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Bus Pass App Using Android Development.

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ABSTRACT:

Today, reliability in university bus transportation is crucial. This project offers an operational approach for ticket sales using an Android application for college bus transportation. One login is allocated for the system user, whereas the other is reserved for the administrator. This system allows consumers to purchase bus tickets online through an Android application. This technology allows clients to get bus tickets online, thereby obviating the necessity of waiting for the bus attendant to provide tickets. This method allows users to obtain bus tickets quickly and easily, reducing the necessary paperwork. The user can submit their information, link a bank account, or use wallet services to process a payment. This system offers functions including instant bus ticket issuance and access to critical user information for authentication. This system offers users security features and verifies the operation of buses on the upcoming route. The application will send a message to the user with information such as the time, date, and location of the ticket used in a transaction. .

Keywords: - Bus Pass, QR Code, Attendance, Application.

1. Introduction :

In many areas nowadays, buses serve as the primary means of transportation for college students. A system that can monitor and forecast passenger movement on existing vehicles will improve the efficiency of the bus company. Rider Flow in this sense refers to the fluctuating bus passenger load that changes with time and location. The passenger flow will reflect the overall human quality along a route and, consequently, the comfort level of the bus service. From a programming standpoint, it denotes the quantity of individuals who navigate or necessitate navigation along a particular path. This information will assist operators in the precise dynamic allocation and scheduling of routes and timetables.

Contemporary practices among bus transportation system operators reveal that manual data collection is expensive and typically effective only at restricted scales. The use of automated data collection technologies is fast growing and possesses considerable promise. The development of comprehensive information systems now allows us to assess and forecast passenger flow for each bus in an urban bus transit system. A number of buses go in a linear manner, and it is often presumed that no overtaking transpires among them during their entire excursions. Each station features a specific passenger entrance and exit, which alters the movement of bus riders throughout time and place. The buses have completed the routes and stops denoted by the solid lines and circles; the remaining journeys are illustrated by the dashed lines. The difficulty lies in calculating the passenger count on each bus and forecasting the number for the trip's duration in the near future, employing time data from AFC transaction records and OBU traces of the buses.

Each bus is generally under the conductor's authority. Each passenger will obtain a ticket, and the conductor will collect payment. Tickets are initially allocated on printed paper or tokens. Tickets are now produced using portable equipment. This system has some shortcomings. The time needed to obtain a ticket is progressively lengthening due to the increasing quantity of paper required for its production. The passenger must scan the QR code to verify attendance. At now, conductors are receiving instruction on the use of portable ticketing systems. Assume a passenger plans to board the bus. He must have cash. The conductor will distribute tickets after receiving the money. All passengers must listen to this again. This will require extra time and exhaust both energy and human resources. Portable ticketing devices demonstrate limited efficiency and require training for optimal use.

The administrator is tasked with overseeing the GSM module. The incorporation of a GSM module in the programme enables the swift identification of the bus's location, hence mitigating the problem of waiting times at bus stops. The application's shortcomings include its inability to address the real-time issues of bus ticketing, which is the key concern for passengers, its dependence on the manual processes of the current bus ticketing system, and its absence of an integrated interface.

2. Literature Survey:

Sr. No.	Author	Title	Pros	Cons
1	Mohini S., Shirsath and Pooja M. Chinchole, Vaishnavi R. Mahajan, Varsha G. Mogal, 2021	A Review on Smart Bus Ticketing System using QR-Code,	Efficient ticket verification process using QR technology.	Data security concerns due to possible vulnerabilities in QR-based systems.
2	Nwakanma Cosmas, Etus Chukwuemeka, Ajere Ikenna, Agomuo, Uchechukwu 2015 .	Online Bus Ticket Reservation System. Statistics and Computing.	Improved efficiency in online bus ticket booking and management.	Ensitive to lighting Conditions, affecting accuracy.
3	Dhruv Mehra, Jay Gangadia, Jeevan Ghag , Aayush Gupta 2020	Bus Reservation System" International Research Journal of Engineering and technology.	Wide application and adaptability across Different transportation networks.	Lacks robust security measures, making it vulnerable to cyber threats.
4	P. Sharmila, A. Ponmalar, R. Skanda Gurunathan 2020	A system that incorporates bus pass generation with a QR Code scheme is proposed.	Simplifies bus pass generation through QR code integration.	Limited to object and suspicious activity detection, lacks broader security measures.
5	Anurag Sharma, Amit Sharma, 2021	Development of 2021 effective web-based bus pass generation"	Reduces manual intervention and processing time.	Reduces manual Intervention and Processing time.

