ERUDITE TRANSPORTATION SYSTEM

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Abstract
Our society's population is rapidly increasing these days. Many of them, such as schoolchildren, working men and women and people over the age of 65 as well as physically challenged people use public transportation as part of their daily lives. However, public transportation nowadays provides the worst travel experience. Buses arrive late for bus stops, and sometimes they do not stop at all, this will be affecting a large number of passengers. Also, schoolchildren and working men travel by bus on the foot board, and many of them are killed in accidents. Many people in this generation do not enjoy travelling with this crowd. They will prefer to travel in a peaceful setting. They also require a safe journey with their fellow passengers. So, this sophisticated logistic system provides a good solution to our problem. This system is primarily focused on physically challenged people, who can always use our public transportation without fear. Additionally, the growth was completely covered by tickets provided by our websites. They will book a ticket for their daily travel on time and they will all arrive on time for their daily work. Also, the drivers must always stop the bus at the exact stop, or the bus will not move forward to the next stop. This system primarily assists physically challenged people in determining whether or not the bus will arrive and in booking a ticket for themselves. This system also aids in determining the exact location of the bus as well as when it arrives at its stop.
KEYWORD - Smart bus shelter, physically challenged people, women safety

I. Introduction

Smart bus shelters can be particularly beneficial for physically challenged people, as they provide features that cater to their specific needs. These features can include: Accessibility: Smart bus shelters can be designed to be wheelchair accessible, with ramps or elevators to allow people with mobility issues to enter and exit the shelter easily. Audio announcements: Real-time audio announcements can be made through speakers installed in the shelter, providing important information on bus schedules and routes for visually impaired people. Braille signage: Braille signage can be installed to provide information to visually impaired people, including bus schedules, routes, and other important details. Comfortable seating: Smart bus shelters can provide comfortable seating options for people with physical disabilities, including benches designed for wheelchair users. Automatic doors: Smart bus shelters can be designed with automatic doors that open and close automatically, making it easier for people with physical disabilities to enter and exit the shelter. By providing these features, smart bus shelters can help physically challenged people to feel more comfortable and safer while waiting for buses. They can also help to ensure that people with physical disabilities can access public transportation more easily, helping to promote greater mobility and independence for these individuals. A smart bus shelter is a technologically advanced shelter that provides a range of features and services to enhance the experience of commuters waiting for buses. These shelters are equipped with a variety of features such as real-time information displays, interactive touch screens, Wi-Fi connectivity, charging ports for electronic devices, CCTV cameras, and environmental sensors that provide data on temperature, air quality, and noise levels. The primary goal of a smart bus shelter is to enhance the overall experience of passengers and to make their wait for buses more comfortable, convenient, and safe. By providing real-time information on bus schedules and routes, passengers can plan their journey more efficiently and avoid long waiting times. The interactive touch screens also offer additional services, such as way finding, local news, and emergency alerts, to improve the overall passenger experience Smart bus shelters also offer benefits to transit agencies and municipalities by

providing valuable data on passenger flows, weather patterns, and environmental conditions. This data can help transit agencies optimize their routes and schedules, improve service reliability, and reduce carbon emissions. In summary, smart bus shelters represent a significant advancement in public transportation infrastructure, providing a range of features and services to enhance the overall passenger experience while providing valuable data to transit agencies to improve service efficiency and sustainability.

Miraal Kamal* [4] The advent of smart sensors, single system-on-chip computing devices, Internet of Things (IoT), and cloud computing is facilitating the design and development of smart devices and services. These include smart meters, smart street lightings, smart gas stations, smart parking lots, and smart bus stops. Countries in the Gulf region have hot and humid weather around 6–7 months of the year, which might lead to uncomfortable conditions for public commuters. Transportation authorities have made some major enhancements to existing bus stops by installing air-conditioning units, but without any remote monitoring and control features. The mobile app encompasses a map interface enabling operators to remotely monitor the conditions of bus stops such as the temperature, humidity, estimated occupancy, and air pollution levels. In addition to presenting the system's architecture and detailed design, a system prototype is built to test and validate the proposed solution.

Kelvin Wachira* [1] Various initiatives are carried out towards developing Smart cities that aim to make cities more sustainable. The Internet of Things (IoT) is a key aspect, where sensors are integrated in various „things", creating devices that are aware of, and respond to their environment. Bus shelters are among the facilities that are highly used by people in the city while commuting. Despite this high usage, they have remained the same technologically over the years. However, with new IoT technologies, bus shelters have the potential to be improved, providing a better experience to commuters, as well as creating value for businesses and public transport providers.

