

Drone-Based AI System for Wildfire Monitoring and Risk Prediction

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Abstract: Wildfires pose a significant threat to ecosystems, human lives, and infrastructure worldwide. Traditional wildfire detection and risk assessment methods often suffer from limitations such as delayed detection and low confidence in certain regions. In this paper, we propose a novel computational system based on Machine Learning for wildfire risk assessment using data collected by drones. The system can integrate various sensors to capture spatiotemporal data on environmental factors such as temperature, humidity, and vegetation. By leveraging high-resolution data collected through autonomous drone missions, our system enhances wildfire risk estimation and enables proactive mission planning. Although the system is mainly designed to address wildfire monitoring using drone-collected data, it can be easily adapted to other environmental monitoring applications and other sources of data. We demonstrate the effectiveness of our approach through a comprehensive evaluation and validation process in both simulated and real world environments. Our work contributes to advancing wildfire monitoring capabilities, improving early detection, and mitigating the impact of wildfires on communities and the environment

Keywords: Aerial drones, artificial intelligence, environmental monitoring, machine learning, risk assessment, spatiotemporal data, wildfire detection, wildfire risk estimation

