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Seamless Transportation platform Digitizing Buspass Management with Precision

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Abstract:

The rapid advancement of technology and the growing demand for digital services have significantly transformed the traditional logistics sector. The rise of smart devices, interconnected through the Internet of Things (IoT), and the integration of artificial intelligence (AI) are reshaping the future of transportation. Despite these technological strides, the role of user interface (UI) design in enhancing the user experience of digital platforms, such as journey planners and bus pass management systems, has been overlooked. Public transportation systems, responsible for a large share of global energy consumption and carbon emissions, face the challenge of promoting sustainable transport options. This article aims to explain the process of developing a seamless transportation platform that digitizes bus pass management with precision, serving as a smart travel assistant for users. The platform is built using a Python full-stack development approach with Django for back-end services, ensuring a robust and scalable solution. A competitive audit and user research were carried out, which significantly contributed to the design of the application's interface. The ideation phase culminated in the creation of initial wireframes using the Figma tool, detailing the application's functionality and user-centric design. The final prototype addresses key user issues identified during the study. To bring the prototype to life, the application will be implemented by developers using Python and Django, turning the conceptual design into a fully functional product that will serve users and promote the adoption of sustainable public transport solutions.

Keywords: Logistics, User Interface, User Experience, Python Full Stack, Django, Bus Pass Management, Sustainable Transportation, Digital Services, Public Transport.

1.Introduction

In the kingdom of shared drive, the effectiveness of train ticket validation systems plays a critical job in ensuring a flowery and efficient journey experience. However, the contemporary methodology, mostly dependent on manual transit net checking, is full of obstacles that hinder its power [1]. The laborious features of this action don't just consume valuable time but additionally introduce a more perfect chance of mistakes, leading to inefficiencies in the wide procedure. Acknowledging these restrictions, there's a critical necessity for a respectfully transformative answer that takes advantage of technological upgrades to smooth the validation

process, enhance preciseness, and provide a more user-comfortable experience for both explorers and bus personnel [2]. To address these pushing subjects, the suggestion is to establish a cutting-edge card reader system fixed on buses. This system will overturn the authorization of Pupil Bus Passes by conveniently incorporating a central database. By this integration, the system can momentarily check the genuineness of passes, exceedingly decreasing the time demanded for authentication [3]. Moreover, the planned answer aspires to empower bus personnel with expressive clues, permitting them to instantly perceive the state of a passenger's bus pass. Besides, the system will be designed to formulate real-time news for invalid passes, permitting quick intervention and solving.

2.Literature review

In this project is to reduce the work load of both the government and the beneficiaries/passengers who are accessing the service and also the reduction of documentation process in the renewal and registration of the bus passes in the transport department is also a time reducing work, user convenient, helps to pay the beneficiaries for the services what they are accessing in a safe and reliable process [4]. To get a new bus pass the user has to register in the prescribed application format, and for the students, who are all accessing this service have to upload the relevant documents such as address proof, photos to be uploaded, after the process got completed, they are directed to do the payment mode. Once the verification process got completed either by the admin/depot officer. The bus pass based on the selected category what they have opted has been sent to their registered mail id [5]. They can get print out of their bus pass from e-mail. The android-based application also consists of a module to get the user feedback based on the feedback facility. There is a high risk of the pass getting malpractice i.e, a forged editing can take place. Further the smart pass consists of all the user details which are linked to the web host servers [6]. Bus Pass Multi Authority Approval System Using Logistic Regression. The main audience of this paper is individuals who struggle to get a pass manually right now. By utilizing an E-platform in this venture, they could get it. User must register their information. After their information is viewed, the Administrator can approve the bus pass. Consequently, the bus pass will be created. Users can view information by logging in with their unique IDs and get a bus pass. The bus pass can be renewed if it expires. Payment can be made with the assistance of UPI. The implementation of AI for developing an E-transport pass framework is a revolutionary approach that uses cutting-edge innovation to enhance the effectiveness and efficiency of the transport pass framework. The traditional transport pass framework has several disadvantages such as potential for fraud, errors in manual data entry, and lack of real-time data analysis. The E-transport pass system employs AI algorithms for validating tickets automatically, improving data entry accuracy, and identifying and halting fraudulent activities.

