniques. Remotely sensed data, point cloud, thermal images and more are just few examples of complex data which requires growing computational capabilities, but, foremost, powerful tools of processing and interpretation.

The applications of modern AI-based algorithms for the processing of geomatics data offer opportunities that wouldn't be affordable up to few years ago. For geospatial domains, fundamental questions include how AI can be specifically applied to or has to be specifically created for geomatics data. This change is also having a significant impact on geospatial data. Machine Learning (ML) has been a core component of spatial analysis for classification, clustering, and prediction. In addition, Deep Learning (DL) is being integrated to automatically extract useful information with the task of classification, object detection, semantic and instance segmentation, etc. The integration of AI, ML, and DL in geomatics has developed into the concept of Geospatial Artificial Intelligence (GeoAI) that is a new paradigm for geographic knowledge discovery and beyond.

This talk aims at giving a sight on the emergent discipline called GeoAI, a novel research field in which cutting edge learning based methods are applied to enhance the knowledge and improve the ability of humans to manage complex information. Beside providing a picture of the latest achievements in the filed (outlining AI-based techniques for the analysis and the interpretation of complex geomatics data), this lecture will provide several examples of researches and applications, demonstrating opportunities, challenges and limitations with practical examples.

Bearing in mind that, for the upcoming future, the "man on the loop" will always assess unpredictable outcomes from the automatization process, it will be demonstrated, at different scales of representation and facing research challenges in different domains (e.g. environmental challenges, forestry, cultural heritage, tourism just to mention some), AI outperforms manual operations in terms of both cost effectiveness and reliability.