Road Assessment and Hazards (RAAH)

Group Members

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1. Abstract

This project addresses the problem of road hazards such as potholes, broken traffic lights, littering and clogged drains by enabling citizens to report these issues directly to the municipal authorities. The main objective is to resolve common road problems and make travel safer for the general public. To achieve this, we propose a reporting system that allows users to submit complaints with supporting images and precise location details. The system strengthens communication between citizens and authorities, leading to quicker identification and resolution of issues. The project demonstrates the potential of technology-driven solutions to enhance road safety, increase public participation and improve the overall quality of urban life.

2. Introduction

Pakistan has a high rate of road hazards that disrupt urban life in the form of potholes, broken traffic lights, littering, and clogged drains. These problems not only undermine road safety, but also lower the overall quality of life for citizens. Despite being chronic, such issues are rarely reported or resolved in a timely manner due to the absence of proper communication channels between the public and municipal authorities.

To address this gap, Road Assessment and Hazards (RAAH) has been developed as a Human-Computer Interaction (HCI) system. Providing a user-friendly and real-time platform, RAAH gives citizens the opportunity to report hazards with ease and authorities to respond more efficiently. With features such as multi-language support, large buttons, voice assistance, and real-time notifications, RAAH ensures inclusivity, making it accessible to elderly and differently-abled individuals as well.

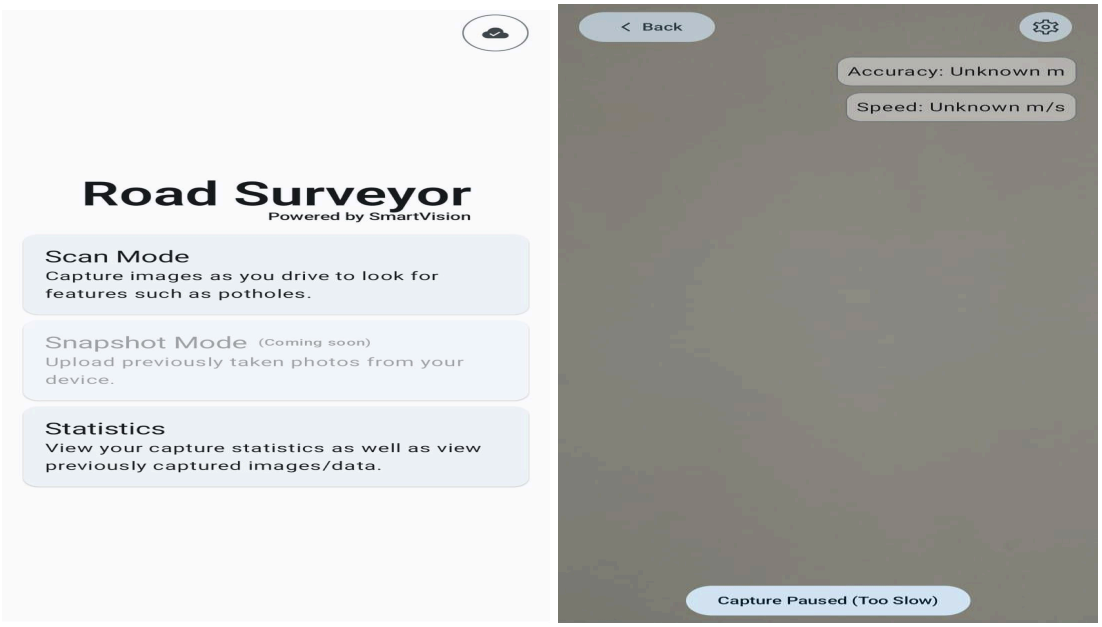
3. Related Work

Several road-reporting and safety apps exist but face critical shortcomings.

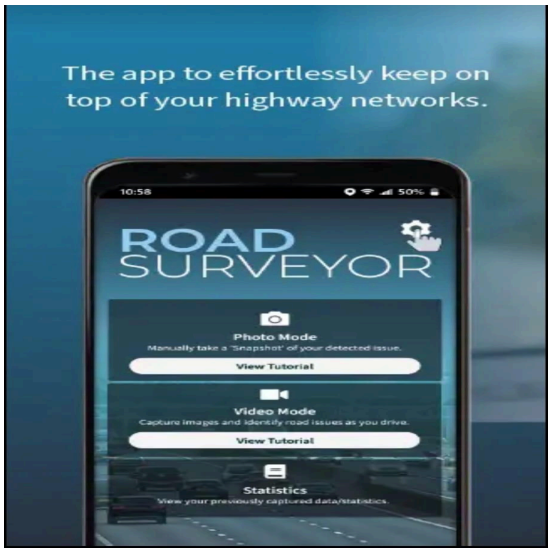
- **Road Surveyor**

The application is limited to video capture, does not support saving features, has a weak CRUD implementation, and suffers from inconsistent design.