3. SYSTEM ARCHITECTURE

The architecture for an online bus pass system encompasses a user-friendly interface for registration, pass selection, and purchases, integrated with a secure payment gateway. It features a central server hosting a database for managing user profiles, transaction histories, and pass details, coupled with a pass management system for generating and validating passes. Essential components include a mobile app offering real-time bus schedules and notifications, a security layer ensuring data protection, and seamless integration with transit authority systems for comprehensive fleet management. Additionally, an analytics module analyzes

usage patterns for continuous service improvement, while the entire system maintains communication through encrypted channels, safeguarding user information and transactions.

A. Design

To build the architecture required by a project, we use incremental process model in which we test each prototype and then clubbed with the actual model on observing a correct output. Each Prototype is built along each model and then clubbed together with an actual model. In this way project is built using incremental model.

B. Requirement Analysis

For any software project there are different kinds of requirements to be fulfilled in order to ensure smooth running of the processes. Clearly defined requirements are important markers on the road to a successful project. They establish a formal agreement between the customer and the service provider that both are working towards the same goal. The following are the different kinds of requirement for our project:

Proposed System

The proposed Bus Pass Management E-platform represents a cutting-edge solution to the challenges faced by individuals struggling with manual bus pass applications. Through a seamless and intuitive user interface, applicants can effortlessly register their details, receiving unique special IDs for secure access. The system's hallmark feature lies in its automated approval workflow, significantly expediting the process compared to traditional manual methods. Administrators can efficiently review applications, granting approvals promptly. Transparency is ensured as applicants can track their application status in real-time, bolstering their confidence in the system. Moreover, the system offers a holistic approach by not only simplifying initial applications but also facilitating effortless renewals. Users receive timely reminders, eliminating the risk of service interruptions. The option for both digital and physical pass formats cater to diverse user preferences, enhancing flexibility. Security is paramount, with stringent measures in place to protect user data. Regular security audits and encryption protocols guarantee the confidentiality of sensitive information. In essence, this E-platform not only transforms the bus pass application process but also establishes a secure, efficient, and user-centered ecosystem, ensuring a seamless experience for both applicants and administrators alike.

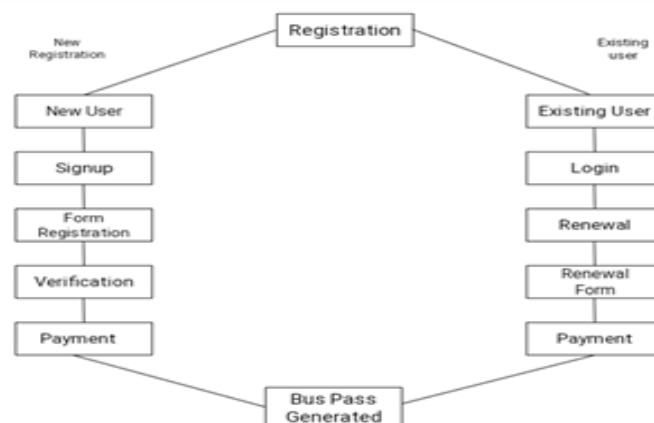


Figure: Proposed System of Bus Pass Approval System Using cloud

System Process

The system design for the Bus Pass Management E-platform encompasses a user-centric approach, ensuring simplicity, efficiency, and security throughout the entire process. At its core, the design emphasizes an intuitive user interface, featuring user registration and login functionalities that allow applicants to securely input their information and obtain unique special IDs. The application forms are meticulously crafted to guide users seamlessly through the bus pass application and renewal processes, ensuring a hassle-free experience. Behind the scenes, a robust application logic design manages user authentication, authorization, and approval workflows. The automated approval system streamlines the administrator's tasks, allowing for quick and accurate application reviews. Renewal reminders are sent Integration with external services such as SMS and email ensures real-time communication with users, providing timely updates on their application status and renewal reminders. For added convenience, optional integration with payment gateways facilitates secure online transactions, making the fee payment process seamless. Geo location services, if integrated, assist users in locating nearby bus pass distribution points. The system's modular architecture not only ensures scalability to accommodate a growing user base but also allows for future enhancements and the integration of emerging technologies, making it a robust, adaptable, and user-friendly solution for bus pass management.

