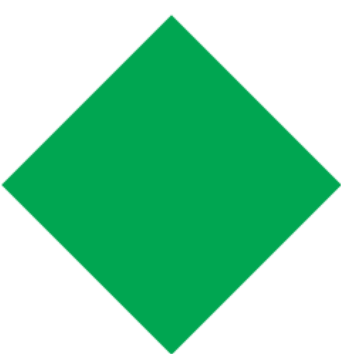


Identification of Agricultural Area in the Kamala Catchment, Nepal

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www.github.com/yingying3/SynthesisProject

LAND AND WATER
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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 areas in the Kamala Catchment, Nepal, using **Machine Learning (ML)** in remote sensing satellite data.

My Digital Toolbox

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

My time went ...

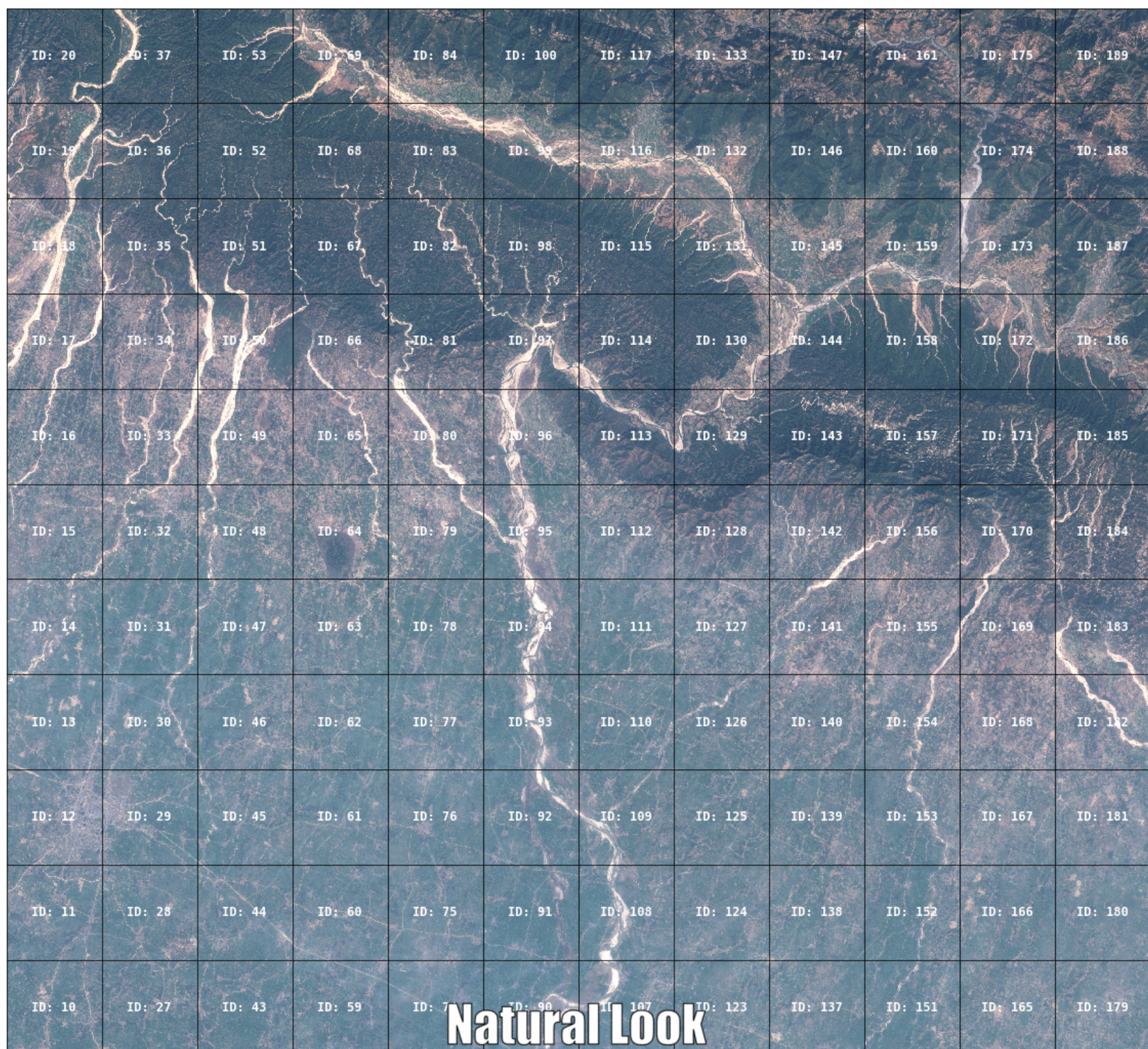
- I spent the most of my time in data preparation and manipulation.
- The most challenges were to clean and reshape
5D dataset (pixel, time, x and y coordinates, features) into
2D (pixel * (x,y), time * features)
- 8 features for eace pixel
Spectral Channels (B02, B03, B04, B08, B11, B12) &
2 calculated indices (Normalized Difference *Vegetation* and *Water* Index)

