

# Project Cropsense

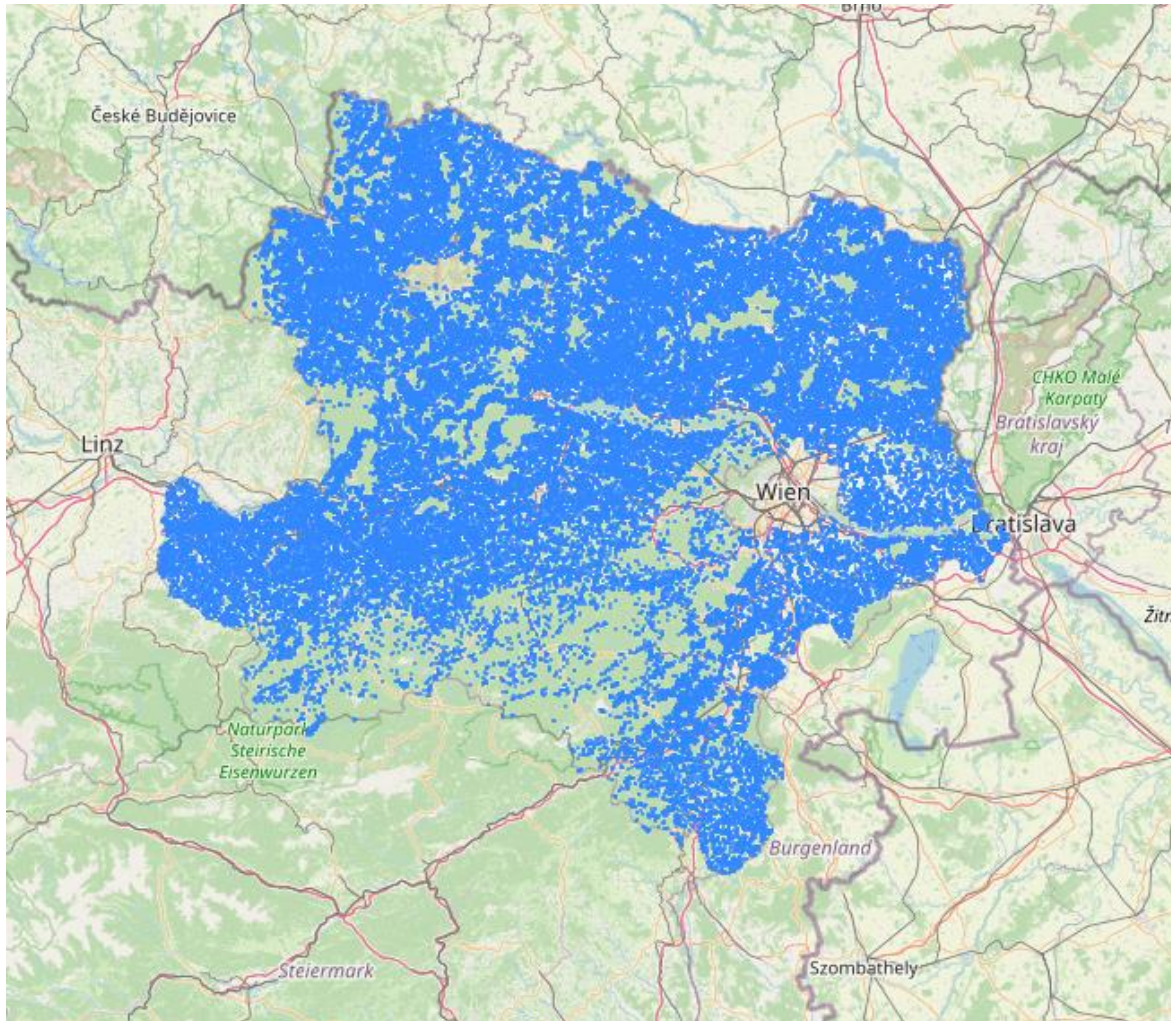
Satellite- and AI-based agricultural land use detection

# Objectives

- Train an AI component to detect the kind of crops grown on agricultural fields within Lower Austria
- Use Sentinel-2 image data and open land use data as training data
- Classify test data as good as possible by using the development of NDVI and RGB color information

# Training data

crop_id	7_B2	7_B3	7_B4	7_NDVI	9_B2	9_B3	9_B4	9_NDVI	13_B2	...	29_B4	29_NDVI	33_B2	33_B3	33_B4	33_NDVI	35_B2	35_B3	35_B4	35_NDVI
7	0.129000	0.112883	0.069333	0.425136	0.510503	0.516332	0.541035	0.057239	0.061227	...	0.060096	0.624769	0.063373	0.084314	0.091992	0.463942	0.055891	0.070151	0.077549	0.419329
5	0.051260	0.078760	0.076900	0.516139	0.327950	0.339717	0.336833	0.188272	0.049250	...	0.064242	0.608213	0.075400	0.094942	0.119117	0.276271	0.062717	0.084500	0.102742	0.318294
7	0.054457	0.083071	0.088961	0.469389	0.061650	0.080125	0.092000	0.431923	0.052334	...	0.077779	0.502695	0.064303	0.081976	0.102838	0.300192	0.079017	0.107369	0.134255	0.257509
9	0.053043	0.083905	0.084330	0.531874	0.074633	0.095233	0.095767	0.502252	0.028074	...	0.113267	0.470613	0.058305	0.072962	0.092288	0.313995	0.070750	0.096731	0.117276	0.321318
5	0.053700	0.081200	0.082800	0.500362	0.054100	0.072800	0.079400	0.496353	0.043744	...	0.079633	0.457990	0.056400	0.067900	0.091256	0.229803	0.083067	0.112489	0.133378	0.292008

