

Project Objectives: Land Type Classification using Sentinel-2 Satellite Images

1. **Develop a robust AI model** based on Deep Neural Networks (DNNs) to classify different land types (such as agriculture, water, urban areas, desert, roads, and trees) using multispectral satellite images from Sentinel-2.
2. **Analyze and improve data quality** by collecting and preprocessing satellite images, performing Exploratory Data Analysis (EDA) to identify challenges such as data imbalance, missing values, or misclassified images.
3. **Enhance classification accuracy** by leveraging additional features such as vegetation indices (NDVI) and feature engineering techniques to ensure precise classification of different land types.
4. **Test and evaluate advanced models** like CNN, ResNet, and VGG, and explore Transfer Learning techniques to utilize pre-trained models and enhance performance.
5. **Develop an integrated and deployable system** by building a model that can be deployed as a web service or API, allowing users to upload satellite images and receive accurate land type classifications.
6. **Implement MLOps practices for performance monitoring**, establishing mechanisms to track classification accuracy and address performance degradation through model retraining when necessary.
7. **Analyze environmental and geographical impacts** by studying how land classification changes over time and identifying patterns or shifts in land use.
8. **Support various fields such as urban planning, agriculture, and environmental conservation** by providing a tool that aids in data-driven decision-making for better resource management and sustainable planning.
9. **Deliver a comprehensive project report and presentation**, summarizing the methodology, findings, and challenges, along with recommendations for future improvements, such as integrating additional satellite data or experimenting with more advanced models.