Data Processing

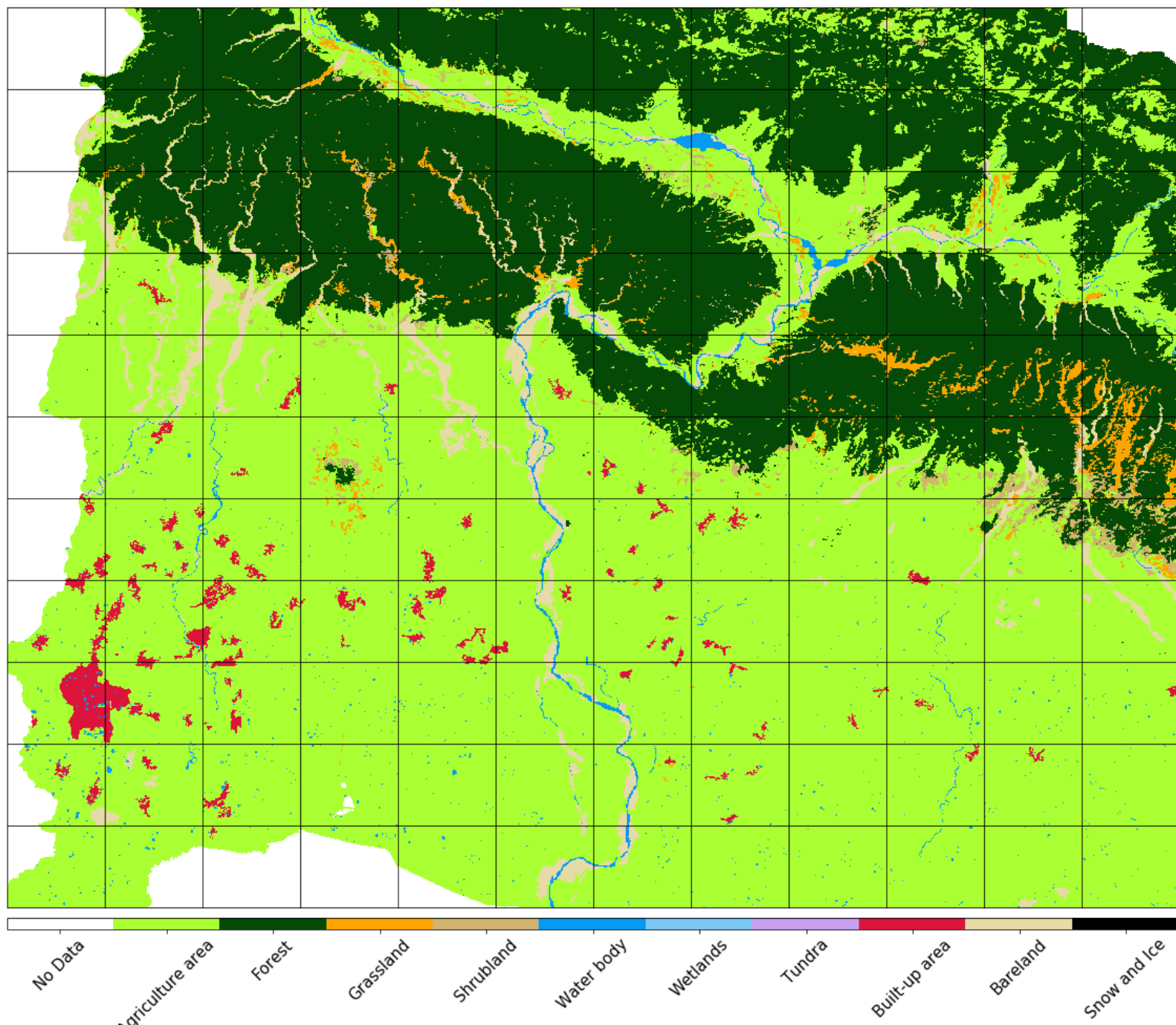
Data from Satellite Sentinel - 2, with spatial resoultion of 10 m and temporal resolution of 16 days.

