# BUS GUARD AI : ACCIDENT DETECTION AND TRACKING SYSTEM

Abstract

The **Bus Guard AI : Accident Detection and Tracking System** is an innovative solution aimed at improving the safety and communication in school transportation systems. While traditional bus trackers offer only real-time GPS location, they fail to address emergency situations like accidents. This system integrates GPS tracking with AI-based accident detection to provide real-time alerts and updates to parents and school authorities, thereby enhancing student safety and operational transparency.

At its core, the system uses **AI algorithms** to analyze sensor or camera data from onboard devices to detect anomalies such as collisions. Once an incident is detected, the system instantly notifies parents and administrators, allowing for quicker emergency responses. The GPS tracking ensures real-time monitoring of bus routes, while delay notifications help parents better manage their schedules. This dual-layered system of tracking and detection promotes proactive safety measures and timely communication.

Key features include **real-time GPS tracking, AI-powered accident detection, emergency alert systems, delay notifications, and estimated time of arrival (ETA) updates**. The platform supports a **mobile app for parents** and a **web dashboard for school administrators**, enabling centralized monitoring and incident management. By offering such a comprehensive set of features, the system bridges the communication gap between transport services, schools, and parents.

To ensure **reliability and scalability**, the system is built using **HTML, Bootstrap, CSS, and JavaScript for the frontend (web dashboard)**, **Dart for mobile app development**, and **Python for backend APIs**. AI components use the **K-Nearest Neighbors (KNN) algorithm** for accident detection, while **Firebase or MySQL** manages the database. The **Google Maps API** enables GPS integration, and notification services are implemented for instant communication.

Overall, the **School Bus Tracker with AI Accident Detection** serves as a secure, efficient, and scalable platform that addresses the growing need for real-time safety mechanisms in school transport. It fosters trust, improves emergency response, and enhances the daily communication experience for all stakeholders involved in student transportation.