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Research on Smart Bus System using IOT Technology

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Abstract: *Smart Bus System is used for managing multiple features, but the primary feature is generated automated fee receipt according to its distance, show live location of the bus. They are analysed for planning the bus schedules and analysing the frequency of buses needed on a route. Our system mainly divided into three aspects 1) Student Login-Show all information about student i.e., student distance, fees according to distance, Payment history.2) Driver-Drive has access of student data, where they can see the location of every student3)Admin-Store driver and student information in admit and they are able to manage data according to their status .Thus, smart bus is an efficient, convenient and highly reliable system which is used to reduce corruption, misused of fee receipt smart bus system has strategic planning and management, which will eventually make student journey peaceful, saving paper through digitalization and save the effort and time for planning*

Keywords: INTERNET OF THINGS, SENSER, STUDENT TRANSPORT, GPS, ANDROID

I. INTRODUCTION

In almost every organization, school, or college there is their private bus transport service is available. So, they need to keep a record of their vehicle or bus running /driving and the driver of that bus or vehicle. This record contains bus traveling distance (in km) and the bus driver's details, and they need to keep bus departure, arrival and delay time. They need to keep track of that record in a notebook or register manually. This process is so time-consuming, and it needs extra manpower. There is another problem related to students and staff is that they don't know the real-time location of the bus for which they are waiting for and the time it will take to reach their bus stop. And parents also don't know the location of the bus so, they need to wait. When bus is late then there is a late remark for staff that is traveling through the bus. There is another problem regarding vehicle maintains. To know there are a vehicle needs maintains is so hard. In this proposed system through GPS, we will get the bus running distance, distance will be getting from the map API. We can track the bus from where it is coming and where is its next stop so student, staff, parents do not need to wait they can track the bus in the mobile application. Security head needs to give the daily report of transportation to the concerned authority, this report is generated through this system it will be sent to the concerned authority. After some distance for maintains of the vehicle this system will notify to maintain department that bus needs maintenance. And using the biometric devices, we will get the attendance of students and staff on time so that if the bus was late then the staff cannot get late remark and if a student is not in the bus after a certain stop parent will get notified that their child was not in the bus. Information about the bus acquired by integrating the GPS device and biometric device in the bus. This will help to reduce manpower and time for this work. There are many systems are available to bus tracking and monitoring student in bus. But this system will track the bus, monitor student, and generate report using GPS and map API.

This system will be easy to access because there is not any manual work needs to do, making system smart which works automatically. This system has first component is GPS, GPS sends coordinates, and we will locate bus on map using map API that will track on mobile or desktop. There is only user need to enter vehicle number and user will get the real time location of the vehicle. This is about the tracking of vehicle. Using map data, we get travelling distance of vehicle and we will get the bus current distance travel status. From this data we will provide maintenance alert for

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maintain vehicle. This system also monitors student and staff who are traveling through the bus. It also improves data security no one will be change data because everything is system generated data is provided.

We will use IOT scanner for scan the Code to check the student eligibility i.e., student is eligible or not. We can provide scanner on bus, and we assign the code to every student using that code student can access their data. the blockchain. It is very necessary to protect the geographically decentralized data structure to protect it from data losses, internal failure, and termination of the entire system. To retain consistency in a decentralized system, a blockchain technology is preferred. Blockchain is about advanced data (chunk) put away in an open database (chain). The information is conveyed across numerous PCs, and the entire blockchain is completely decentralized. This implies no individual has command over blockchain, this is an extreme database that controlled and regulated by organizations and different elements. Blockchain system joins private keys innovations, appropriately arranged and shared records.

II. LITERATURE SURVEY

1) V. Krishna Sankar 2020: College transport is used by millions of children worldwide. However, not a substantial effort is done to improve the existing school transport systems. This paper presents the development of an IoT based college bus monitoring system. The development of new telematics technologies has enabled the development of various Intelligent Transport Systems. However, these are not presented as ITS services to end users. This paper presents the development of an IoT based scholar bus monitoring system that through localization and speed sensors will allow many stakeholders such as parents, the government, the school, and many other authorities to keep Realtime track of the scholar bus behaviour, resulting in a better controlled college bus.

2) R. Santhanan Krishnan 2021: College bus transportation system plays a vital role in students' life. They provide safe and secured journey compared to other mode of transportation. The current COVID19 pandemic situation has driven the State Governments and all the college authorities around India to enforce limitations on transportation and movement of students to prevent the spread of disease. But taking the students education into considerations, many state governments have advised to open the colleges with proper precautionary measures. However, student health must be given more importance as they are the backbone of the country. So, a Secured College Bus Management System (SCBMS) has been introduced which monitors the health of the student and the safety measures followed by the student before entering the bus. Alert information will be passed to the parent and the college management if a person fails to cross these two stages of screening process. Vehicle location information is passed to the parents periodically to prepare their child for the school on scheduled time before the bus reaches their boarding point. College bus attendance is monitored efficiently and updated to college authorities for further actions.

