

Report regarding project ID 2519a4 titled
“Crop yield prediction using Sentinel-2
satellite imagery”

Submitted to:

NoR team @ ESA

Objectives of the project

- The aim of this project is to design a system for the early yield prediction of crops with the help of Sentinel-2 satellite images.
- Specific objectives are:
 - Creation of a dataset of Sentinel-2 images over Madhya Pradesh region, India.
 - Mapping of the fetched satellite images to the ground truth mask.
 - Designing and training a deep learning based semantic segmentation and yield prediction model.

How using tools and data within cloud environments helped to achieve goals

- We were able to download the satellite images for an entire span of the year 2020 for the Ludhiana region as our area of interest covering 4678 km².
- We downloaded all the 13 Sentinel-2 L2A bands as well as the cloud probability masks for the entire area of interest.
- This was done using Python libraries such as eolearn and sentinelhub.

Removing too cloudy scenes

- The cloud probability mask fetched from SentinelHub along with the satellite imagery helped to remove the scenes with $>70\%$ cloud probability.
- Through this, we were able to get rid of garbage data which did not contribute to improve model's performance.
- Various other tools in eolearn library such as those for linear interpolation, erosion, dilation, etc. were also employed.

Outcomes of the project

- Through this project, we were able to generate semantic segmentation maps indicating the vegetation cover type of every pixel in a scene.
- Through this, one would be able to shed light on crop/vegetation cover dynamics which is crucial in the current circumstances of environmental degradation and population rise.

Paper Published

- Preetpal Kaur Buttar, Manoj Kumar Sachan, “Semantic segmentation of satellite images for crop type identification in smallholder farms,” The Journal of Supercomputing, 2023. <https://doi.org/10.1007/s11227-023-05533-4>.