

Title: *Intelligent UAV Disaster imagery for hazards monitoring and vulnerability assessment in flood affected areas*

Indian PIs: Prof. P. M. Pathak (Professor IIT Roorkee India), Prof A.K Agrawal (Professor Delhi Technological University Delhi India) and PIs in TIH-IIT Delhi (IHFC), India.

US PIs: Prof. M. Iftekharuddin Khan, Prof. Mecit Cetin, Old Dominion University Norfolk, Virginia US

This collaborative research project aims to develop ML/DL methods to accurately detect floodwater extent and depth from high-resolution imagery captured by UAVs during the monsoon season in Delhi (India) and surrounding areas. Recent advancements in computer vision and DL methods, such as CNNs, hold promise for processing diverse image data effectively for this purpose. The core novelty lies in identifying the height and extent of flooded water on roads and streets using UAV-taken visible light images and LIDAR sensor data to process multitemporal orthophoto maps of test sites. **The processed data analyzed and classified using commercial software and GIS for spatial analysis, and a dataset will be prepared for model training and testing by identifying objects of interest and water-level annotations using a hybrid approach of pretrained CNNs (IHFC). Further this work will be extended to develop and implement advanced DL/ML techniques to accurately estimate the extent and depth of floodwater from UAV images, involving retraining object detection networks and developing CNN-based approaches for floodwater depth estimation (Old Dominion University).** The purpose of this work is to provide an effective solution for imagery application in flood-affected regions for monitoring and data analysis. Accurate and current flood plain maps can be the most valuable tools for avoiding severe social and economic losses from floods, and they also improve public safety by allowing early identification of flood-prone properties during emergencies and establishing warning and evacuation priorities

