CosmicCarrots

Konverto Challenge

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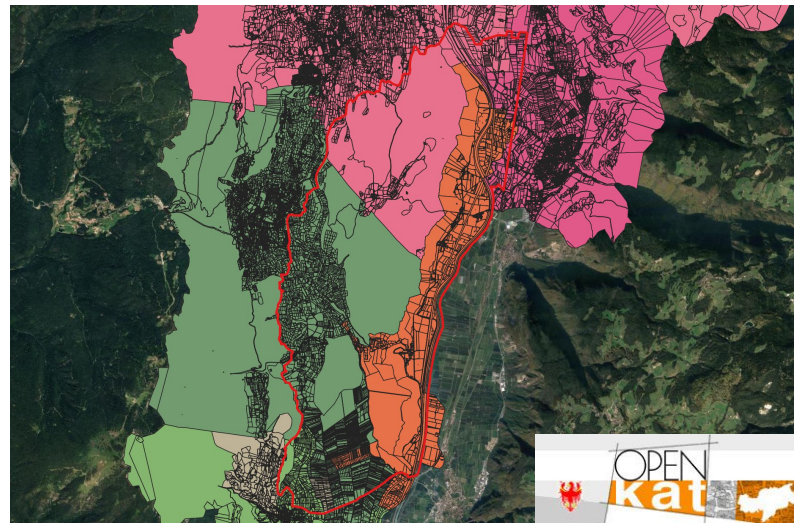# Konverto Challenge-Data

Data:

- High resolution raster data for
    - Climate
    - Agricultural Index
    - Geophysical Features

- 64GB of raw data
   - In the Zone of Kaltern/Caldaro

Konverto Challenge

Goal:

- Data integration of catasteral data in the AOI (Area Of Interest)

- Data-cleaning with ML

  (Missing Data Imputation)

- Data visualization for agriculture

Integration of an Additional Data Source
(Cadastral Community Dataset)

- Parcel Polygons from OpenKat
  - Bozen
  - Kaltern
  - Neumarkt

- Allows farmers to get valuable insights about their land via parcel numbers

https://nuop.catastobz.it/scarico-catasto-geometrico/de/index.html
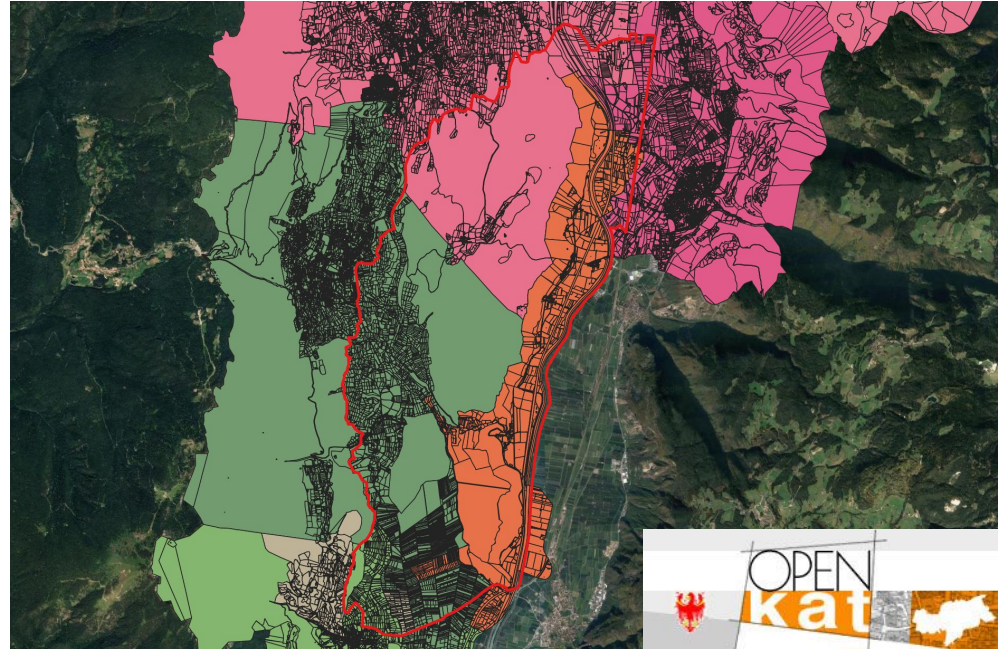
Konverto's Data