3) Ezequiel Dantas 2016: Urbanization in developing countries has resulted in increased demand for public transportation in the face of limited resources. This requires smart transportation management that allows urban planners to evaluate the impact of their policies and design targeted interventions. This paper proposes a three-layer management system to support smart urban mobility with an emphasis on bus transportation. In Layer-1, we apply novel Big Data techniques to compute bus travel time and passenger demands in an efficient and economical way. Layer-2 contains two analytic components: network analysis of passenger transit patterns and causal relationship analysis for bus delays. The third layer provides decision support in an interactive visualization environment. The proposed system is developed and validated in cooperation with the city of Fortaleza in Brazil. The use of generally available urban transportation data makes our methodology adaptable and customizable for other cities.

4) Jairam Sankar 2019: It is important for every school to have a trustworthy and secure transportation service to ensure the safety of the students. It helps the school administration to effectively manage their bus fleet and potentially reduce mishaps. This is where vehicle monitoring takes effect. The proposed system provides real time information about various parameters of the vehicle like the location, the route, the speed, the list of passengers, the adherence of drivers to schedule and much more. The system further allows the parents to be notified when their ward alights or boards the bus. In this system, we make use of RFID and GPS technologies and connect them to a remote server over Wi-Fi using an ESP8266 microcontroller. An Ublox 6M GPS module is used to find the current geographic coordinates of the vehicle's location as well as the speed it is going at. An MFRC522 RFID reader identifies each student as they board or alight the vehicle by reading the id from their RFID tags. The system uses the ESP8266 to upload the information from the peripherals to a database in the web server. The information can be accessed by the parents

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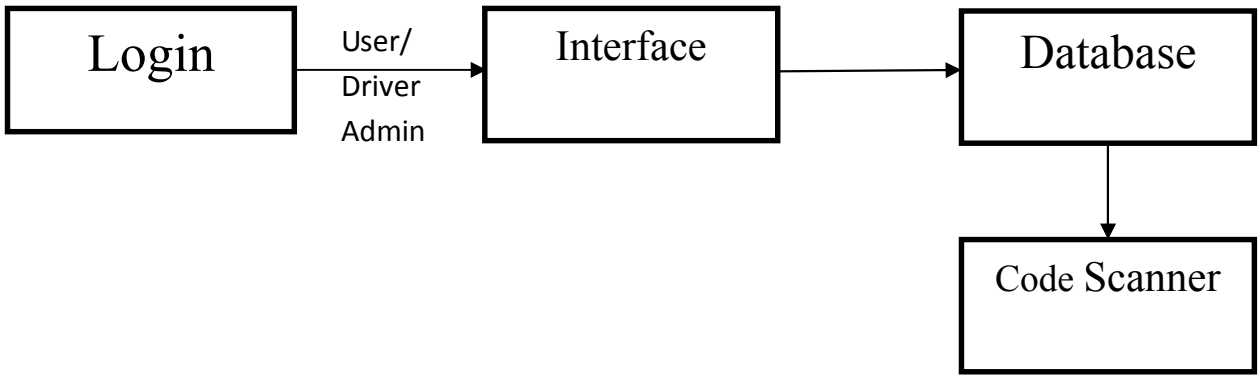
through a mobile application, and this helps them track their wards effectively. The school administration can also access the application to ensure student safety and contact a driver or a parent. The application also allows the administration to be informed of emergencies or complaints.

5) Suleyman Eken 2021: When it comes to taking the public transportation, time and patience are of essence. In other words, many people using public transport buses have experienced time loss because of waiting at the bus stops. In this paper, we proposed smart bus tracking system that any passenger with a smart phone or mobile device with the QR (Quick Response) code reader can scan QR codes placed at bus stops to view estimated bus arrival times, buses' current locations, and bus routes on a map. Anyone can access these maps and have the option to sign up to receive free alerts about expected bus arrival times for the interested buses and related routes via SMS and e-mails. We used C4.5 (a statistical classifier) algorithm for the estimation of bus arrival times to minimize the passengers waiting time. GPS (Global Positioning System) and Google Maps are used for navigation and display services, respective, from reference [1],[4],[2]

III. ARCHITECTURE



- Login: - This interface is for login of Student, Driver, Administrator. Also, there is Registration option also available.
- Interface: - It show the whole contains of the respective user like student, driver and Administration.
- Database: - We used firebase as a Database for storing the whole information in database.
- Code Scanner: - Its used to check the eligibility of Student as the student has paid their fees or not.

