

Automated Urban Mapping in a Satellite Ground Segment

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Abstract

The ESA-funded Earth Observation image Librarian (EOLib) project serves to setup the next-generation of Image Information Mining (IIM) systems, implementing novel techniques for image content exploration. EOLib will exploit information about Earth Observation (EO) product contents which is usually hidden in raster data, image time series and metadata, thus enabling content-based search in very large archives of high resolution EO data.

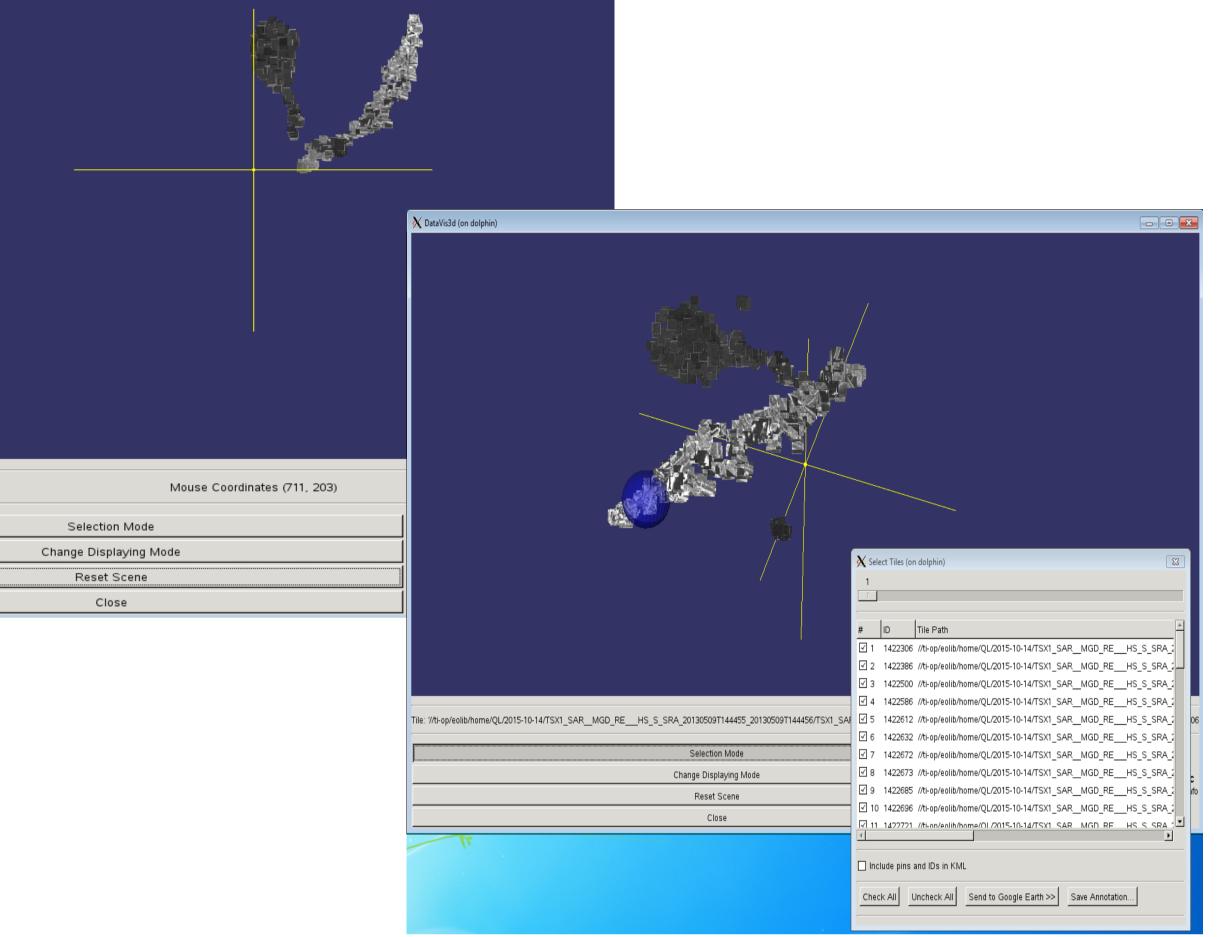
This system is particularly suitable for (semi-)automated urban mapping as the EO product information content represents actionable information for local information mining, including the semantic annotation of image patches.

