Identification of Agricultural Area in the Kamala Catchment, Nepal

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www.github.com/yingying3/SynthesisProject

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I am a Water Resouce Modeler from Land and Water and interested in programming. I learnt basic Matlab at Uni and now would like to switch to Python.

My Synthesis Project

To identify crop arears in the Kamala Catchment, Nepal, using **Machine Learning (ML)** in remote sensing satellite data.

My Digital Toolbox

- Python - `Matplotlib`, `Numpy`, `Geopandas`(Basics of GIS), `EO - Learn` (Earth observation and remote sensing), `Sklearn` and `LightGBM` (ML).

My time went …

- I spent the most of my time on data preparation and manipulation.
- The greatest challenges were to clean and reshape

  5D dataset (pixel, time, x and y coordinates, features) into

  2D (pixel * (x,y), time * features)

- 8 features for each pixel

  Spectral Channels (B02, B03, B04, B08, B11, B12) &

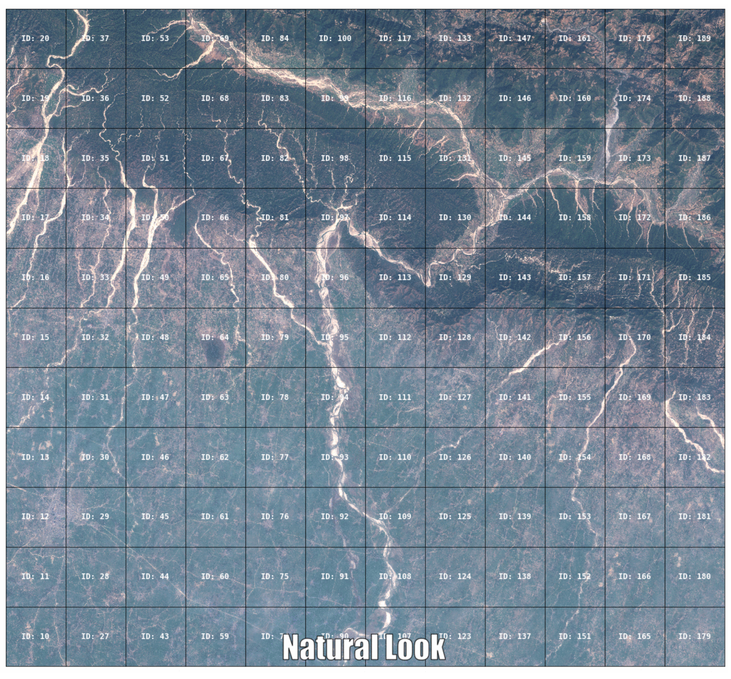
  2 calculated indices (Normalized Difference *Vegetation* and *Water* Index)

Data Processing

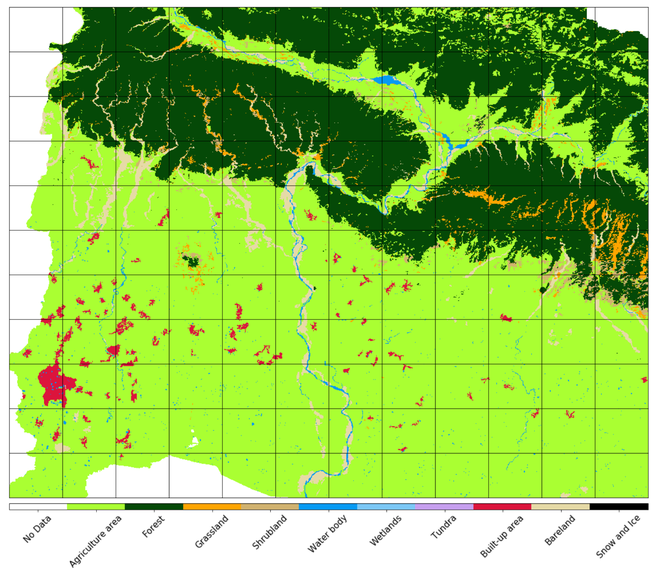
Data from Satellite Sentinel - 2, with spatial resoultion of *10* m and temporal resoultion of *16* days.

- Index calculation
- Remove cloud effects
- Spatial interpolation
- Temporal interpolation

Natural Look and normalised indices

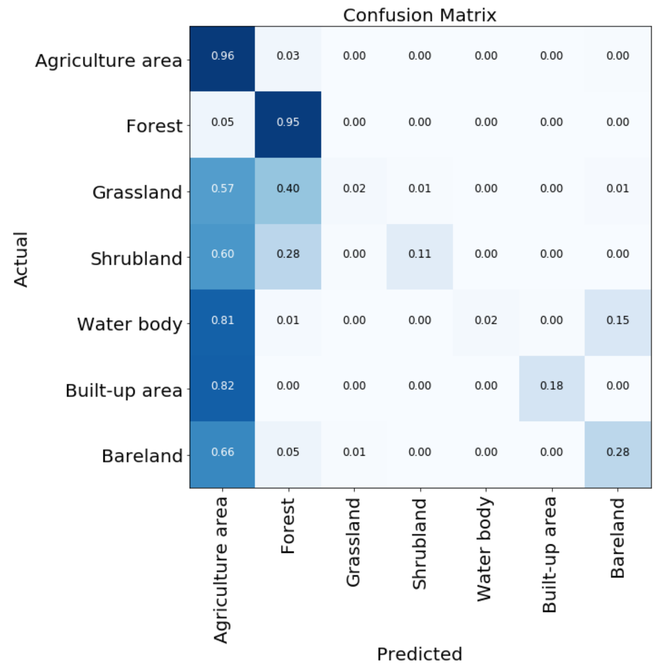


Reference of Land Cover Map for Supervised Classification ML



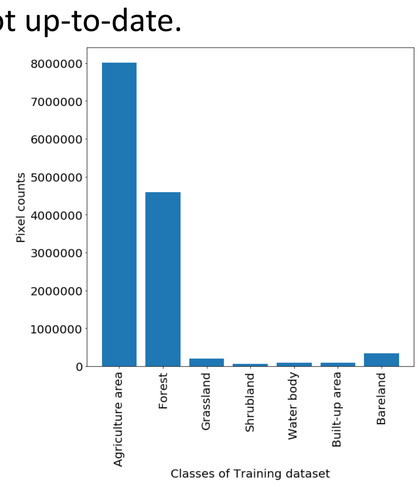
Preliminary Resutls

- Data Training to create a model
- Model Validation: **performance measurement for machine learning classification**



Further Improvements

- There is an unbalanced training set among different classes.
- The reference map is not up-to-date.



MY DATA SCHOOL EXPERIENCE

- Wonderful experience to learn multiple tools: python, R and SQL
- Already have applied to my daily work. i.e. write a python script to transfer a batch of PPTs to PDFs and Word documents
- Inspired me to learn more after dataschool