LAND COVER CLASSIFICATION TOOL
FOR A SLOVENIAN LAND INFORMATION SYSTEM
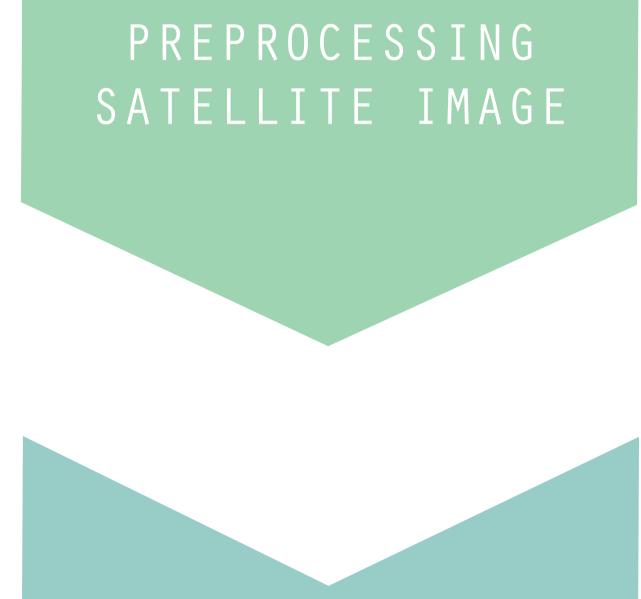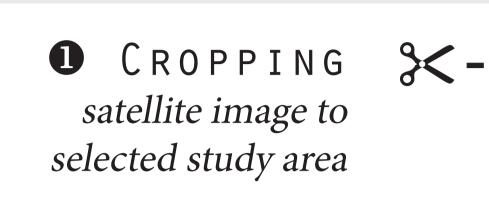
SPACE·SI

ZRCSAZU

Authors: Maja Somrak [1], Nataša Đurić [2], dr. Žiga Kokalj [1,2]
Contact: maja.somrak@zrc-sazu.si
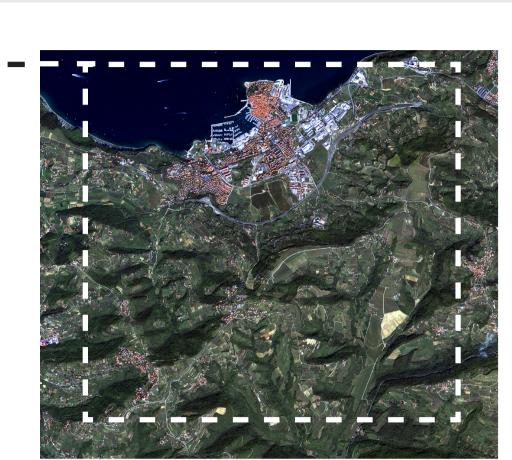
[1] ZRC SAZU Department of Remote Sensing, Institute of Anthropological and Spatial Studies
[2] SPACE-SI Center of Excellence for Space Sciences and Technologies

Advanced Satellite Landcover ANalysis (ASLAN) tool is a software for automatic analysis of land cover from high resolution satellite images. ASLAN uses a combination of supervised classification and rule-based expert system to produce a map with different land cover categories.
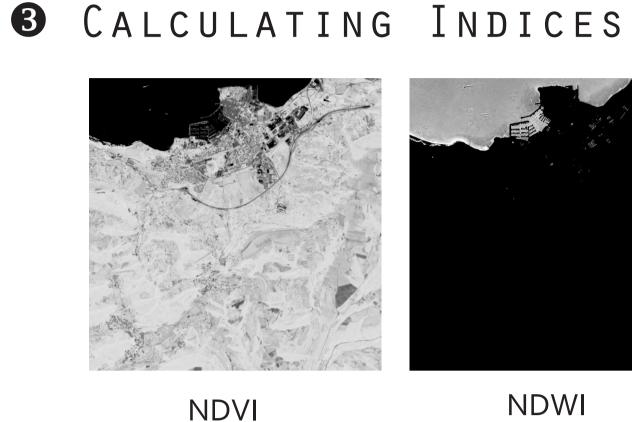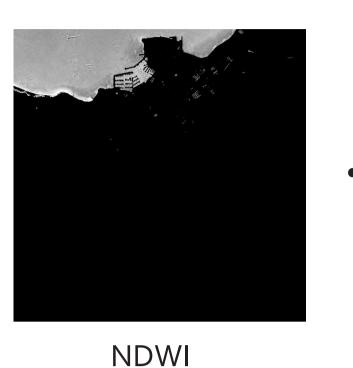
PREPROCESSING SATELLITE IMAGE

❶ **Cropping**
satellite image to selected study area

● **Segmentation**
Segmentation groups similar image pixels together.

❷ **Masking**
clouds
haze
snow
shadows

❸ **Calculating Indices**

NDVI   NDWI   ...

FEATURES & REFERENCE LAYER

❹ **Feature Extraction**
Statistics of indices and bands values for each image segment are used as attributes.

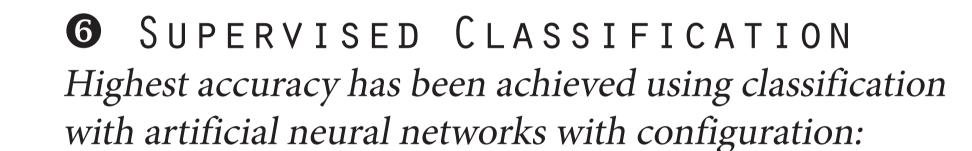BANDS + INDICES
{ *avg()*
stdev()
entropy()
... }

❺ **Class Reference Layer**
Reference layer with class values (land cover) assigned to segments is constructed from auxiliary geodata layers:

land use   DSM
buildings   DTM
roads

CLASSIFICATION

❻ **Supervised Classification**
Highest accuracy has been achieved using classification with artificial neural networks with configuration:

TRAIN PERCENTAGE   20%

SAMPLING   STRATIFIED   RANDOM

PERFORM CLASSIFICATION ON   PIXELS   SEGMENTS

CLASSIFIER
kNN
ANN
RTree
J48
SVM

POSTPROCESSING

❼ **Expert Rules**
Classification results are leveraged by applying additional rules, which may reassign some segments a different class value. Rules are predefined and based on domain expert knowledge. They mostly determine thresholds within which a certain feature value is known to correspond to a particular land cover.

❽ **Level of Refinement**
There are three different levels of refinement (below); every further level consists of additional (sub)classes. This produces more detailed result, but could lower its accuracy.

❾ **Application of MMU**

Table: Land cover classes at different levels.

	Level 1		Level 2		Level 3
100	build-up	1	building	1	building
		2	other constructed area	2	other constructed area
200	non-build-up	3	bare soil	3	bare soil
		4	scree and bare rock	4	scree and bare rock
300	water	5	surface water	5	surface water
			snow	6	snow
400	woody vegetation	400	woody vegetation	7	trees
				8	bushes
				9	dwarf shrubs
500	herbaceous vegetation	500	herbaceous vegetation	10	herbaceous vegetation
				11	reeds
600	special cases	600	special cases	12	shadow
				13	cloud

RESULTING IMAGE

Result of Level 2 classification and postprocessing on a study area of 25 km².

VALIDATION

❿ **Automatic & Manual Validation**

APPLICATION

Application to Cadastral Data
Results from ASLAN are used for tracking land cover changes on land properties over time.