Below are the screenshots of the application after installation, displaying its main features and interface.



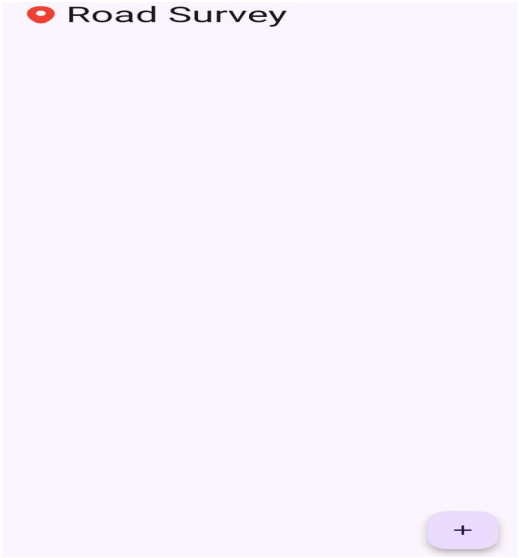
Below are the screenshots of the application on play store, showcasing its main features and interface.



The above images highlight a clear gap between what was promised and what is actually presented. The commitments have not been fulfilled, indicating that the application is still under development.

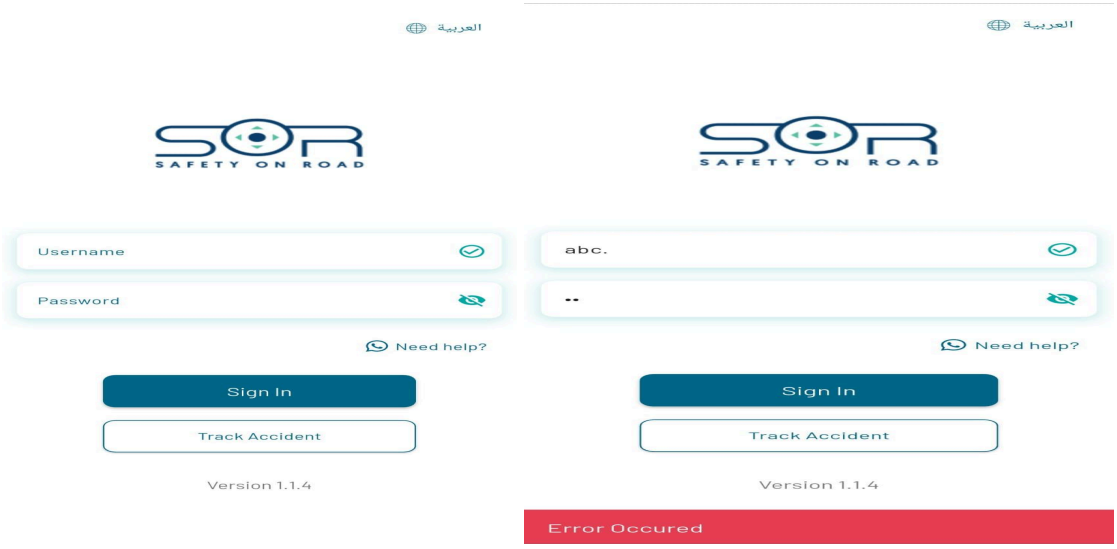
- **Road Survey**

Since the application allows anonymous reporting without authentication, the risk of fake or misleading reports is high. Additionally, there is no response mechanism from authorities, and the user interface is poorly designed making it difficult to use.



- **SOR (Safety of Road)**

The application lacks a signup option, has poor error handling, features a non-interactive design, and suffers from low adoption. These issues are highlighted in the images below.



- **SeeClickFix (USA)**

This application is effective for issue reporting and communication with local authorities, but not localized for Pakistan.

