European Union's Horizon 2020 Research and Innovation Programme under the Grant Agreement 776115

Perceptive Sentinel eo-learn Python package

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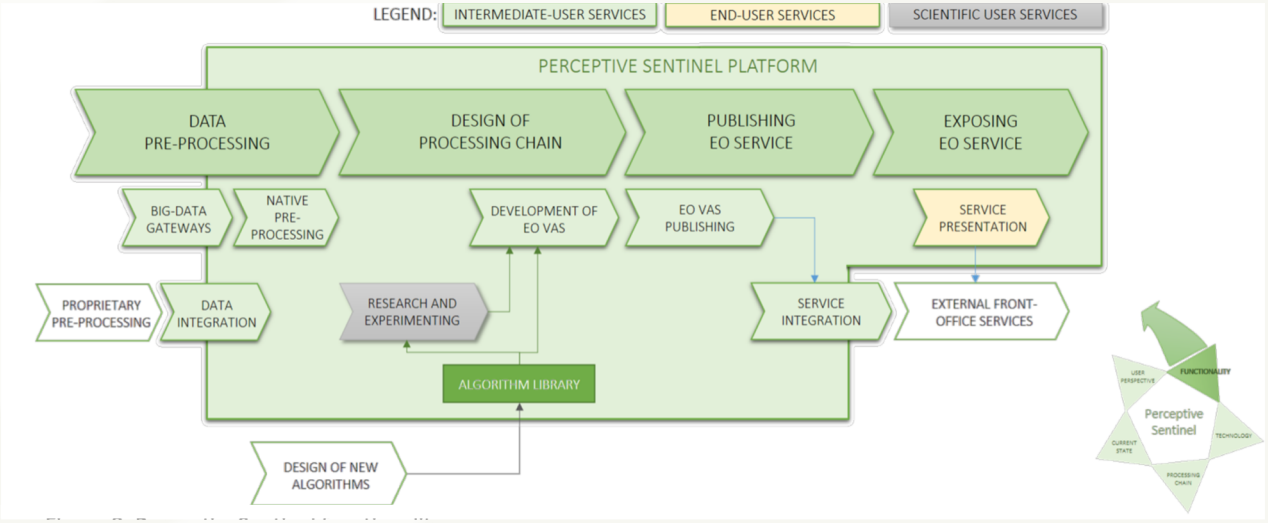
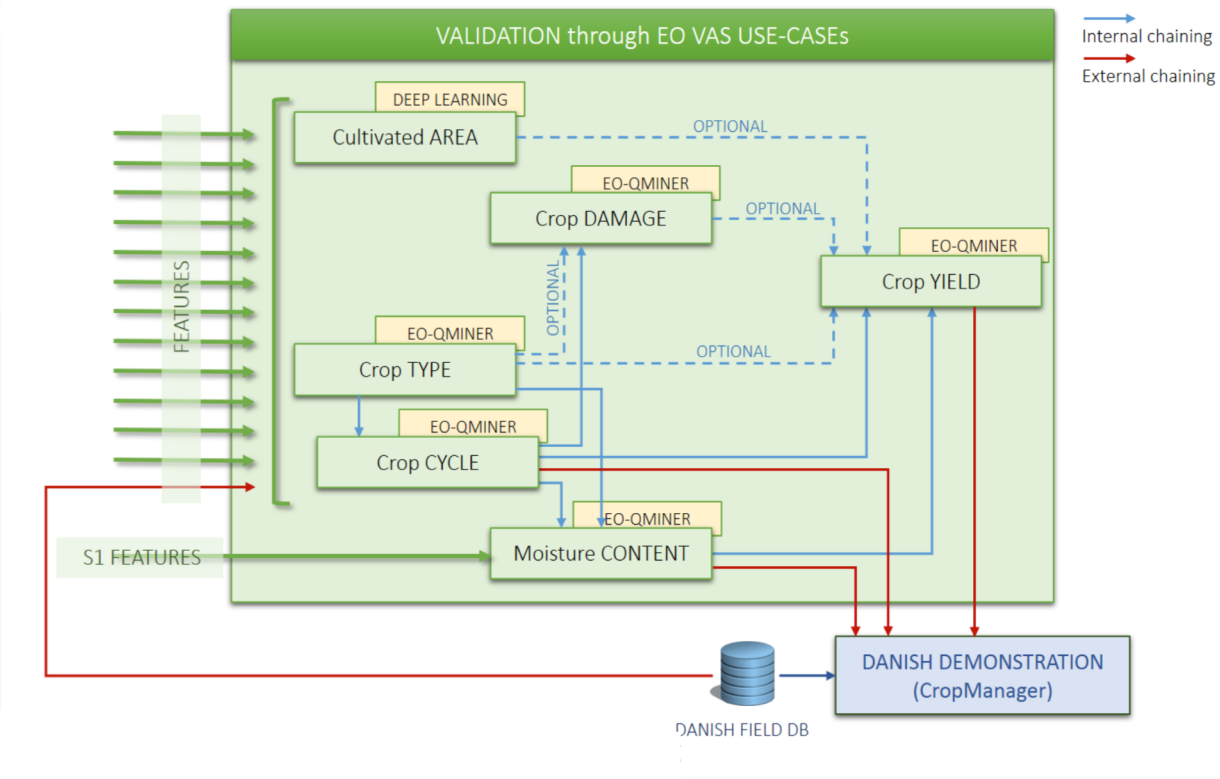
Perceptive Sentinel in a nutshell



