VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI - 590018

Mini Project Report

On

"GEO INTELLIGENCE FOR MAPPING TREES OUTSIDE FOREST"

A report submitted in partial fulfillment of the requirements for

MINI PROJECT (21AIMP67)
In
Artificial Intelligence & Machine Learning

Submitted by

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CERTIFICATE

This is to certify that the Project entitled **"GEO INTELLIGENCE FOR MAPPING TREES OUTSIDE FOREST"** has been successfully completed by

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The Bonafide students of the Department of Artificial Intelligence and Machine Learning, Alva's Institute of Engineering and Technology of the VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The Project report has been approved as it satisfies the academic requirements in respect of the Project work prescribed for the Bachelor of Engineering Degree.

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ABSTRACT

"Mapping Trees Outside Forests (TOF) in Ankola Taluk, Uttara Kannada, Karnataka using Google Earth Engine (GEE) and Random Forest machine learning algorithm offers an innovative approach that combines high-resolution Sentinel-2A satellite images and advanced spectral enhancement techniques." The proposed method paper presents an unconventional method used in Ankola Taluk, Uttara Kannada, Karnataka for mapping Trees Outside Forests (TOF), with the help of Google Earth Engine (GEE) and Random Forest machine learning algorithm. The process entails using high resolution Sentinel-2A satellite images that are first made to go through a two-stage Reversible Color Transform (RCT) in order to enhance the distinct spectral characteristics of TOF. Firstly, shape file of Ankola Taluk is imported from Karnataka-GIS platform and then FALSE COLOR COMPOSITION is applied on the satellite data to highlight vegetation. Thereafter, the data was clipped to the area of interest and training samples created by creating polygons over specific TOF areas. These areas are classified using Random Forest algorithm where 70% of its sample was taken as training while 30% were testing. The classification results are then assessed for accuracy and extent of TOF calculated. The proposed method approach involves double-level RCT integration and advanced machine learning methods greatly improving detection as well as efficient mapping on TOFs thus gives insights into their distribution and status. High level accuracy has been achieved in TOF mapping through the proposed method that works effectively with small or large-scale natural environments. These findings contribute to sustainable land management and support global initiatives aimed at climate change mitigation efforts such as afforestation among others.