4. Problem Statement

Road hazards such as potholes, broken traffic signals, garbage, clogged drains, and damaged streetlights are widespread in Pakistan and negatively impact both road safety and the quality of urban life. Despite their frequency, these issues are often left unresolved due to the absence of an efficient reporting and tracking mechanism. Citizens currently rely on manual complaints or outdated systems, while existing apps suffer from poor usability, lack of real-time tracking, and low adoption. This communication gap between citizens and municipal authorities results in delayed responses, accidents, traffic congestion, and public dissatisfaction.

5. Proposed Solution

The proposed solution is *Road Assessment and Hazards (RAAH)*, a smart digital platform that enables citizens to quickly report and track road issues. Through a user-friendly mobile interface, RAAH allows users to submit complaints with images, descriptions, and precise GPS-based locations. The system includes real-time notifications, multi-language support, and accessibility features to ensure inclusivity for all citizens. On the authority side, an organized dashboard provides tools to categorize, prioritize, and monitor reported issues, ensuring timely resolution. By bridging the gap between citizens and municipal bodies, RAAH improves communication, enhances road safety, promotes urban cleanliness, and supports the vision of smarter, more sustainable cities.

6. Feasibility

- **Technical Feasibility**

The proposed solution is technically feasible with existing infrastructure. The system can be developed using standard web and mobile development frameworks such as Flutter or React Native to ensure cross-platform compatibility. Secure cloud-based databases will be used to store data and track complaints, with scalability as adoption grows. GPS integration will allow precise tagging of hazards, while push notifications will deliver real-time updates to users. Accessibility features such as voice commands, large buttons, and multi-language support can be implemented using existing APIs without adding unnecessary complexity to development.

- **Economic Feasibility**

Financially, RAAH needs a small investment compared to the benefits it offers to the society. The primary costs include application and web development, server hosting and ongoing maintenance. Since the system is meant to minimize the number of road related accidents, delays and the destruction of infrastructure, the long term economic gains of the citizens and municipalities will supersede the initial expenditures. Additionally, RAAH will be able to find government funding or even public-private partnership since it is compatible with the smart city projects and sustainable urban development objectives.

- **Operational Feasibility**

RAAH is operationally very practical. The system also makes reporting easy as it has user-friendly interfaces, and it is not restricted to individuals with different degrees of digital literacy. This will give authorities an organized dashboard to categorize, prioritize, and track issues to make decisions faster and hold them accountable. Since the system is user-centered and based on HCI design principles, it requires minimal training. Furthermore, as it has a direct positive effect on citizen satisfaction and efficiency of urban governance, both stakeholders are likely to adopt it.

7. Goal

The main idea behind RAAH is to provide an inclusive, reliable, and user-friendly platform that strengthens communication between citizens and authorities. RAAH aims to enhance road safety, reduce accidents, promote urban cleanliness and help to achieve the vision of smarter and more sustainable cities in Pakistan by making sure that road and infrastructure hazards are reported and resolved in a timely manner.

8. Research

Activity	Concerns	Stakeholder Collaboration	Deliverable
Scope – Define project goals and schedule	Road hazard reporting, citizen–authority communication, project deadlines, resource constraints, survey, prototype, final app.	Meetings with project supervisor, group members, and possibly municipal representatives.	Document stating project scope, goals, and schedule.
Audit – Review existing work and product	Analysis of existing apps, their limitations, relevant technologies.	Team review sessions, discussions with users familiar with these apps.	
Stakeholder Interviews – Understand product vision and constraints	Citizen reporting system for safer roads, low adoption, data accuracy, integration with authorities, public-private funding.	Interviews with citizens, drivers and potentially municipal authority representatives.	
User Interviews & Observations – Understand user needs and behavior	Citizens using smartphones daily, facing hazards, frustration with unreported issues, safer travel, trust in government response.	Survey results, one-on-one interviews, group discussions.	

References

- SeeClickFix. (n.d.). *SeeClickFix: Empowering residents, improving communities* [Mobile application]. Retrieved from SeeClickFix - Apps on Google Play

- SOR - Safety on The Road. (n.d.). *Safety on The Road app* [Mobile application]. Retrieved from SOR - Safety on The Road - Apps on Google Play

- Road Surveyor. (n.d.). *Road Surveyor app* [Mobile application]. Google Play Store.

- Road Survey. (n.d.). *Road Survey app* [Mobile application]. Retrieved from Road Survey - Apps on Google Play