

Problem Statement: Inefficient Deforestation Monitoring

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Effective forest **sustainability** requires timely and accurate monitoring of forest cover changes. Traditional methods for tracking deforestation are often slow, require extensive manual effort, and lack the scale necessary to address the rapid environmental degradation of global forests.

The core problem is the need for an **automated and scalable system** to reliably and frequently detect, quantify, and visualise deforestation. This is critical for supporting conservation efforts, enforcing regulations, and accurately calculating **sustainability metrics** like annual CO2 loss due to forest cover reduction.

The goal of ForestVision is to create a web-based tool that overcomes these limitations by utilising advanced satellite imagery and AI.

Dataset

- **Data Source: Sentinel-2 satellite data.**
 - **Purpose:** The imagery provides the raw input needed for AI-driven image processing. Sentinel-2 is a key source for remote sensing data, offering multi-spectral capabilities useful for land cover analysis.
 - **Scope:** The system allows users to select **any location globally** using geographic coordinates and define a specific **time frame** for analysis.
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Approach

The project addresses the problem using a **Convolutional Neural Network (CNN)** approach for image segmentation (a type of AI image segmentation).

1. **Geographic and Time Selection:** The user defines the area of interest using latitude and longitude, and specifies the start and end dates for the analysis.
2. **Image Retrieval and Processing:** The system retrieves and processes the necessary Sentinel-2 satellite images for the selected location and time frame.
3. **AI Image Segmentation (using CNN):** An AI image segmentation model (likely based on a CNN, as the repository tags mention *convolutional-neural-networks* and *deep-learning*) is used to identify and delineate the forest cover changes between the two dates.
4. **Visualisation and Calculation:** The results are displayed on an **interactive map** with an overlay indicating the deforested area. Key **sustainability metrics** are calculated, including the percentage of forest cover loss, total deforested area in hectares, and estimated annual CO2 loss.
5. **Deployment:** The tool is made available as a **web-based application** for public use, ensuring scalability and accessibility.