**EXISTING SYSTEM**

The existing system for school bus tracking often relies on expensive and extensive technologies, making it inaccessible for schools with budget constraints. Parents and guardians are understandably concerned about the safety of their children during school bus transportation. While some schools can afford advanced security measures, others lack access to such resources. This project aims to address this disparity by proposing an efficient and affordable school bus tracking cum safety solution. The system consists of an Android application paired with a website, incorporating location tracking, a QR-based authentication mechanism, and notification features. Additionally, anomaly detection techniques are employed to raise alerts in case of unusual activities, ensuring an extra layer of security. The proposed system not only keeps parents informed in both known and unforeseen circumstances but also allows school authorities to monitor bus status through a dedicated website. To enhance the overall travel experience, the system implements route optimization and traffic-based delay prediction as additional features. This comprehensive approach seeks to make school bus tracking and safety measures accessible to a broader range of educational institutions, promoting the well-being of students without imposing a financial burden.

**LIMITATIONS**

**Cost Constraints:** The existing school bus tracking systems often come with high implementation and maintenance costs, making them unaffordable for schools with limited budgets. This financial barrier restricts the accessibility of advanced safety measures, leaving many educational institutions with conventional and less secure methods of student transportation.

**Limited Authentication Methods:** Many existing systems rely on conventional authentication methods, such as manual attendance or basic RFID cards. These methods can be prone to errors or unauthorized usage, potentially compromising the safety of students during bus journeys. Lack of advanced authentication measures can be a limitation in ensuring fool-proof security.

**Inadequate Anomaly Detection:** Some current systems may lack sophisticated anomaly detection mechanisms, making them less capable of identifying and responding to unusual activities or emergencies effectively. This limitation can pose challenges in promptly addressing safety concerns, especially in critical situations.

**Scalability Issues:** As the number of students and buses increases, scalability becomes a significant concern for some existing systems. Scalability issues can lead to performance degradation, delays in data processing, and decreased overall system efficiency, hindering the system's ability to handle a growing student population.

**Limited Accessibility for Parents:** Existing systems may not provide real-time and user-friendly interfaces for parents to monitor their child's bus journey. Limited accessibility to accurate and timely information about the bus location, expected arrival times, and potential delays can create anxiety and inconvenience for parents, impacting their ability to stay informed about their child's safety.