Land Cover Classification Using Satellite Imagery

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Aim

- To classify the land usage and land cover into several classes using deep learning approach
- To create a framework to easily extract land usage information from satellite images.

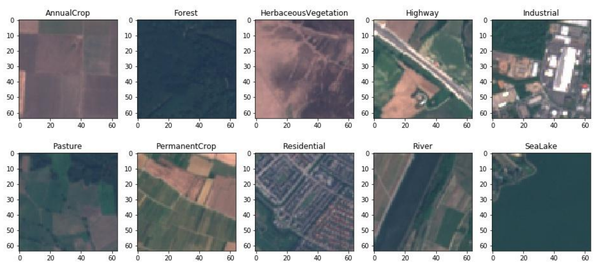
Motivation

Land is a key resource, especially in this age of urbanisation. The knowledge about land cover has become increasingly important as it overcomes problems like uncontrolled development of a region, depletion of resources, loss of green cover, destruction of wetlands, loss of wildlife habitat.

Mumbai

Data

We used publicly available satellite images from Sentinel-2 program of EU Copernicus. Labelled data from **EuroSAT Dataset**[1] is used for training the model.

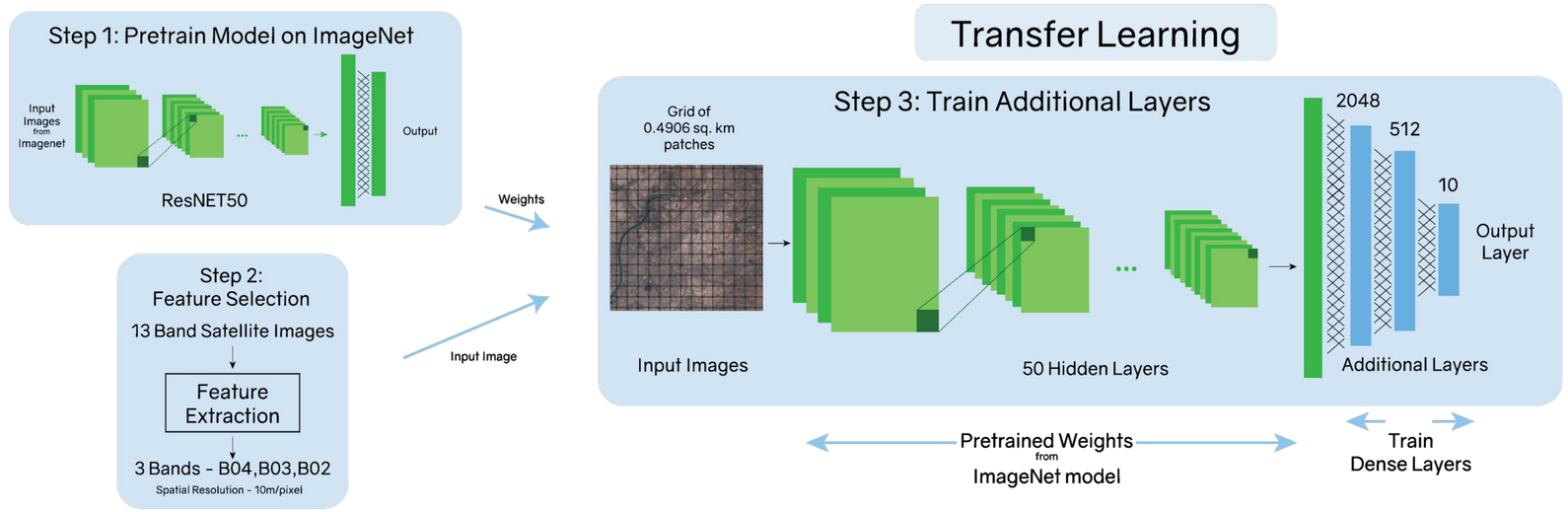


Dataset Classes

Application

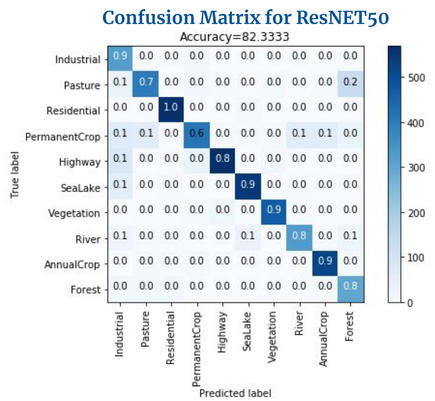
- Land Cover Classification can help monitor changes and survey specific regions without human intervention.
- Information about land usage is useful for better planning of future policies and infrastructures to tackle the resource crunch of arable land.
- It can be used to track environmental damage like deforestation in a region over time.

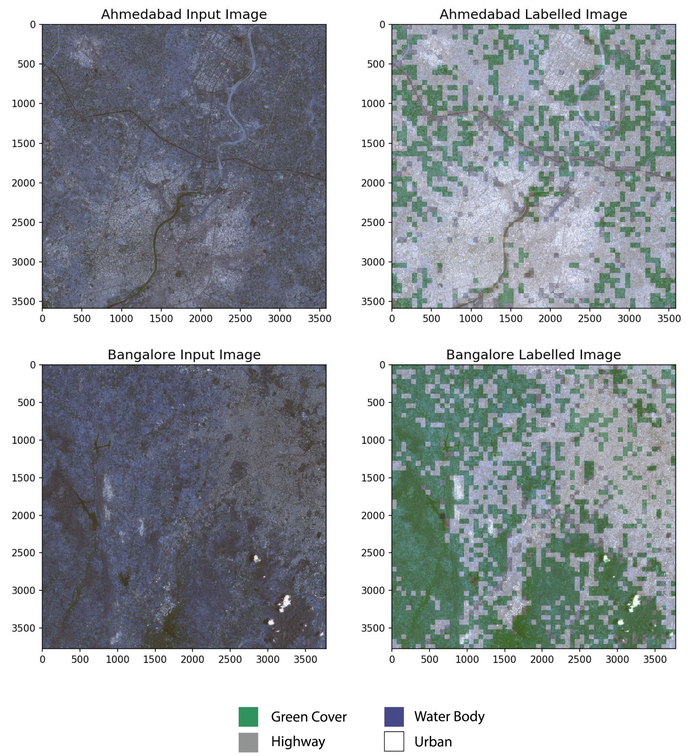
Approach



Results

Model	Test Accuracy
ResNET50	82.33%
VGG16	81.9%
VGG19	78.2%
Baseline Model	62%





Challenges

- Amount of data required for training deep learning models is huge and labelled satellite data is not easily available.
- Cloud cover is also a major issue, it leads to ambiguity between classes.

Future Work

- Using higher Resolution Imagery from various satellite programmes and compare results.
- Using domain-specific knowledge to extract features from 13 Band Images.

References

[1] Helber, Patrick, et al. "Introducing EuroSAT: A Novel Dataset and Deep Learning Benchmark for Land Use and Land Cover Classification." IGARSS 2018-2018 IEEE International Geoscience and Remote Sensing Symposium. IEEE, 2018.
[2] Yang, C., Rottensteiner, F., & Heipke, C. (2018). Classification of land cover and land use based on convolutional neural networks. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences 4 (2018), Nr. 3*, 4(3), 251-258.
[3] Sentinel Hub. Retrieved from https://www.sentinel-hub.com/