

AI-Driven Smart Dam Management System for Enhanced Safety And Flood Prevention

Anuradha H Dhavan and Prof. Dr. Kolhe P. S

Department of Electronic & Telecommunication Engineering

TPCTS College of Engineering, Osmanabad, India

Abstract: *Water is fundamental to daily life and plays critical roles across numerous sectors. To address increasing water-related challenges, innovative solutions are being developed, such as adaptive management and advanced remote sensing, along with concepts like water security and global information integration. Dam safety, in particular, is becoming more critical as aging infrastructure, seismic activity, and extreme weather events increase the risk of dam damage or failure. In response, dam safety has become a top priority for national disaster management strategies. Governments are enacting regulatory measures to ensure dam safety, and various organizations are implementing both institutional and technical safeguards. one of the primary gaps in dam safety is the lack of standardized protocols for water release, especially in emergency situations. This project proposes an AI-driven dam management system that leverages a Stacked Dense LSTM (Long Short-Term Memory) model to monitor and stabilize dam conditions. The LSTM model processes real-time water level data, along with temperature, humidity, and rainfall measurements, which are stored in the cloud. This machine learning framework helps predict and manage water flow, guiding the automated release of water through dam gates to prevent overflow and flooding. floods, often triggered by rising rivers, lakes, or heavy rainfall, can occur unexpectedly at any time and pose significant risks to lives and property. These events can force families from their homes, devastate farms, and create lasting hardships for affected communities. The proposed system's predictive capabilities offer a proactive approach to dam management, helping to mitigate flood risks and enhance community resilience.*

Keywords: Water management, Dam safety, AI-driven dam management, Flood mitigation, Stacked Dense LSTM model, Real-time monitoring, Automated water release, Disaster management, Climate resilience, Cloud-based data storage, Predictive analytics, Emergency protocols, Community resilience, Water flow prediction

