**Satellite Image Analysis for Deforestation Monitoring**

# Objective

The objective of this task was to develop a system that uses satellite imagery to detect and monitor deforestation areas over time. We aimed to train a Convolutional Neural Network (CNN) on land classification using satellite data and perform change detection to simulate deforestation analysis.

# Dataset and Challenges

The originally proposed dataset, 'Planet: Understanding the Amazon from Space', was inaccessible due to download or permission issues. Attempts to use alternative TIFF-based satellite imagery from GitHub also failed due to broken links (404 errors).

# Solution and Implementation

To overcome the dataset issues, we used the EuroSAT RGB dataset available through torchvision. It provides 10 classes of Sentinel-2 satellite images and is publicly accessible and compatible with Google Colab. The images were loaded, preprocessed, and visualized. A CNN model was trained on the dataset to classify land types.

We then simulated deforestation by comparing images from different classes (e.g., Forest vs. Urban). The pixel-wise difference between these images was calculated to highlight potential environmental changes, representing a basic change detection mechanism.

# Outcome

The model successfully classified land cover using satellite images. Simulated deforestation change detection demonstrated the feasibility of using such techniques for environmental monitoring. Despite initial data access issues, we were able to adapt and use publicly available data for proof-of-concept implementation.

# Conclusion

This project demonstrated how deep learning and open-source satellite imagery can be leveraged to monitor deforestation. Although real-time deforestation monitoring would require sequential temporal data, our approach lays the groundwork for building more advanced systems in future work.