

# Project : Douala Cameroon, Local Chapter Automating Land Use and Land Cover Mapping using Computer vision and satellite imagery

Document Status: Draft | In Review | **Approved**

## The Background

In Cameroon in August and December 2021, conflicts between farmers and fishermen caused at least 67 dead, hundred injured and 100 000 displaced due to tensions around fisheries, pasture and agricultural resources as result of global warming due to climate change.

Before the organization of the African Cup of Nations in 2022, many remote areas in the country have undergone rapid urbanization leading to an increase in built-up areas as well as a massive loss of terrestrial carbon storage which can also result in large carbon emissions..

The country's major cities, Douala, Yaoundé and Bafoussam, are experiencing urbanization issues due to anarchic construction without following administrative procedures or settlement of populations in areas subject to risk of disasters such as floods and landslides. As a direct consequence 43 people were dead in October 2019 at Bafoussam and 11 were dead at Yaoundé in November 2022 due to landslides.

## The Problem

Mapping the extent of land use and land cover categories over time is essential for better environmental monitoring, urban planning, nature protection, conflict prevention, disaster reduction, rescue planning as well as long-term climate adaptation efforts.

This initiative's goal is to build a Machine Learning model that accurately classifies Land use and Land Cover (LULC) in satellite imagery. Then use the trained model to automatically generate the LULC map for a region of interest. Finally create a Web GIS dashboard containing the LULC Map of the region of interest.

The project results will be made open source. The aim being to help connect local organizations and communities to use AI tools and Earth Observations data as an action to cope with local challenges such as land land use monitoring and the world's most critical challenges like climate change. We also hope to encourage citizen

science by open sourcing the dataset and code.

### Project Goals

- The Web GIS dashboard containing LULC Map of the region of interest.
- The ML models(s) with best performance.
- The datasets collected during the project on Google Drive for open access.
- GitHub Repo with Well-documented open source code.
- Documentation of the work and approach.

### Learning Outcomes

In 8 weeks (two parts, 4 weeks each), the learning outcome will be to :

- Collect open source satellite images and extract relevant features (Part 1).
- Train a deep learning model for satellite image classification (Part 1).
- Use the trained model to automatically generate land use and land cover maps for a region of interest using Python GIS (Part 2).
- Create a Web GIS dashboard containing the LULC Map of the region of interest (Part 2).

### The Tasks & Timeline

**Week 1** : Research and Literature review

**Week 2** : Data Collection

**Week 3** : Data Preprocessing and Visualisation

**Week 4** : Model Development

**Week 5** : Model training

**Week 6** : Model Analysis and Interpretation

**Week 7** : Land use and Land Cover Cover map prediction

**Week 8** : Web-GIS App Development

### Timeline

March 06 , to April 24, 2023