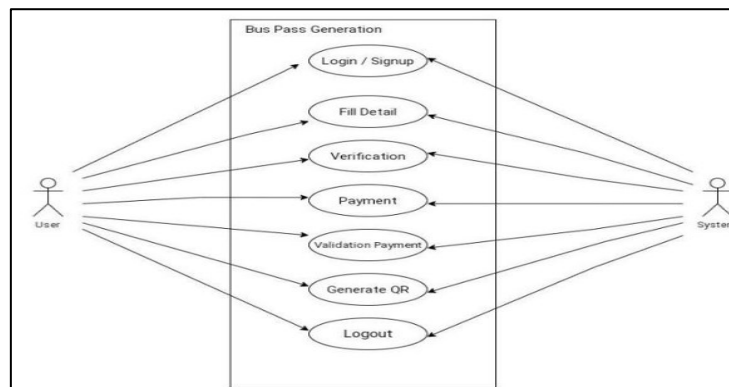


Figure: Use case of Bus Pass Approval System Using cloud

Data Flow

Data flow diagram represents the data flow of a process or system and usually an information system and; through The DFD also provides information about the revenue and profit of each unit and the process itself. A data flow diagram has no control flow - it has no decision rules and no loops. A data flow diagram (DFD) is a graphic or visual representation that uses a standardized set of symbols and notations to describe the operation of a business through the transmission of information.

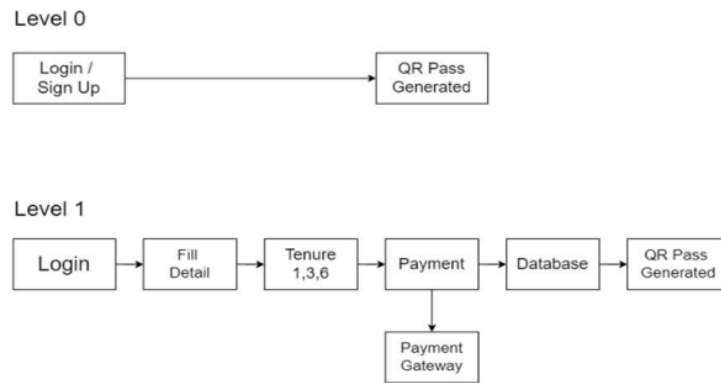


Figure: Data flow of Bus Pass Approval System Using cloud

4. RESULT

The implementation of the Bus Pass Management E-platform has led to transformative outcomes for both users and administrators. Previously faced with the arduous task of acquiring bus passes manually, individuals now experience a streamlined, efficient, and user-friendly process. With the help of the E-platform, users can effortlessly register their information, apply for bus passes, and view their pass details using unique special IDs. Administrators benefit from an automated approval workflow, significantly reducing processing times and enhancing accuracy. The system's proactive 23 renewal notifications ensure that users never miss their renewal deadlines, guaranteeing continuous access to public transportation services. In conclusion, the Bus Pass Management E-platform has not only resolved the immediate challenges faced by individuals seeking bus passes but has also set a benchmark for efficient, user-focused public service delivery. Its success highlights the transformative potential of technology in simplifying complex processes, improving user experiences, and ensuring continuous and uninterrupted access to essential public services.

The presented screens are intended to convey the functionality of the application, not show an exact and consistent real schedule. The location of public transport was created based on their real locations on Mapympk. Adding an alarm is to help the user get out of the house on time. Users often have a problem finding themselves on the map; sometimes it is easier for them to travel by seeing the actual arrangement of buildings in the 3D view. Here, the application, with each movement, shows live where the user is now, which allows him to get to the destination more easily. The view of the tickets screen is a store where the user has the opportunity to buy a ticket and display it in the event of ticket control. Among public transport users, advocates of travelling using timetables have emerged. This group of users is just as important as those using the route search functionality. The community view was created out of the need for mutual communication between users. This is similar to a Facebook group where they can share information on any topic. From this screen, they can post and search by keywords or by means of communication numbers that have been marked to emphasize that the message is about a given line. Additionally, there is an option to select a button labelled “Show other travel options”, which was added based on feedback from a survey where approximately half of the users expressed interest in sharing this information with each other.