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

Natural Look and normalised indices



Reference of Land Cover Map for Supervised Classification ML



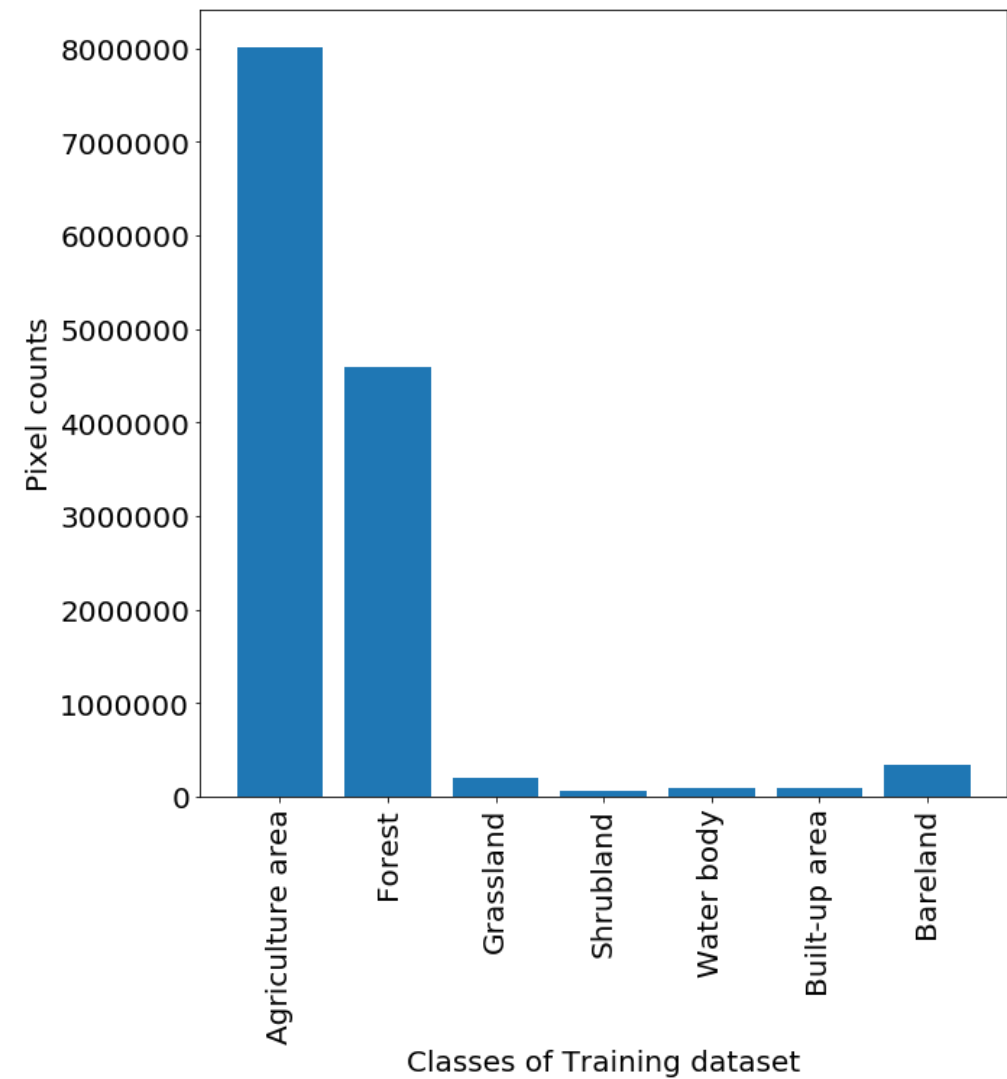
Preliminary Resutls

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

		Confusion Matrix						
Actual	Agriculture area	0.96	0.03	0.00	0.00	0.00	0.00	0.00
	Forest	0.05	0.95	0.00	0.00	0.00	0.00	0.00
	Grassland	0.57	0.40	0.02	0.01	0.00	0.00	0.01
	Shrubland	0.60	0.28	0.00	0.11	0.00	0.00	0.00
	Water body	0.81	0.01	0.00	0.00	0.02	0.00	0.15
	Built-up area	0.82	0.00	0.00	0.00	0.00	0.18	0.00
	Bareland	0.66	0.05	0.01	0.00	0.00	0.00	0.28
		Agriculture area	Forest	Grassland	Shrubland	Water body	Built-up area	Bareland
		Predicted						

Further Improvements

- There is 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