S, Bagavathi Sivakumar* [2] The need for a real-time public transport information system is growing steadily. People want to plan their city commutes and do not like waiting for long hours, nor take a long route to reach their destination. The proposed hardware solution in this paper computes the shortest path to reach the destination in real time and gives that information to the bus driver. Artificial Neural Networks (ANN) is used to give an accurate estimate of the arrival time (ETA) to the commuter by means of an application.ETA to the next stop is communicated to the commuter using the MQTT (Message Queuing Telemetry Transport) protocol, by the hardware mounted on the bus. The proposed solution also adds a fleet management console to the administrators, making them manage and monitor the fleet of buses in real time. The prototype thus developed makes sure the commuting in cities is pleasant, and hassle free.

Aakash Walke* [5] In the daily life cycle of work in bus system, the many problem face by system due to this is affected to traffic congestion, delays, irregular bus dispatching times, the increased waiting time make public transport unattractive for passengers, the smart bus system uses different technologies to track the location of bus in running time and by this information to prediction of bus arrivals time at bus stops, when this information is send to passengers by internet or any wired and wireless media, they can plan their time efficiently and reach the bus stop just before the time or take alternate option for transport if the bus is delayed. However the passengers can also check the crowd in bus, seats availability. These days the traffic get more and more, most of the people drive the vehicles very fast, the number of accidents due to rash driving in the city has nearly doubled in the last five years.

Lemuel Ebo Makafui Amegashie* [14] Bus stop designs are a communal checkpoint for public vehicular transit. It has become a prominent and relevant tool in curbing traffic, as well as minimizing

carbon emissions through its public services by reducing the ratio of passengers to automobile usage. Bus stops, therefore, have evolved into hubs of public significance for settlers in their businesses, schools, churches, offices as well as homes, hospitals, parks etc. In the universities, bus stops have moved from a mere option to an inevitable necessity. The rising demand by the student populace has proven to be a result of numerous factors, of which one of them is, to minimize transport expenses in the case of opting for taxis; or avoidance of fuel expenses and maintenance costs in the case of owning a licensed vehicle.

Bhat Apoorva* [7] The most vital transport challenges are frequently identified with urban territories and happen when transport system, for a variety of reasons, cannot fulfill the various prerequisite of urban versatility. Keeping in mind the end goal to manage these negative aspects, in this paper, we proposed smart bus ticketing and tracking system that any passenger with an application on the smart phone can get information like current location of the bus, bus routes on a map and crowd on the bus and the list of every single conceivable buses arriving in within fifteen minutes.

R. Tostado* [3] An alternative to optimize transportation services in the city of Puebla is presented. Main problems tackled to provide advanced transport applications in a Smart City, are described and some available solutions in other countries are analyzed. As a case of study, the challenges for designing and developing a mobile application oriented to users of the buses provided by Universidad de las Américas Puebla (UDLAP) are presented. Users include students, as well as faculty members and administrative employees. The application provides an innovative way of tracking, in real time, movements of the UDLAP transportation buses through the city of Puebla in Mexico. Modeling and technical implementation solved problems are presented and future steps for extending those services to the city of Puebla are also suggested.

Shashank Yadav* [11] Transportation system for any country is one the key features in deciding the infrastructure of that country. For managing the movement of public from one location to another in country having large population is not an easy task. Transportation facility generally includes railways, waterways, roadways and airways. In this paper we will specifically focus on buses which is one of the primary means of transportation in roadways. This theoretical paper aims at providing the effective solution for the current underlying problems faced by the passengers who use public transport as the means of transportation such as defer in arrival time of bus, long waiting time, overloaded bus with passengers.

S Vigneshwaran * [15] Smart city / digital city is engaging in Big Data which will be utilized in monitoring and optimizing the urban systems to minimize resource consumption and maximize the quality of life. To implement the concept of "smart cities", smart city components, design innovation and prototypes must be studied in detail which will be beneficial in understanding the features. India is moving towards becoming one of the developed nations, the source of revenue is highly dependent on public contributions, especially through the transportation sector. The population of India is majorly comprised of the middle-class income category. Their livelihood mainly depends on the regional level jobs and for commute, they prefer public transportation especially Buses. For lodging these buses that are huge in number, Bus Terminus become an integral infrastructure component. In Indian cities, the existing bus terminus appears to be poorly designed and highly congested irrespective of their sizes. Interventions of modern methodologies to improve the conditions in the existing bus terminus in various Indian cities and reconstructing them is of utmost priority for urban planners and policymakers to reach sustainable cities. The objective of adopting smart innovative solutions in Bus Terminus is to reduce pollution, congestion of traffic, improve safety, time optimization and cost reduction.