- Climate: Daily raster files for
  - Temperature, Precipitation and GDD (100×100 m^2 spatial resolution)
  - Sun Hours and Sun Energy (10×10 m^2 spatial resolution)
- Precomputed Satellite Indices for Agricultural Purpose
  - NDVI (High values indicate healthy plants)
  - NDWI (Reflects water content of leaves)
  - RECI
- Visual Satellite Data (Orthophotos)
- Terrain Data: Elevation, Exposure, Slope (2.5×2.5 m^2 resolution)

Classification Approach

Create training set from **labelled data** and use it for **prediction**:

Manually created polygons by Konverto that can be used for ML training:
- ~100 polygons including apple orchards, wineries, forests and buildings

Use open data from OpenKat (South Tyrol) to get polygons of single fields to use for predictions.

Sources:

- Remote Sensing in Agriculture: State-of-the-Art (Borgogno-Mondino et al. 2022. ISBN 978-3-0365-5484-6)
- Experts of agriculture

Missing Value imputation

Transformer model for Missing data imputation in Time Series data

PyMPOTS   ([2305.18811] PyPOTS: A Python Toolbox for Data Mining on Partially-Observed Time Series (arxiv.org))

- A Python Toolbox for Data Mining on Partially-Observed Time Series

Missing Value imputation

GDD Forecast

Transformer model for Missing data imputation in Time Series data

PyPOTS [[2305.18811] PyPOTS: A Python Toolbox for Data Mining on Partially-Observed Time Series (arxiv.org)](#)