IV. WORKING

This system will have three sides Administrator side, Student side, Driver side. In administrator side, there are login Page. After login, there are list of total buses and their respective drivers. Database connected to administrator side. Administrator can maintain all record of students, buses, and drivers.

In driver side also have login page and after login, Driver has the information about all student of that respective bus through the administrator. Also, there are QR code scanner for scanning the QR code of Students for getting information about fees. For this purpose, used Reed Solomon Algorithm for reading QR code.

Reed Solomon Algorithm: -The Reed Solomon method is an algorithm that all QR code readers have built-in as standard. It allows QR codes to be scanned even if a certain amount of the QR code is covered up or blocked.

However, there is a limit as to how much of your QR code you can cover up. The Reed Solomon method isn't magic, but it does do a good job of filling in the blanks so long as you adhere to the basic principles.As there are different versions and sizes of QR codes, the amount you can cover up or alter will vary depending on a number of factors. The easiest way to figure out how much of the QR code can be covered up is to use the table located on the QRcode.com website.

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In student side, first window is of login and registration page. If student handle the application first time, he has to register his information first and then login. If student have already account, he has to login directly. If in case studentforgot his password there is facility of reset the password via email. After Login the interface have open home page. On that home page, there are 2 options, first for paying fees of bus. In this section after click on pay button student redirected to payment gateway and through that student can choose their payment method and can be able to pay the fee. and second if student have some issue regarding paying the fees, then there is option of uploading the approval letter of principal where they can upload.

In Menu bar, there are Profile, QR code, Bus details, Fee status and track bus, these options are available for students.

- Profile: - In this section user or Student can be able to see their own information and get their fee status also.
- QR code: - In this option after opening QR code, Driver must scan that code to get the fee status of that student to allow the entry in the bus.
- Bus Details: - Student's get the details of their bus like bus number, bus route, Driver name and contact Number.
- Fee Status: - Student can be able to see their own fee status.
- Track Bus: - After opening this section map interface will open and Student can see the location of their respective bus and get accurate location.

In IoT section, we used GPS module with some components like GPS module for Tracker, ESP 32 Development Module, Buck Connector2596, DC power jack, 12V 2A Adaptor, ribbon cables.

- GPS Module: - It is used for tracking bus.
- ESP 32 Development Module: - It is for Developing GPS module. It integrated with WI-fi and Bluetooth.
- Buck Converter 2596: - It is used for USB on the go point of load converter for pcs and Laptop.
- DC Power Jack: - It used for receiving power.
- 12V 2A Adapter: - Used for handled the current.
- Ribbon Cables: - It is used for Data Transmission and Communications.

Using these components, we developed GPS module for Tracking Live location of the bus for the students. For this purpose, we used Match Mapping Algorithm.

Map Matching Algorithm -Map matching is the problem of how to match recorded geographic coordinates to a logical model of the real world, typically using some form of Geographic Information System. The most common approach is to take recorded, serial location points (e.g. from GPS) and relate them to edges in an existing street graph (network), usually in a sorted list representing the travel of a user or vehicle. Matching observations to a logical model in this way has applications in satellites navigation, GPS tracking of freight, and transportation engineering.Probably the most common use of map-matching is where a traveller has some mobile computer giving him or her directions across a street network. In order to give accurate directions, the device must know exactly where in the street network the user is. A GPS location has positional error though, so picking the nearest street segment and routing from there will likely not work. Instead, the history of locations reported by the GPS can be used to guess a plausible route and infer the current location more accurately.Other uses, more analytical in nature, include, extracting traffic flow information from vehicle GPS tracks associating user-reported attributes with a streetautomatically infer turn restrictions based on an analysis of multiple GPS tracks.

