

Area Based land use classification of Satellite Images using Machine Learning

Report Name	Project Outline
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1. Project description

Introduction:

This project is aimed to develop an application that can be fed a Set of Satellite imagery which it then using a specific machine learning technique can determine what are the different land uses present in the area (Urban, Agricultural, Undeveloped, Water, etc) and then compare that to other pictures to determine how much the land uses have changed over a set period of time

Features:

- The application should be able to be run from most windows computers and so it needs to be less computationally intensive and not take a long time when classifying the images.
- The user should be able to compare two images together and the application should highlight the change in land use using a shaded colour between the images.
- The program should be able to determine and display how much of the image is each land use.

Technologies used:

- The program will most likely use Python along with some libraries which are still to be determined.
- The program will either Use the Random Forest model, CAST (Decision Tree model), SVM, and or a CNN (Convolution neural Network)
- Data will be taken from the Copernicus Browser specially the Sentinel-2 L2A data source.

2. Proposed tasks

- Determine Locations used and Time Period
- Determine Land use cases
- Collect data for training Machine Learning Algorithms
 - Will be done Using the Copernicus Browser Needs 3 locations.
- Machine Learning Algorithms selection
- Determine which ML algorithm is best?
- Create UI for Program
- Train Model and implement into the Program.
- Testing of Code and Model Using a wide variety of images
- Documentation will just contain the Project Report

3. Project deliverables

- Python Application: Fully functional program which is able to take Satellite Images and Classify them according to land use and allows the user to compare Images together
- Documentation: Full research report which explores the Experimentation involved with the Machine Learning Techniques, Structure of the program, instructions on use of the program, any testing done and many more items of discussion.

4. Annotated bibliography

- [1] Keshtkar, H., Voigt, W. & Alizadeh, E. Land-cover classification and analysis of change using machine-learning classifiers and multi-temporal remote sensing imagery. Arab J Geosci 10, 154 (2017). <https://doi.org/10.1007/s12517-017-2899-y>
- [2] J S Nurfadila et al Initial Results on Landuse/Landcover Classification Using Pixel-Based Random Forest Algorithm on Sentinel-2 Imagery over Enrekang Region IOP Conf. Ser.: Earth Environ. Sci. 280 012036 (2019). <https://dx.doi.org/10.1088/1755-1315/280/1/012036>
- [3] Copernicus Browser <https://dataspace.copernicus.eu/browser/>
Data source for Project