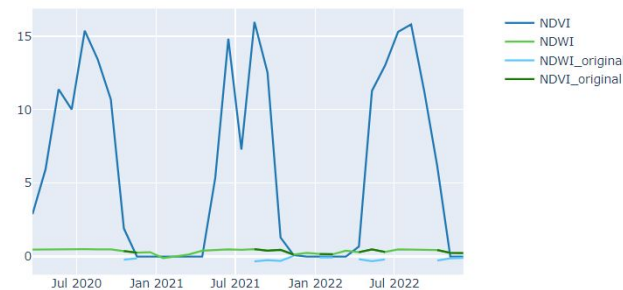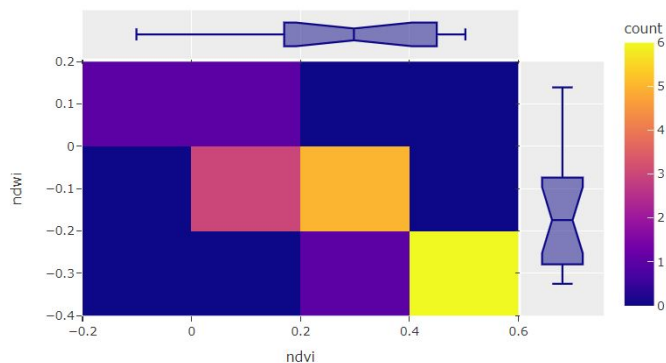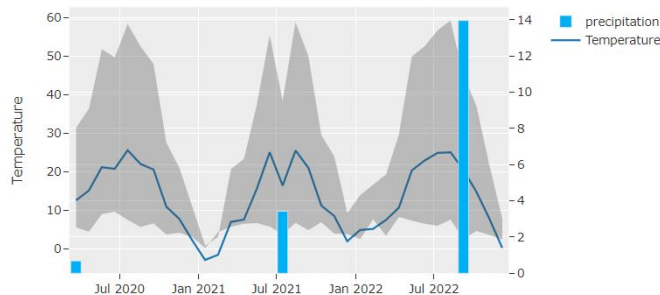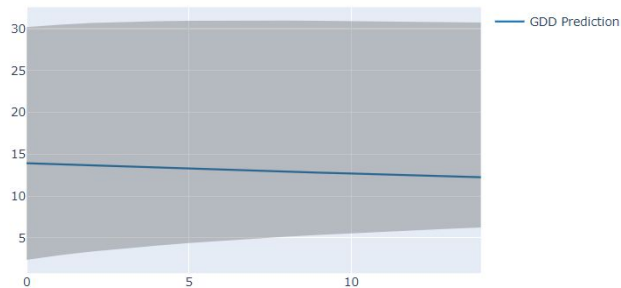- A Python Toolbox for Data Mining on Partially-Observed Time Series
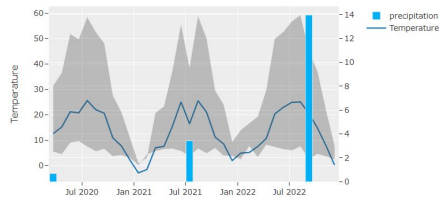
ARIMA model:
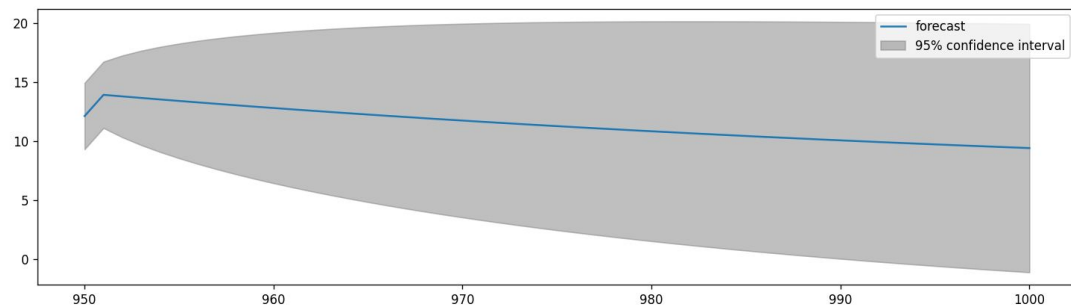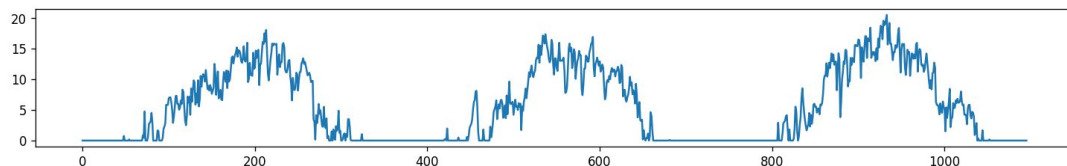
CosmicCarrots Dashboard
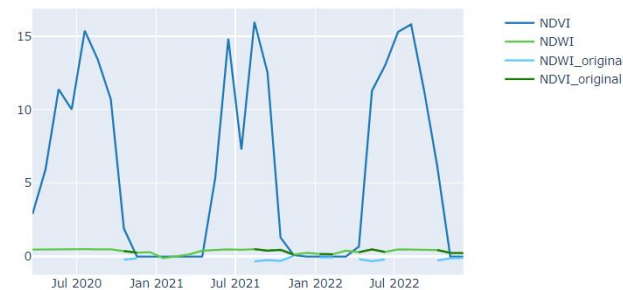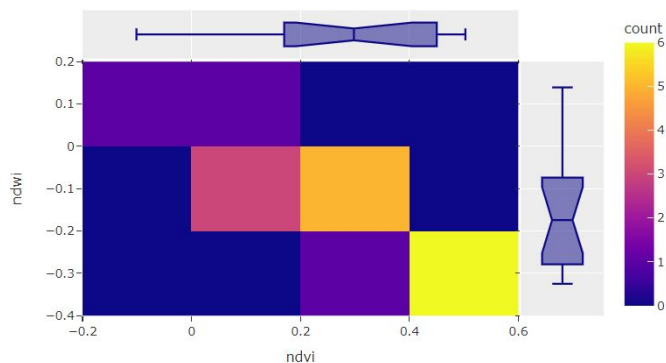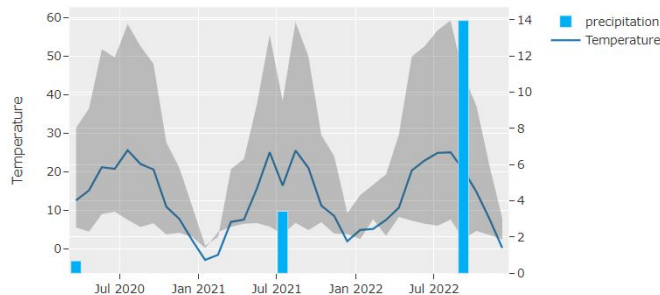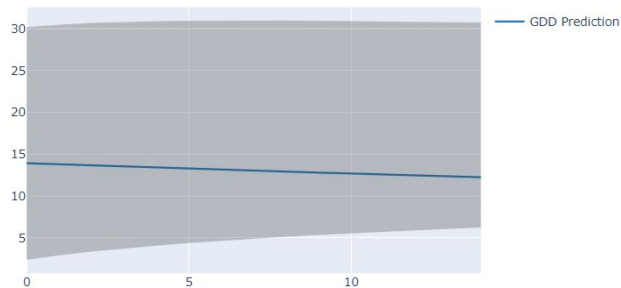
CosmicCarrots Dashboard