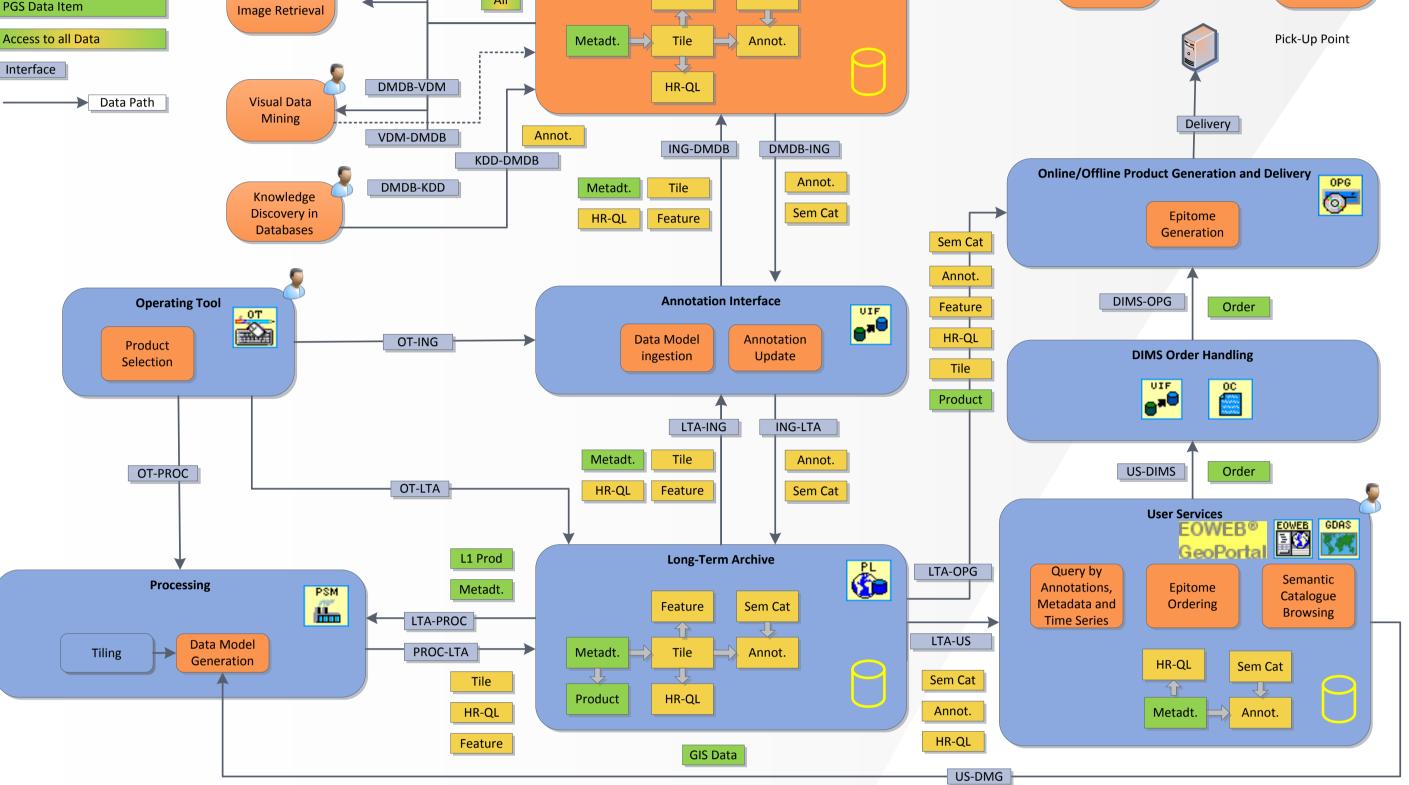
Architecture

Visual Data Mining

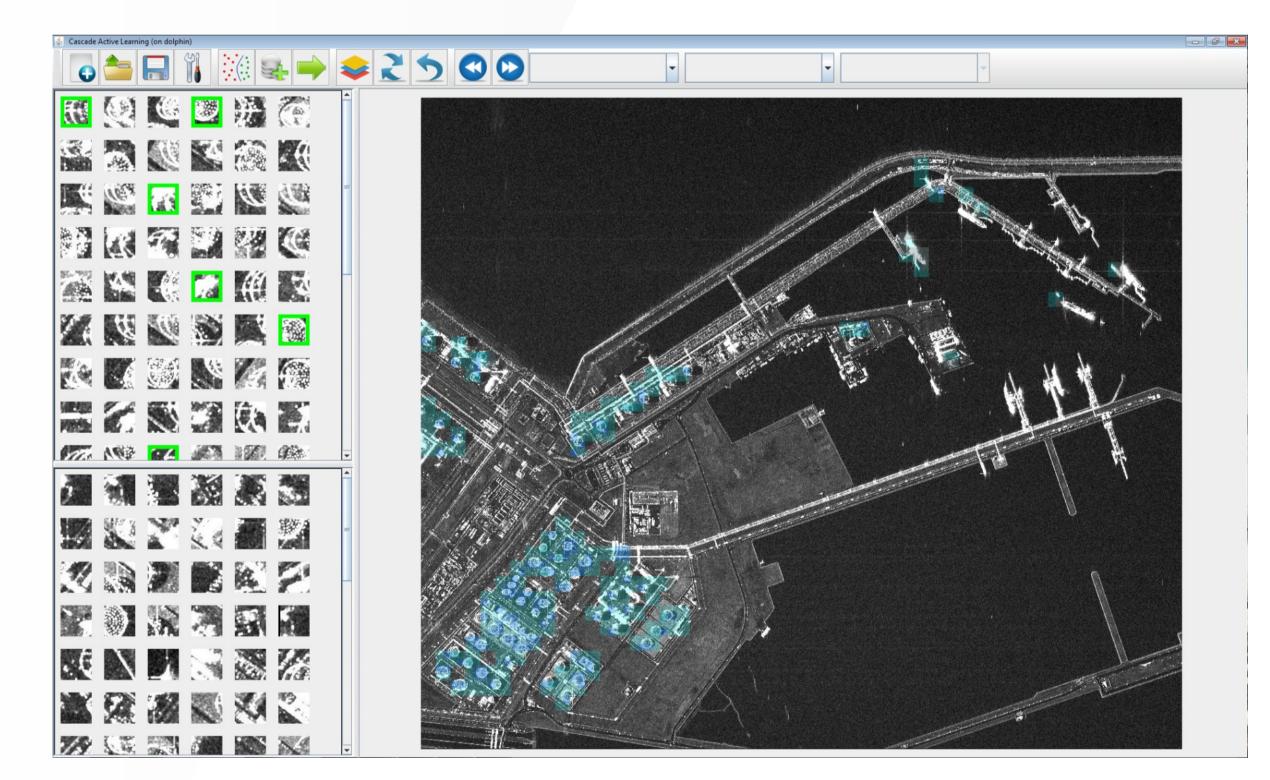






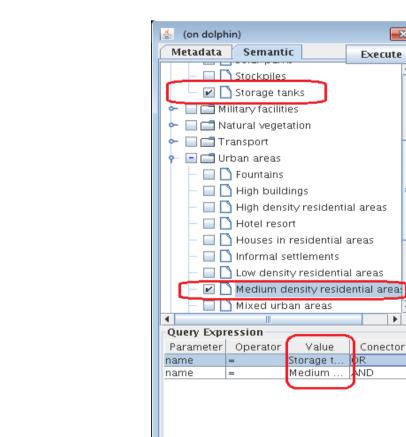


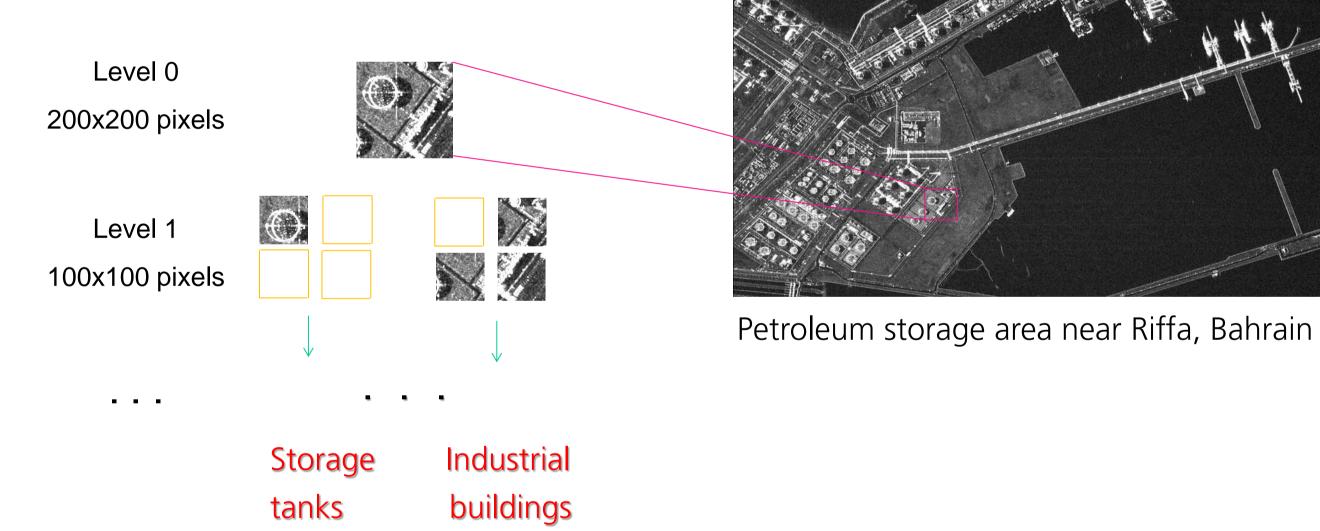
Knowledge Discovery in Databases





Query Engine

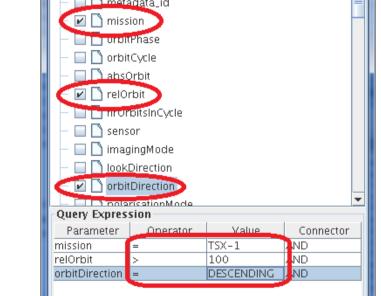




Test Data Set

- Our test data set consists of 1100 TerraSAR-X products covering different urban and nonurban areas around the world.
- ✤ The selected TerraSAR-X products are multi-look ground range detected, radiometrically enhanced, high resolution Spotlight mode