

PREFACE

The fusion of theoretical knowledge acquired in the classroom with practical project work empowers students to reach their full potential. Engaging in projects within educational institutions exposes students to real-world scenarios in their respective fields, providing them with valuable experience. The primary goal of such projects is to allow students to apply technological concepts within an organizational context. This immersion helps them understand organizational dynamics and functions.

The importance of GIS (Geographic Information System) and remote sensing is immense, as these rapidly growing fields leverage technology to make India smarter. GIS is specifically designed to capture, store, manipulate, analyze, manage, and present various types of spatial or geographical data. Remote sensing, in contrast, involves acquiring information about a phenomenon without direct physical contact, unlike on-site observation. It has applications in numerous fields, including geography, hydrology, ecology, oceanography, glaciology, and geology, as well as in military, intelligence, commercial, economic, planning, and humanitarian sectors. In summary, combining theoretical knowledge with practical project experience enables students to excel by exposing them to real-world situations and allowing them to apply technology in practical scenarios. The growing importance of GIS and remote sensing in leveraging technology for smarter solutions in India cannot be overlooked.

Machine learning is revolutionizing flood susceptibility mapping by integrating diverse data types and selecting essential features for accurate modeling. These algorithms identify intricate patterns in geospatial and hydrological data, enhancing flood risk assessments and informing better mitigation strategies. Through rigorous training and calibration, machine learning models capture the dynamics of flood susceptibility accurately, enabling stakeholders to make informed decisions and mitigate risks effectively.

Assessing flood susceptibility is crucial for effective flood risk management, especially with the increasing frequency and severity of floods worldwide. Traditional methods often lack efficiency and accuracy, prompting a shift towards machine learning (ML) techniques. Boosting algorithms like Adaboost, Gradient Boosting, Stochastic Boosting, CatBoost, and XGBoost offer promising solutions due to their ability to enhance predictive performance.