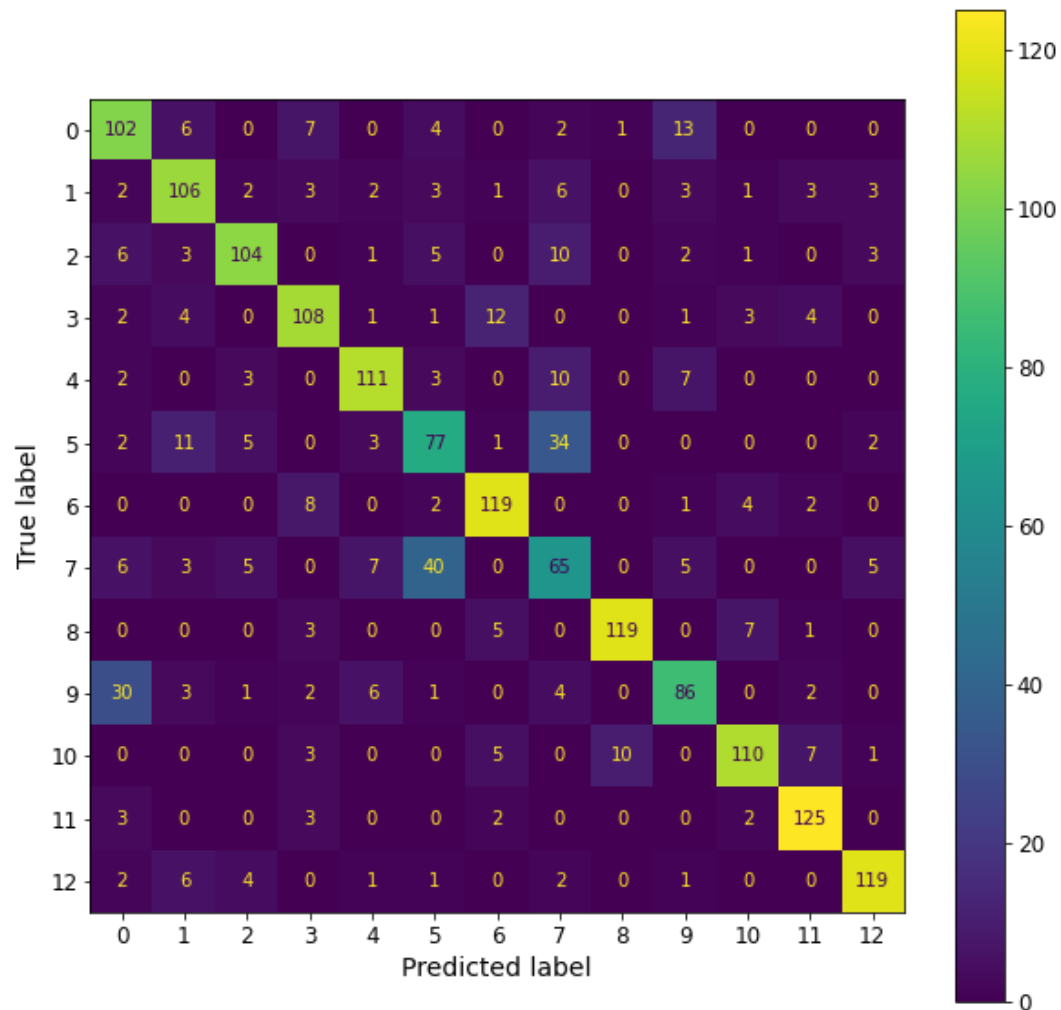


- Land use data from data.gv.at
- Sentinel-2 band information: B2, B3, B4 and B8

# Usage of cloud environments

- <https://www.sentinel-hub.com/> provides an intuitive user interface to explore the data
- We downloaded the satellite image data as GeoTIFF files from the provided API endpoint
- We also downloaded cloud masks via the provided API endpoint
- Having a stable API endpoint increased the efficiency of our data gathering and preparation process

# Quality of AI-based land use detection



It can be clearly seen that the classification performance decreases mainly within the winter and summer cereals, but otherwise has very high values. The first column contains the crop\_id which can be decoded with the following table:

- 12;WINTERRAPS
- 11;SUGAR BEETS
- 10;SOYBEANS
- 9;SUMMER BARROWS
- 8;KÖRNERMAIS
- 7;WINTER TRITICALE
- 6;OILCROWN
- 5;WINTER RAW
- 4;WINTER SOFT WHEAT
- 3;SUNFLOWER
- 2;WINTER BARLEY
- 1;CLEANA
- 0;SUMMER OATS

# Highlights of benefits to society derived from the project

- AI-based land use detection enables
  - better planning and forecasting of future harvest volumes
  - check if registered land use corresponds with real land use