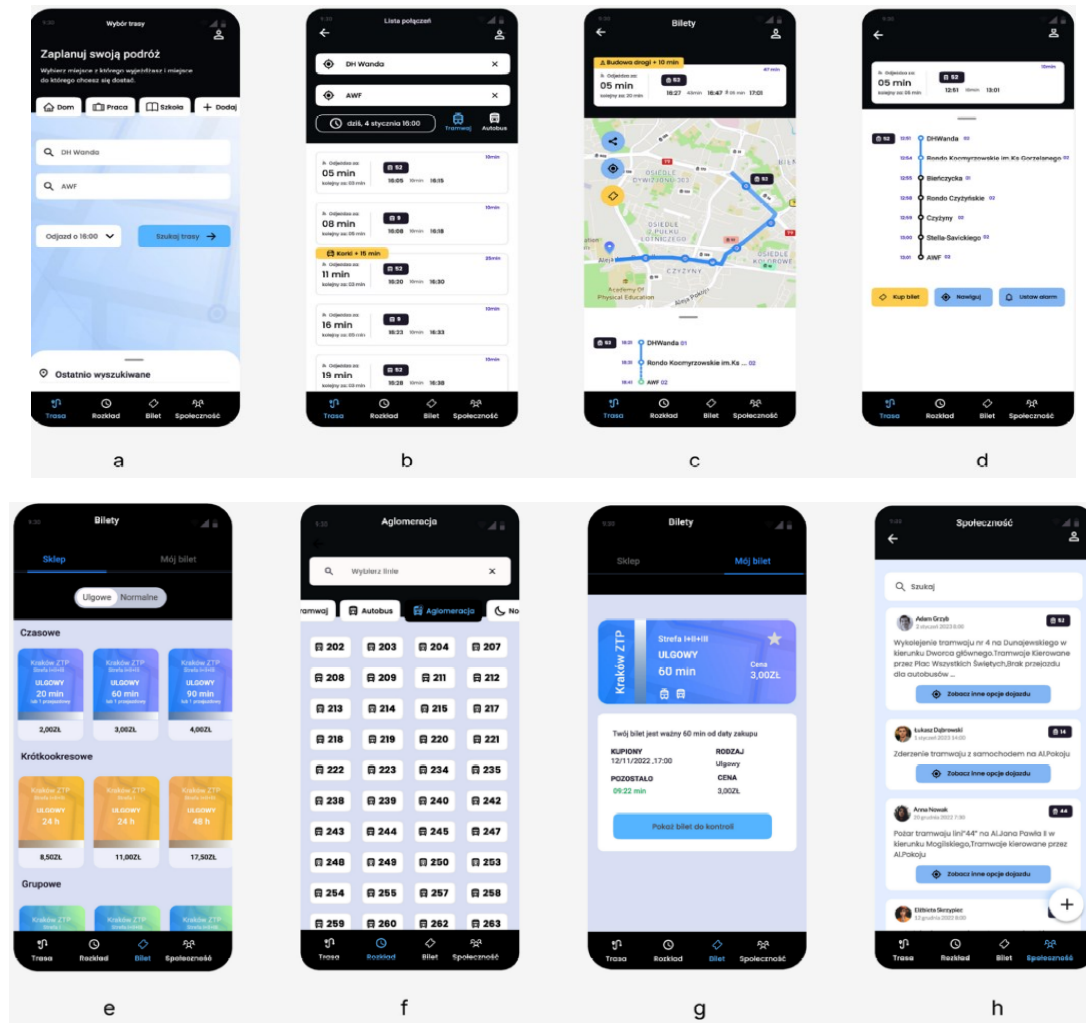
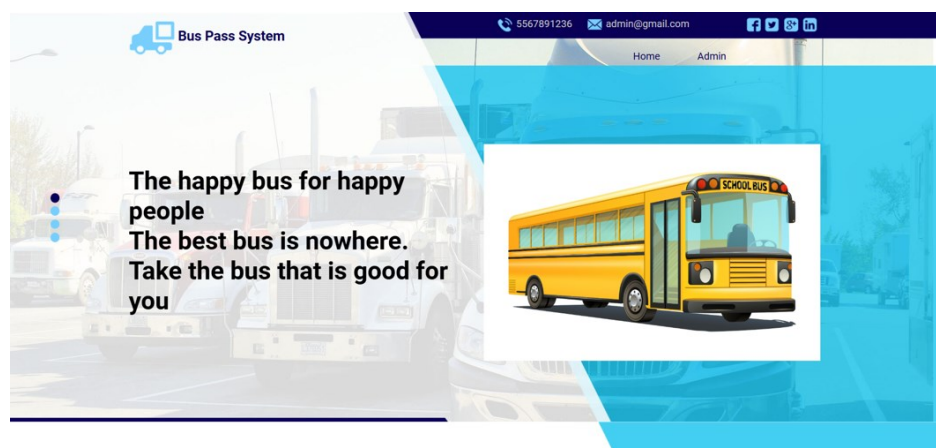
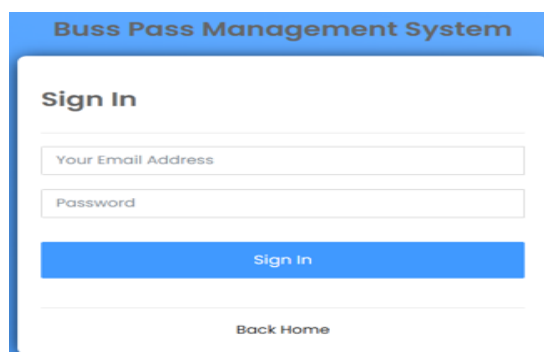
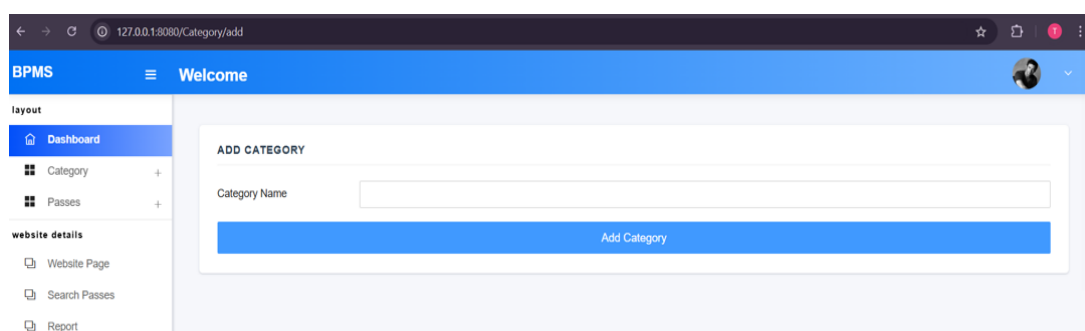
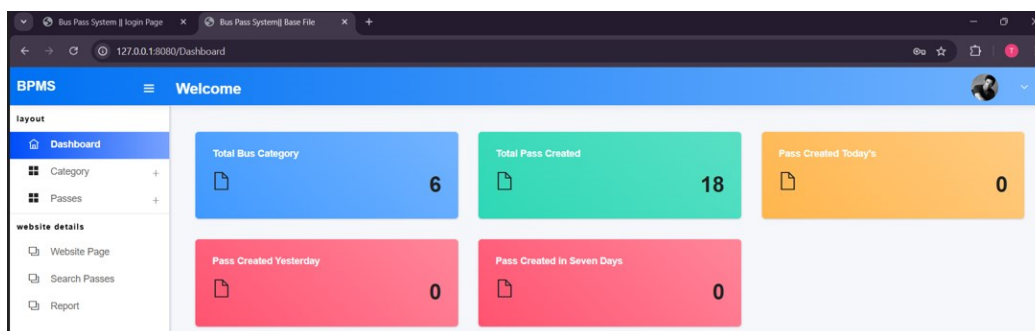


