**INTRODUCTION**

In today’s world, ensuring safety and security is a major concern and top priority. There have been a lot of reports of mishaps with children during travel. Child safety is always the main concern for parents as well as the school authorities, especially when they are away from their child. They are always eager to ensure that all necessary precautions are being taken. For example, parents are always concerned about their child coming late from school. The presence of conductors and caretakers on buses is being employed to ensure someone keeps a watch over children and their safe boarding and leaving the bus. However, not all schools have enough personnel and often parents at work need live updates of their child’s whereabouts.

Another common problem faced by the people in India is relying on the ever-busy streets for daily commutes. Traffic especially affects heavy vehicles like buses which are prone to delay. For schools facilitating buses as a mode of transport, they need to know how early the buses should depart to pick up the students for school. In case of delay, the entire school schedule gets disrupted.

Observations from a survey with the local school authorities and the parents of school-going children revealed that there is a lack of such a system. However, there was general agreement towards the existence of such a system being of good use. It is of particular value to those who travel from far to get to the school and also to those who travel through congested routes. A study of the existing literature on the topic reveals the existence of numerous tracking technologies, which keep track of the student's activity, the location of the route of the bus. Some of these also implement additional security measures. However, these suffer from the requirement of hardware components and complicated use, while some are one dimensional and have loopholes.

Therefore, a solution is needed which can :

• Provide reliable information about the whereabouts of a child from the point of pick-up to drop-off.

• The application should be as automated as possible, reducing the work of bus staff

• The proposed solution shall also give additional information such as estimated arrival time

• The application should be intelligent and be able to issue alerts in case of a deviation from the norm.

• The application should be easy to use and should not involve any complicated or expensive hardware.

The paper proposes an android based solution that uses QR code scanning to authenticate each child and log their entry or exit from the bus. The solution uses this logged information, along with location and route information using google APIs, to monitor the live status of the bus and the children. The system communicates via REST APIs with a Django backend server and dispatches notifications to parents. The authors have also integrated features to alert the conductor and school authorities in case of any mistakes in boarding, leaving or route.

The application is reliable, easy to use and inexpensive. To address the problem of traffic-induced delays, this study also presents work on an additional feature in the system to predict the bus delays due to road anomalies to suggest to the school authorities what time the school buses should leave in the morning to pick up the children. This paper is distributed in seven sections. Section II of this paper discusses the related literature behind previous solutions of student safety in buses, as well as routing and travel algorithms. Section III introduces the proposed methodology, which is split into two parts: the first part dealing with the actual mobile application for parents and bus staff, while the second explains our approach for predicting time delays. In Section IV the results obtained through this work are summarized. Section V goes over certain limitations and challenges in this study. The paper concludes with Section VI and VII which detail the conclusion and future scope, respectively.