images with single polarization (HH or VV). Their pixel spacing is 1.25 meters with a resolution of about 2.9 meters. The incidence angle ranges from 25° to 52° with images taken from ascending and descending pass direction. The average size of the images is 4,200 × 6,400 (rows × columns).





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Execute

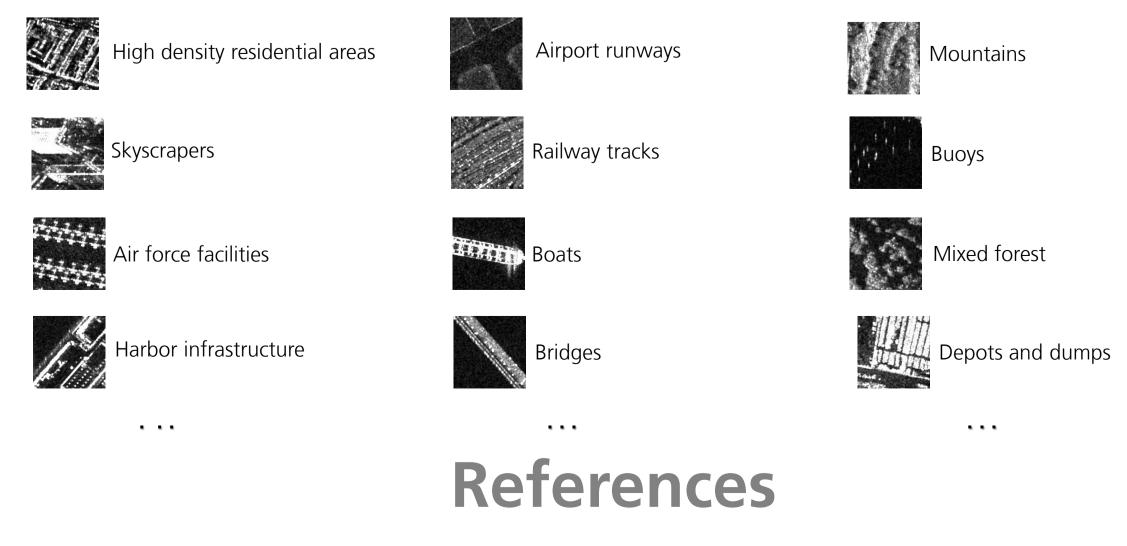
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12	TSX-1	1	20832	124	125	167	DESCENDI	AR	HS	SRA
20	TSX-1	1	29196	138	175	167	DESCENDI	AR	HS	SRA
25	TSX-1	1	33173	107	199	167	DESCENDI	AR	HS	SRA
26	TSX-1	1	33173	107	199	167	DESCENDI	AR	HS	SRA

Metadata Semantic

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We applied a multi-scale hierarchical annotation scheme. A three-level concept with 150 categories in total, split into 9 high-level categories, 73 mid-level categories, and 68 detailed low-level categories. All categories can be labeled on three scales.



[1] http://wiki.services.eoportal.org/tiki-index.php?page=EOLib

DLR – German Aerospace Center Remote Sensing Technology Institute D-82234 Weßling http://www.dlr.de/

