**Digitalizing public bus services**

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Background:

In this contemporary age, characterized by advanced technology and modernization the use of public transport plays a vital role by providing a sustainable, affordable, and accessible means of transportation. Besides being an essential part of modern life there are various issues to be solved such as long waiting times, lack of information about bus schedules, and inefficient routes. Digitalizing public transport services with the help of IoT can help address these issues and attract people to use more public transport services contributing to environmental sustainability[1].

This project mainly focuses on live tracking of buses, automatic fare deduction, and other proposed features which can be deployed using mobile app integration. Additional features like alerts about delays in buses, in-bus Wi-Fi, multilingual support, feedback and rating systems, and information about the occupancy level of the bus can also be integrated improving the overall experience. The collection of data for such features can be made much easier and more accurate with the help of IoT. This overall assists the government with surveys of the usage of buses as public transport and can help in improving the features by allocating funds for the same.

Objective:

The main objective of this digitalized public transport system is to provide real-time information about the location of buses and thus reduce the waiting time of the passengers, provide estimated arrival and journey, simplify the payment process, reduce operational costs, and enhance the overall experience for passengers. We can install digital signage at bus stops and on buses to display real-time bus schedules and other important information for passengers along with multilingual support. Additional features like free In-bus Wi-Fi, feedback and rating system, and other accessibility features like wheelchair ramps would be more useful for the passengers.

Methods:

Live tracking of the buses can be done with the help of GPS which shows the real-time location of the buses, in cases of any technical issues or internet issues from the passenger side or any sort of malfunctions, estimated bus arrival time and live location can be updated based on the previous history of the bus. Contactless smart cards and NFC payments can be used to simplify the payment process for passengers. These features can be effectively implemented with the help of IoT, cloud computing, and data analytics.

Results:

The result of implementing this digitalized public transport system is expected to be a more efficient and effective public transport system that meets the need of both urban and rural life. This will also help to optimize routes and resources and reduce congestion leading to a more sustainable and environment-friendly public transport system. This also reduces the negative impacts of urbanization and improves better access to jobs, education, and other essential services thus leading to a better society. Digitalizing public transport helps improve the overall quality of life and becomes a stepping stone for further developments.

Significance:

This study integrates multiple features such as real-time tracking, estimated arrival and journey mapping, easy payment process, alerts and notifications, multilingual support, in-bus Wi-Fi, feedback, and a rating system. We aim to establish common technical standards and interfaces making it easy for the passengers. This also helps transport sector authorities to make effective decisions in the future with the help of data about service usage by passengers.

References:

[1] Davidsson, P.; Hajinasab, B.; Holmgren, J.; Jevinger, Å.; Persson, J.A. The Fourth Wave of Digitalization and Public Transport: Opportunities and Challenges. Sustainability **2016**, 8, 1248. https://doi.org/10.3390/su8121248