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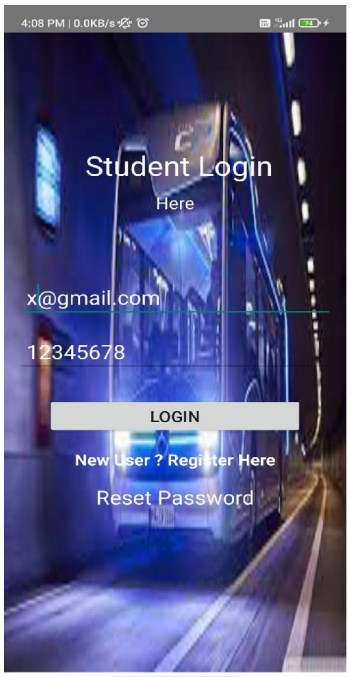
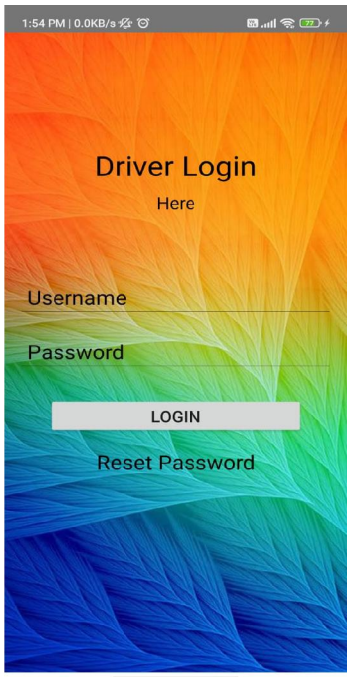
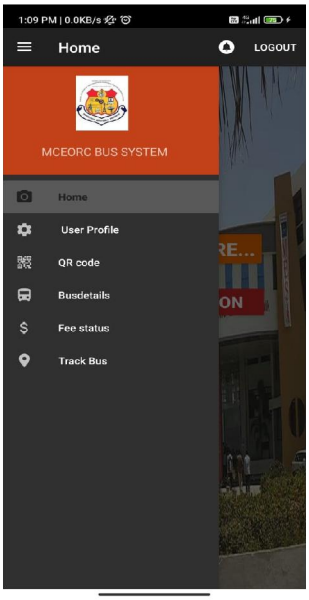
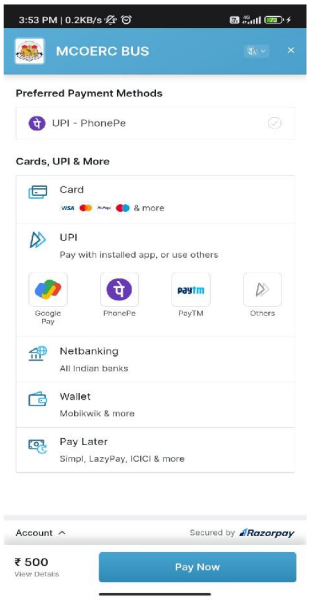
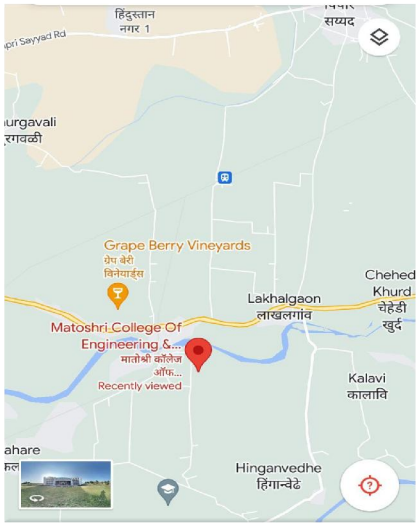
V. RESULTS











VI. CONCLUSION

In this project we have replaced a various existing techniques of college bus Systems. By implementing this idea, we can improve the transportation safety likebus tracking, maintain record of every student and bus. Also,we improved the transparency of Payment and gives quality of services to the college buses. Driver can easily check the eligibility of Students. This system has saved the time of student and Provide easiness. The system has latest technology with moderate cost.

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REFERENCES

[1] Jisha, R. C., Mathews, M. P., Kini, S. P., Kumar, V., Harisankar, U. V., & Shilpa, M. (2018). An Android Application for School Bus Tracking and Student Monitoring System. 2018 IEEE International Conference on Computational Intelligence and ComputingResearch (ICCIC). doi:10.1109/iccic.2018.8782320

[2] Jain, S., Trivedi, A., & Sharma, S. (2019). Application Based Bus Tracking System. 2019 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COMITCon). doi:10.1109/comitcon.2019.8862254

[3] Singla, L., & Bhatia, P. (2015). GPS based bus tracking system. 2015 International Conference on Computer, Communication and Control (IC4). doi:10.1109/ic4.2015.7375712

[4] Abdallah Dafallah, H. A. (2014). Design and implementation of an accurate real time GPS tracking system. The Third International Conference on eTechnologies and Networks for Development (ICeND2014). doi:10.1109/icend.2014.6991376

[5] Mulla, A., Baviskar, J., Baviskar, A., & Bhovad, A. (2015). GPS assisted Standard Positioning Service for navigation and tracking: Review & implementation. 2015 International Conference on Pervasive Computing (ICPC). doi:10.1109/pervasive.2015.7087165