- **Intermediate Earth observation (EO)** service providing
  - ***modelling*** and ***publishing*** capabilities for
  - ***design***, ***exposure*** and ***exploitation*** of EO-processing chains for
  - ***forecasting***, ***monitoring*** and ***historical analysis*** based on
  - ***multi-temporal*** and ***multi-spectral*** EO and non-EO data ***modelling***

Perceptive Sentinel in a nutshell

- Partners
  - Sinergise, Slovenia
  - GeoVille, Austria
  - Magellium, France
  - Jožef Stefan Institute, Slovenia
  - Agricultural Institute Slovenia, Slovenia
  - Seges, Denmark

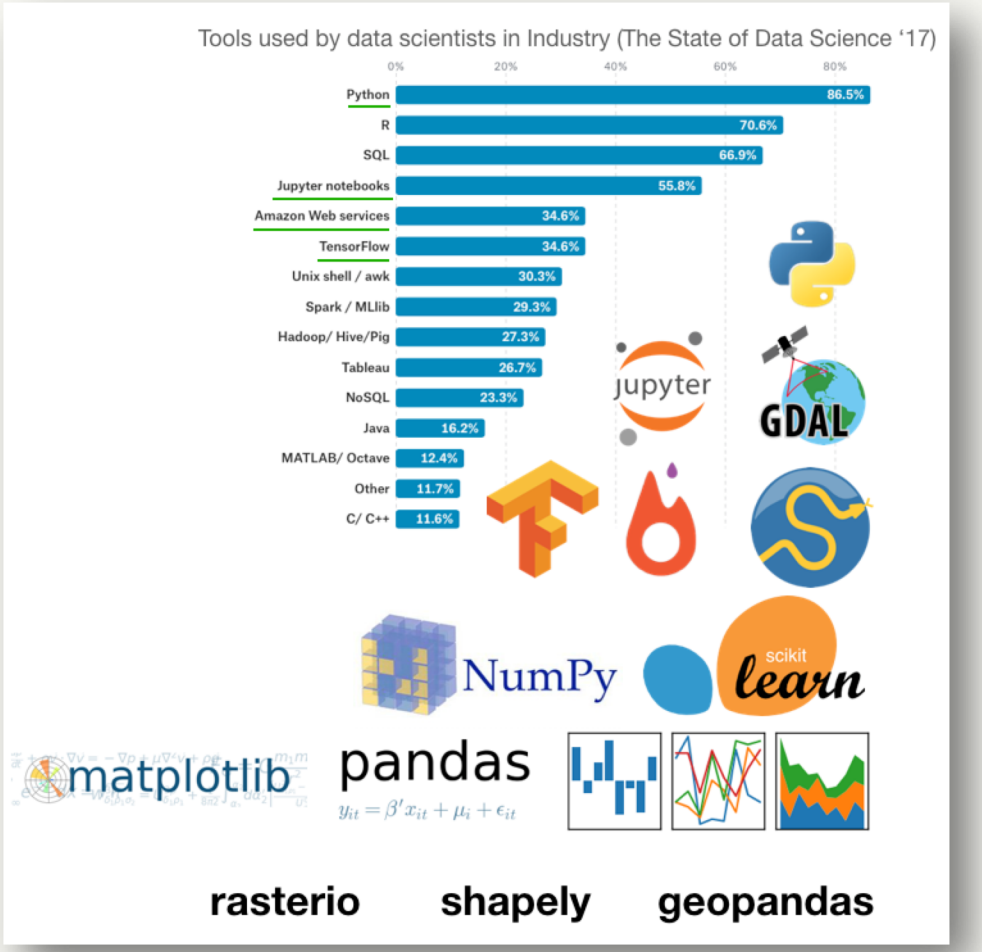


- Demonstration Use-cases
  - Cultivated Area
  - Crop Type
  - Crop Damage
  - Crop Cycle
  - Crop Yield
  - Moisture Content

eo-learn library

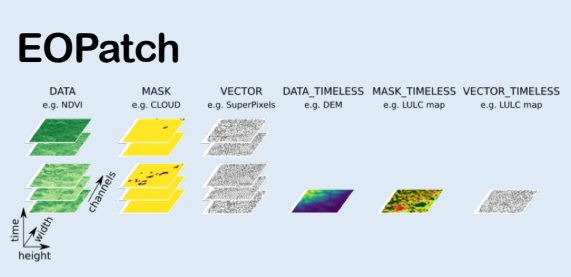
eo-learn

