Vortrag

Semantic data cubes for EO indicator extraction from big EO data

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Free and open Earth Observation (EO) images is a growing collection of data that is one of the few globally consistent sources available for generating information in support of international initiatives. However, this data requires automated workflows for handling, processing and analysis, including methods to convert data into valid information. Optical EO data cannot directly measure most objects, processes or events on Earth (e.g. digital numbers contain no semantics and many different surfaces can be represented by similar values). Indicator extraction is one way to translate this data into meaningful information to support actions towards meeting global agreements.

Recently the term EO data cube (or geospatial data cube, sometimes only referred to as data cube) has emerged to describe a new solution for storing, organising, managing and analysing (big) EO data. EO data cube technology is closely linked to the term analysis-ready data (ARD), which defines the pre-requisites for allowing automated EO data processing through time. Our approach goes beyond ARD and applies semantic enrichment (i.e. initial information extraction) of optical EO data for use within such data cubes. We present a proof-of-concept, generic, semantic EO data cube concept with automatic semantic enrichment and automated integration of optical EO data to enable semantic queries for replicable extraction of EO-based indicators from big EO data.

Two implementations of the concept for different application areas and data sources are presented:

(1) Automatic ex-post flood assessment using long time series of optical EO images (Landsat 8) in Somalia. The semantic data cube is based on the rasdaman array database.

(2) A semantic EO data cube for monitoring environmental changes in north-western Syria by integrating and analysing all available Sentinel-2 data. This implementation uses an Open Data Cube (ODC) environment.