"Geospatial Artificial Intelligence: Potentials for 3D Point Clouds"

Artificial Intelligence (AI) is changing fundamentally the way how IT solutions are implemented and operated across all application domains, including the geospatial domain. This contribution outlines AI-based techniques for 3D point clouds and geospatial digital twins as generic components of geospatial AI. First, we briefly reflect on the term “AI” and outline technology developments needed to apply AI to IT solutions, seen from a software engineering perspective. Next, we characterize 3D point clouds as key category of geodata and their role for creating the basis for geospatial digital twins; we explain the feasibility of Machine Learning (ML) and Deep Learning (DL) approaches for 3D point clouds. In particular, we argue that 3D point clouds can be seen as a corpus with similar properties as natural language corpora and formulate a “Naturalness Hypothesis” for 3D point clouds. In the main part, we introduce a workflow for interpreting 3D point clouds based on ML/DL approaches that derive domain-specific and application-specific semantics for 3D point clouds without having to create explicit spatial 3D models or explicit rule sets. Finally, examples are shown how ML/DL enables us to efficiently build and maintain base data for geospatial digital twins such as virtual 3D city models, indoor models, or building information models.

*Keynote auf Englisch

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