- *collection of modular Python sub-packages that allow processing of spatio-temporal data to prototype, build, and automate large scale EO workflows*
- *operates on Area of Interest (AOI) of any size*
- *acts as a bridge between EO and Python ecosystem for data science and machine learning*
- it's open source (MIT License)

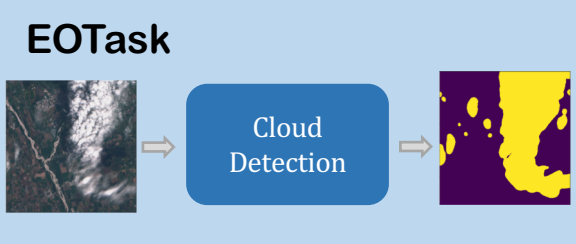


eo-learn enables experts and non-experts alike to explore, discover, and share value from vast amounts of satellite imagery

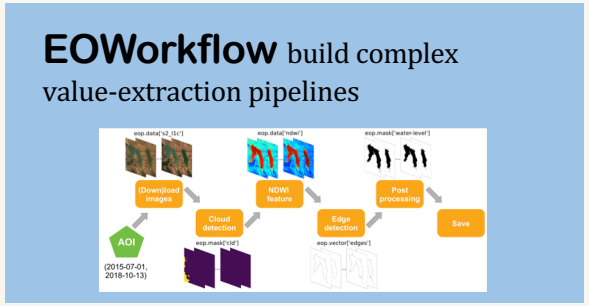
eo-learn building blocks



- a common data-object for *spatio-temporal* EO and non-EO data, and their derivatives (numpy arrays, shapely polygons)
- sensor agnostic (optical, radar, ...)



- a single, well-defined action being performed on existing **EOPatch**(es)
- each **EOTask** takes an **EOPatch** as an input and returns a modified **EOPatch**
- little to no overhead in order to implement a new task