Marko Mijac* [19] The central role in development of information society is taken by smart cities and their novel services through the use of modern technology and smart solutions. The key enabler and

driver of smart cities is Internet of Things (IoT). In this paper, we have conducted a systematic literature review in order to investigate proposed smart city services driven by IoT. We have formulated the review protocol to define the research question/s, search strategy, selection criteria, study quality assessment, and data extraction strategy. We have defined the following main research question: What are the reported applications of Internet of Things in the development of smart city services? The papers were categorized by the smart city services they proposed or described. We have recognized the following categories: traffic and transport; environment monitoring; accessibility & healthcare; waste management; public lighting; energy management; city infrastructure; and other.

II. Experimental Setup

Choose an appropriate location for the smart bus shelter that is easily accessible to physically challenged persons, such as near a busy bus stop or a transportation hub, and has proper infrastructure in place, such as a level surface for wheelchair access. A well-lit, populated, and safe location for the smart bus shelter that is easily accessible to women. Avoid isolated or poorly lit areas that may pose safety risks. A location for the smart bus shelter that is strategically positioned to help manage crowds efficiently. Consider factors such as bus stop location, foot traffic patterns, and nearby attractions or events that may attract crowds. Incorporate smart technologies to enhance the functionality of the bus shelter. This may include features such as automatic doors with motion sensors or push-button controls for easy access, real-time bus arrival information displayed on digital screens, and audio announcements for visually impaired individuals. Design the bus shelter with features that help manage crowds effectively. This may include a layout that allows for clear pathways and prevents overcrowding, sufficient seating options to accommodate waiting passengers, and designated areas for different types of users (e.g., boarding, alighting, waiting). Ensure that the bus shelter is equipped with accessibility features, such as ramps for wheelchair access, tactile markings for visually impaired individuals, and braille signage for information. The shelter should also comply with relevant accessibility standards, such as the Americans with Disabilities Act (ADA) in the United States or similar regulations in other countries. Implement queue management systems, such as physical barriers or markings, to guide passengers and maintain orderly queues. Digital displays or signage can also be used to provide clear instructions and information about bus routes, schedules, and boarding procedures to reduce confusion and congestion. Install video surveillance cameras in and around the bus shelter to monitor the area and deter anti-social behaviors. The cameras should be strategically positioned to cover all areas of the shelter and its surroundings. Adequate signage should also be displayed to inform users about the presence of surveillance cameras. Incorporate digital displays or screens that provide real-time information about bus arrivals, departures, delays, and route changes. This can help passengers plan their travel and reduce the need to gather around the bus shelter, minimizing crowding. Utilize smart technologies to manage crowds effectively. For example, occupancy sensors or people counting sensors can monitor the number of people in the bus shelter and trigger alerts or notifications when the shelter reaches its maximum capacity. Automated announcements or alerts can also be used to communicate important information to passengers and manage crowd flow. Collect data on various crowd control metrics, such as passenger flow, wait times, and incidents of overcrowding. Analyze the data to assess the effectiveness of the smart bus shelter in managing crowds and identify any areas that need improvement. Conduct user testing with women to gather feedback on the safety features and overall usability of the smart bus shelter. This may involve surveys, interviews, and observation of user interactions to identify any potential safety concerns or areas for improvement. Display information related to women's safety, such as contact numbers for local law enforcement or helpline numbers for assistance in case of emergencies. Educational materials on safety tips and awareness campaigns can also be displayed to raise awareness among users about safety precautions. Include emergency communication systems in the bus shelter, such as panic buttons, intercoms, or emergency call boxes that connect directly to local law enforcement or

emergency services. These communication tools can provide a quick response in case of any safety incidents.