3. Problem Statement:

"Public transportation is an essential service used by millions of commuters daily, including students, employees, and

regular travelers. However, the traditional method of obtaining and renewing bus passes is inefficient, time-consuming, and inconvenient. The current manual system requires individuals to visit physical counters, stand in long queues, fill out paperwork, and make cash payments, leading to delays and dissatisfaction. Additionally, physical passes are prone to loss, damage, and forgery, making verification and management challenging for transport authorities.

To address these issues, our project "Online Bus Pass App" aims to provide a digital solution that allows users to apply

for, renew, and manage bus passes online. This system will integrate secure digital payments, QR-based e-passes, and real-time verification to enhance efficiency, reduce operational burdens, and improve the overall commuter experience. By transitioning to an online system, we aim to modernize public transport services, reduce paperwork, and offer a hassle-free, accessible, and user-friendly approach to bus pass management".

4. Objectives:

- To Developing a Digital Bus Pass Platform: Create a user-friendly web and mobile application that allows individuals to apply for, renew, and manage their bus passes conveniently online.
- To Reducing Manual Processes and Long Wait Times: Introduce a fully digital system to minimize the need for physical paperwork, in-person visits, and extended waiting periods.
- To Implementing a Secure and Streamlined Payment System: Offer multiple online payment options to ensure smooth and hassle-free transactions.
- To Providing Real-Time Alerts and Notifications: Automate reminders for renewal deadlines, payment confirmations, and important system updates.

5. Implementation:

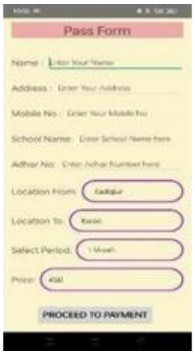
The Bus Pass App is an Android-based mobile application that allows users to register, apply for a bus pass, make online

payments, and use QR codes for validation. The app is developed using Java/Kotlin in Android Studio and integrates with Firebase Authentication for user login and Google Firebase Firestore or MySQL with PHP APIs for data storage. Users can choose their preferred pass type, select routes, upload required documents, and complete payments using integrated payment gateways like Razorpay, Stripe, or Google Pay. Once the application is approved, the system generates a QR code for the bus pass, which can be scanned by conductors or automated scanners for validation. The app utilizes ZXing Library for QR code generation and scanning, ensuring a seamless verification process.

For backend operations, if Firebase is not used, the app connects to a MySQL database via PHP APIs, where user information,

pass details, and payment transactions are stored securely. The admin dashboard, accessible via a web panel, allows administrators to review applications, approve or reject passes, track payments, and send renewal reminders using Firebase Cloud Messaging (FCM). Additionally, automated email notifications are sent to users for pass approvals, payment confirmations, and renewal reminders. The application is designed with a clean and responsive UI using Jetpack Components, Retrofit for API calls, and Room Database for local storage. The app is deployed on Google Play Store, and if using a MySQL backend, the web APIs are hosted on cPanel or AWS servers. This digital bus pass system replaces traditional paper passes, providing users with a secure, cashless, and efficient travel experience while simplifying pass management for bus operators.

6. Snapshot

7. Discussion

The Online Bus Pass App is designed to improve public transportation by streamlining the process of applying for, renewing, and verifying bus passes. Traditional methods often involve manual procedures that lead to long waiting times, inefficiencies, and increased administrative workload for both passengers and transport authorities. By adopting a digital approach, this system overcomes these challenges, offering a smooth and user-friendly experience.

The inclusion of QR-based verification allows bus conductors and transport authorities to authenticate passes quickly, enhancing both security and operational efficiency. Additionally, real-time alerts and renewal reminders ensure that users stay informed, preventing the inconvenience of expired passes.

For transport authorities, the system features a digital dashboard that simplifies application management, pass verification, and

report generation, reducing overall administrative efforts and costs. The incorporation of secure online payment gateways eliminates the reliance on cash transactions, making the process more transparent and hassle-free.

Beyond operational improvements, the system also promotes environmental sustainability by reducing the need for printed documents, thereby supporting a paperless approach. Overall, the Online Bus Pass System enhances accessibility, security, and efficiency, providing a scalable and modern solution for public transportation.

Future advancements may include AI-driven fraud detection, GPS tracking integration, and multilingual support, further optimizing the system for broader adoption.

8. Conclusion:

From this system, physical labour is reduced and digitalization is increased. Bus pass systems can generate bus passes online, renew them using user IDs, and validate them using Aadhaar cards. Users don't need to visit any private or public offices to find all the information they need about bus passes online. Users can register and generate bus passes through the initiative in order to obtain bus passes. To maintain their account, users can use an online application

or website. Additionally, big data processing is used to store the extensive passenger database. To process enormous datasets, it makes advantage of the Android Framework. It is used to protect data and ensure effective memory utilization.

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