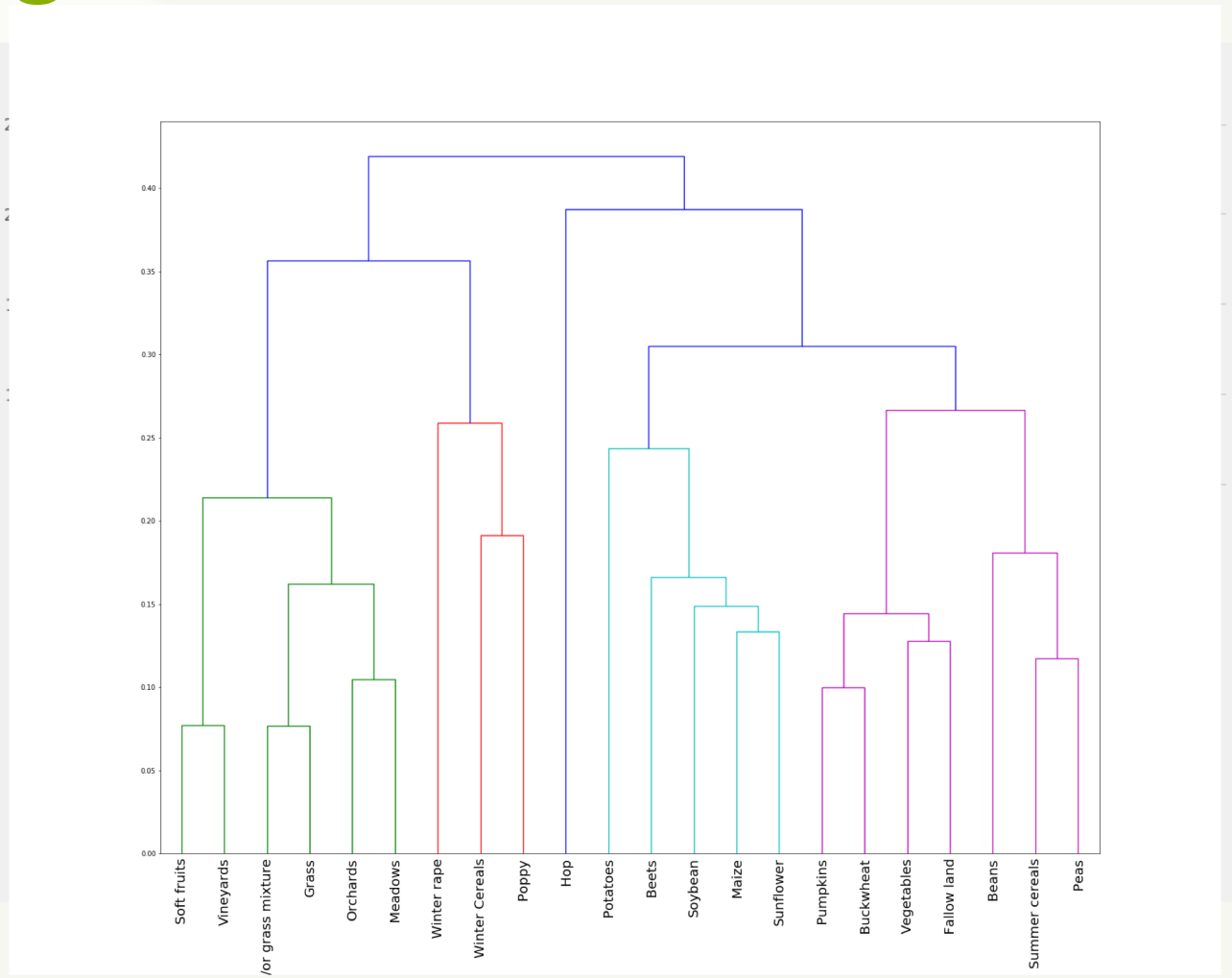
- a collection of **EOTask**s that together represent an *EO-value-adding-processing* chain

Crop-type mapping

Processing pipeline in a nutshell:

- Divide AOI into patches
- Download EO data
  - L2A
  - sen2cor's scene classification
  - s2cloudless
- Add non-EO data
  - GSAA/LPIS
- Rasterize
- Sample
- Develop crop-type classification algorithm