Figure: Interface proposal-screens: (a) Homepage; (b) call list view of the application to be developed; (c) view of the map with mapped route for trams; (d) view of access information; (e) view of a shop-ticket selection; (f) view of the shop-ticket; (g) view of the timetable; and (h) view of the community screen.



Discussion

In this section, we discuss the results from the evaluation, where a survey of public transport users was conducted in the form of a questionnaire using a Google form shared on popular social networks. The questionnaire contained fifteen questions. The subject of the study was to check the availability and adaptation of mobile applications such as a journey planner used to get around by public transport.

Conclusion:

The Bus Pass Management System makes getting bus passes easier. It helps with things like applying for passes, renewing them, and keeping track of their use. This system is like a smart helper for bus services, making things smoother for both the people who ride the buses and those who run them. It keeps everything safe and organized, and it's simple for everyone to use. Overall, it's like a big step forward to make bus travel better for everyone. The system demonstrates a practical IoT solution for bus pass validation, showcasing its potential in data acquisition and management. With modular architecture, secure communication, and cloud

integration, it offers reliability in handling bus pass data. This technology holds promise in optimizing bus pass systems, ensuring efficient validation and tracking in in- reconnected environments. Moreover, the system implements error handling mechanisms to address network connectivity issues and authentication failures, ensuring robustness and reliability in data transmission. Additionally, it incorporates functionality to send SMS notifications using Twilio API, enhancing user engagement and communication.

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