PREFACE

Floods in the Upper Godavari Basin region of India cause many problems for the people and the economy there. Predicting and managing these floods is very important but difficult. Traditional methods of modelling floods have trouble capturing the constantly changing nature of river systems. This leads to poor flood predictions and ineffective management strategies.

In this research, we present a new two-step approach that uses Machine Learning (ML) and hydrodynamic modelling to improve flood prediction and management in the Upper Godavari Basin. First, we use a technique called the K-Nearest Neighbors (KNN) classifier to understand the complex relationship between rainfall and flood occurrence. We train the KNN classifier with historical data on rainfall and floods. This allows us to predict the possibility of a flood based on the expected rainfall patterns.

In the second step, we use a software called the Hydrologic Engineering Center's River Analysis System (HEC-RAS) to model the steady flow of water in the river. HEC-RAS provides detailed simulations of the river's hydraulic behavior and helps identify areas that may get flooded.

Our approach brings together the prediction capabilities of ML and the detailed analysis of HEC-RAS. This combination gives us a comprehensive way to predict floods and manage the risks associated with them. The findings of this study help us better understand the dynamics of floods in the Upper Godavari Basin. This knowledge can lead to more effective flood mitigation strategies and make the region more resilient to the uncertainties of climate change.

Anima Chowdhury,
Student at SIG.