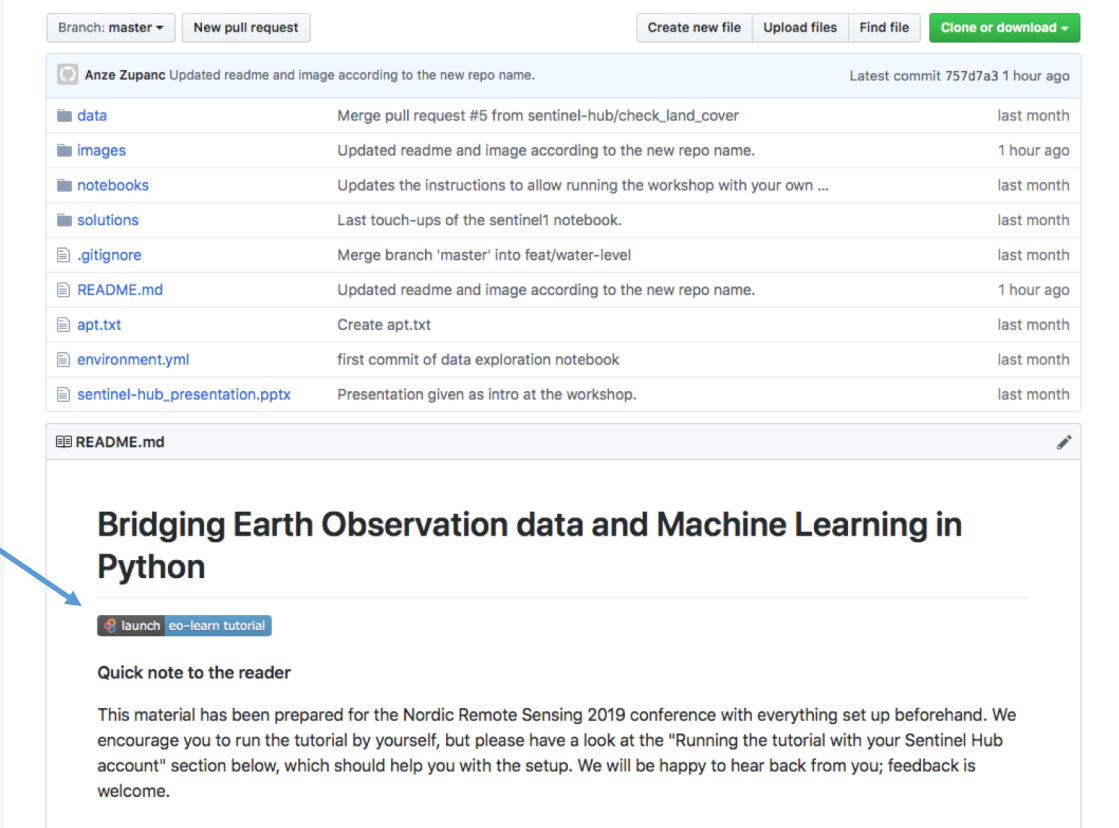
- Predict for AOI



Hands on exercises

- Go to https://github.com/sentinel-hub/eo-learn-workshop
- Launch Binder instance

Click!

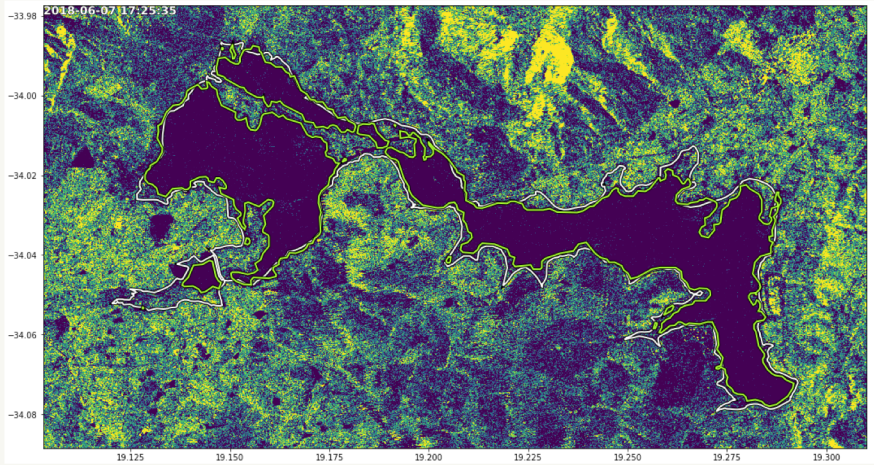


Remember (you're in control):

- eo-learn can be installed anywhere
  - Your laptop
  - Your cluster
  - DIASes
  - Cloud
    - AWS