III. Design of Bus Shelter
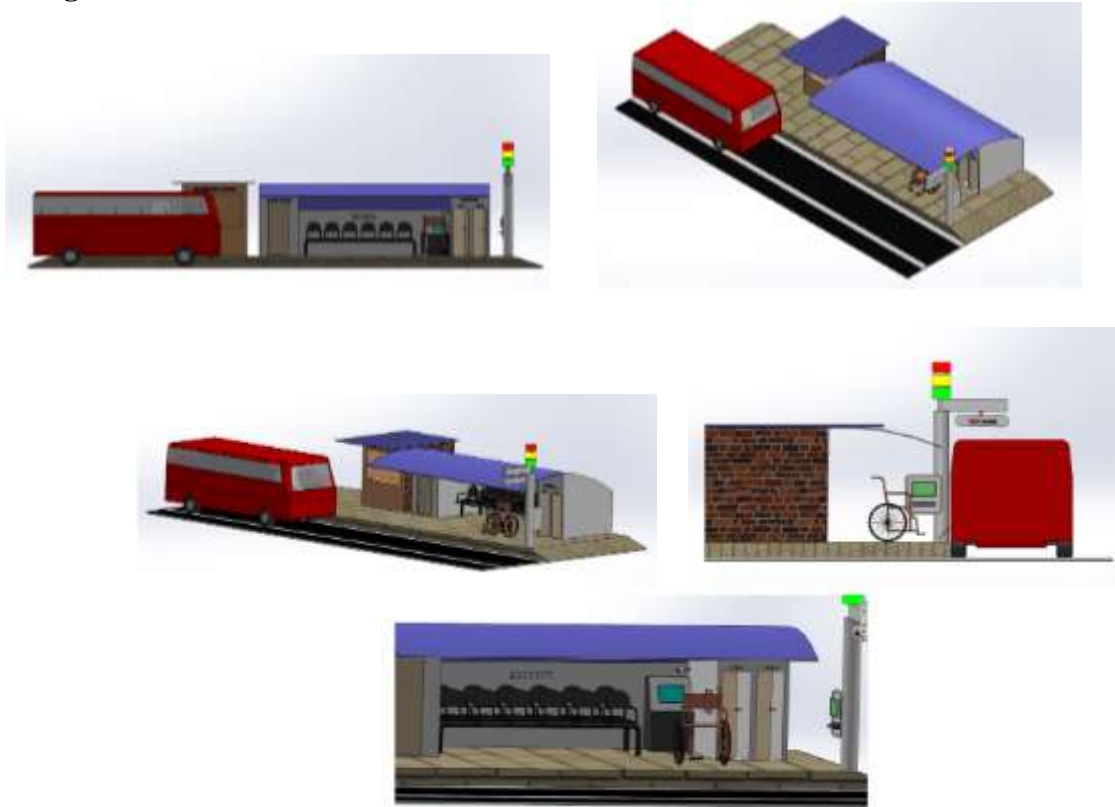
IV. Conclusion

In this research, various useful ways such as the application of IoT in bus shelters and value adding aspects to stakeholders are established. The stakeholders identified are public transport provider, outdoor media advertisement companies, businesses and commuters. In most cases, the advertisement companies are the major stakeholders in the sense that they build and maintain bus shelters. Integration of IoT to connect bus shelters facilitates the possibilities of data collection through sensors that are useful to various stakeholders such as local businesses, advertising companies and public transport providers. Currently, the main source of revenue generated in bus shelters comes from advertisements. Thus, to investigate the value adding aspects of smart bus shelters, this project focus on smart advertising. The concept of dynamic and interactive advertising in bus shelters is being adopted widely since it has a positive influence on the target market. With the prototype, this project sought to demonstrate the way in which dynamic advertising can be achieved through social media and time-based advertising. Since this research is novel, there is a need to develop a small scale prototype in order to further gain insight on how the concept would be built. Additionally, it is important to showcase and explain the working of the prototype to commuters and business persons prior to the launch for a better understanding. This project give scope to the possibility of displaying several valuable information such as real time location of buses as well as local public announcements by the city council.

The IoT technology, facilitates connectivity and control of various aspects by the stakeholder i.e. for instance, outdoor media companies controls how various content is displayed in different bus shelters across the city from a central hub. The value that comes from such implementations involve efficient updating of advertisements to ensure that the information reaches the right target audience. It was established that sensor data may also be useful to monitor the movement of commuter traffic across

the city as well, ensuring suitable planning and allocation of buses in different routes. Vast amounts of sensor data collected over time introduce the possibility of machine learning for the smart bus shelter, whereby the system learns the movement of people at different times of day resulting to better response and performance. This application would be useful in optimizing the bus routes, as well as the information displayed at certain time of the day, week or month. Through critical analysis of the case scenario and system requirements, an elaborate design for a system that could help achieves such efficient time and location-based advertising was developed. The implementation and testing of the prototype showed how a feasible proof of concept can be achieved, that receives a message from local businesses to commuters, using social media. . Furthermore, through evaluating the questionnaire, it was found that the implementation of smart bus shelters can bring the positive response towards advertisements by commuters, creating value for businesses. Additional value towards businesses involves the ability to determine the effectiveness of their advertisements in bus shelters. Innovative methods can be implemented, such as the interaction of the commuter with the advertisement on the screen whereby scanning QR code to obtain coupons. Based on the possible ways to improve bus shelters,, it is found that through IoT, bus shelters can be more useful to stakeholders.

V.   References

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