Road Hazard Detection and Reporting System for Kenyan Urban Roads

The streets of Kenyan cities experience ongoing safety risks from potholes combined with cracks and debris which cause accidents and damage vehicles and create traffic congestion. The main causes are poor maintenance, slow reporting mechanisms, and limited government resources. The National Transport and Safety Authority (NTSA) together with public complaints on Twitter and local media outlets demonstrate that this problem exists at an extreme level. The absence of an efficient real-time reporting system enables road conditions to worsen which puts both drivers and walkers at increased risk.

The proposed solution is a mobile application which will use a hybrid approach with offline functionality which enables users to submit hazard reports without internet access until their data syncs when a connection becomes available. The system will implement Agile methodology to maintain flexibility while using Flutter for developing mobile applications that run on Android and iOS platforms and Python (Django) for backend processing that includes ML-based hazard detection from uploaded images. SQLite will handle offline storage, while Firebase/PostgreSQL will manage online data due to scalability and real-time sync features. The application needs to be mobile-based instead of web-based because it provides superior GPS precision and camera functionality and offline access, which is essential for regions with limited network coverage. The system will implement a web dashboard for authorities to track and organize repair priorities after its initial mobile application deployment.