H2020 EO Big Data Hackathon Challenge ideas

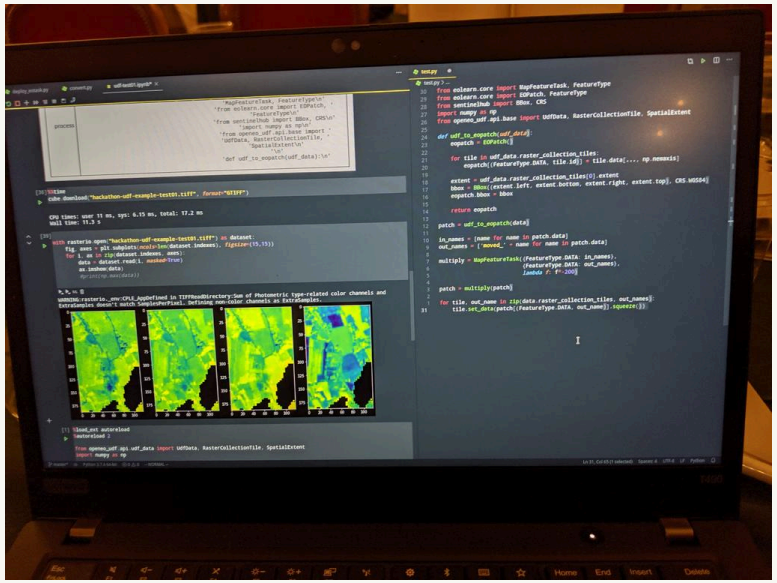
- Participants of the Hackathon are challenged to
  - Run **eo-learn** on their own platforms.
  - Adapt **eo-learn** surface water level extraction workflow to work with Sentinel-1 data as an input.
  - Adapt **eo-learn** surface water level extraction workflow to detect deforested areas in Amazonia (i.e. Porto Velho, Brazil).
  - Run ***s2cloudless*** cloud detection algorithm as User Defined Function within openEO.
  - Run **eo-learn** workflow as User Defined Function within openEO.
  - Implement **eo-learn** task that uses openEO's API to get satellite imagery from any of the openEO's backends.



H2020 Hackathon Outcomes

- openEO and eo-learn were successfully merged
  - a joint processing chain was executed on Vito's back-end
  - Code available on github

    https://github.com/iovsn/eohack



iovsn / eohack

Watch 4 | Star 0 | Fork 0

Code | Issues 0 | Pull requests 0 | Actions | Projects 0 | Wiki | Security | Insights

No description, website, or topics provided.

6 commits | 1 branch | 0 packages | 0 releases | 2 contributors

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

iovsn split notebooks — Latest commit 6cd38c9 10 days ago

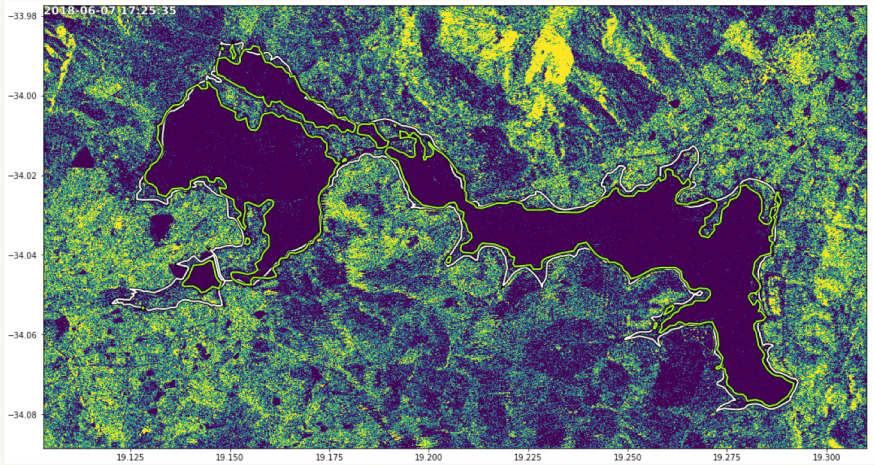
README.md	split notebooks	10 days ago
convert.py	confert eopatch to udf_data and vice versa	21 days ago
run_udf.ipynb	split notebooks	10 days ago
udf_eopatch_conversion.ipynb	split notebooks	10 days ago

README.md

A joint session of openEO and PerceptiveSentinel projects at the H2020 EO Big Data Hackaton.

H2020 Hackathon Outcomes

- A lot of participants attempted to develop a new algorithm of surface water level extraction using Sentinel-1 and detection of deforestation in Amazonia
    - many first time users
    - due to WIFI issues participants working on the challenge were scattered
        - difficult to help all of them at the right time
    - But feedback that we got at the end was positive
        - Participants appreciated *getting hands dirty and let's code approach*



More info

- https://eo-learn.readthedocs.io/
- https://medium.com/sentinel-hub/
- https://github.com/sentinel-hub
- http://www.perceptivesentinel.eu

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