A Review of Highway Bus Arrival Time and Route Prediction System

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Abstract. With busy schedules and lifestyles, people don't have time and energy to waste unnecessarily. That is one of the main reasons people tend to use highway buses more than normal buses these days. In this case, waiting for buses to arrive at certain destinations is not convenient and sensible. Passengers who use buses should have a rough idea about the buses including the live location and the arrival time. This can also be applied to highway buses. A passenger who uses a highway bus must have an idea about 'when the bus arriving' and 'where is the bus at this moment. Bus transportation plays an important role in reducing fuel consumption, private vehicle usage, and traffic congestion. The ability to obtain accurate predictions of buses at a certain location on a real-time basis is important for the bus passengers and the operators. Predicting the arrival time of a bus at a certain location is challenging. To reduce the long waiting time and reduce the inconvenience faced by bus passengers, it is essential to accurately predict the arrival times of buses. With the development of technology, a large number of systems have been developed to overcome this challenging yet important task. In this paper, a large number of literatures have been reviewed and analysed for bus arrival time, route prediction, and live location tracking. The review was done with the help of recent studies that have been conducted in this area. Artificial neural network (ANN), Deep neural network (DNN), and support vector machine (SVM) models were identified as some of the techniques that can be used to predict the arrival time. In addition to that, it was observed that statistical models such as regression models and historical data-based models can also be used in order to predict the arrival time. At the end of the review, it was identified that machine learning approaches such as ANN models and DNN models are the most suitable approaches that can be used to predict the arrival time of the bus at a specified location due to the accuracy of the results and the performance. GPS devices attached to the bus, Google map API, Geolocation API, and android smartphones that can track the location of the user are the methods that can be used to track the live location of the bus at any moment according to the review. Lastly, the haversine algorithm was identified as the most suitable algorithm that can be used to find the nearest bus station from the user's current location.

Keywords: *arrival time prediction, location tracking, the nearest location, neural networks, GPS, haversine algorithm*