DEMO

- http://localhost:8050/
- http://localhost:5050/
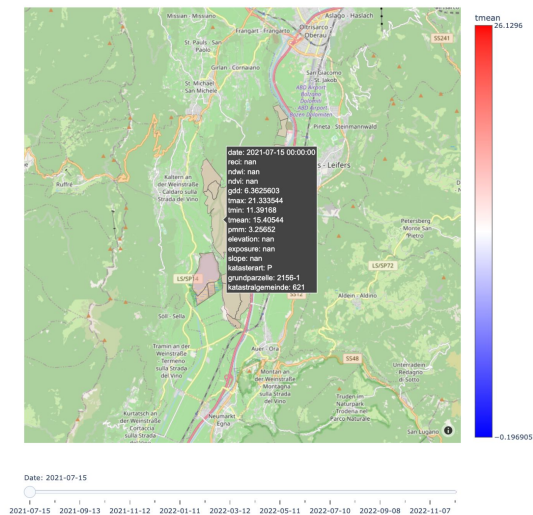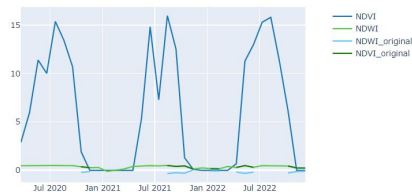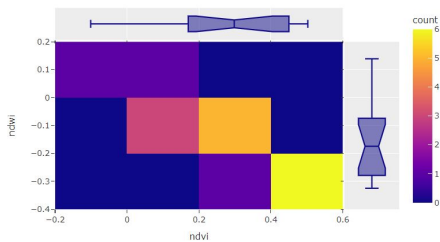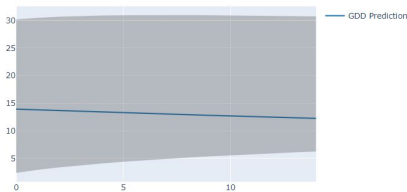
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