SMART RIDE BOOKING AND NAVIGATION SYSTEM

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Abstract— **Most college students residing outside of their homes never possess a vehicle, due to which they are unable to go around between courses, cafeteria, ground, Sports arena, etc. This bicycle rental scheme in GPS tracking, QR scanning, online payment, locking and unlocking automatically through android application and all the features on a single android application. This scheme also has an admin website where all the information of user and bikes are stored also history of bikes, payment and rides for security purposes. Bus services is provided in the campus, but the time schedule may not be ideal to the students. Thus, students may prefer different modes of transport if they have a choice. This alternative now takes the shape of bike sharing services and is found to be very useful and affordable way for navigation within the campus.**

Keywords— **GPSModule, QRCode Scanning, Kodular, Raspberry Pi PICO, Android studio, User friendly.**

I. INTRODUCTION

In recent years a smart ride booking and navigation system bridges the gap between the advanced needs of users, drivers, and transportation operators. This system aims at the integration of mobile applications, real time data analytics, GPS navigation, and machine learning algorithms to facilitate improvement in a booking process, optimized routes and better satisfaction for users in general.

All-Round Convenient and Efficient for a Cyclist Smart ride booking and navigation system. Qr technology integration within bicycle locks shall provide for the simplest and quickest form of getting into one's bike.

Still, it's not to that an extent.Navigation, to our mind, shall feature in the product, Not that if we are taking just that's a commute from some point to come to office, or there's this navigation with having that sense tom explore many areas and locations. In addition, booking bicycle from nearby stations will also be easy at your fingertips with our ride booking system,

Experience the future of cycling with a smart ride booking and navigation systems, where your journey starts at the touch of a simple scan. This project introduces an user friendly interface of intuitive mobile apps for easy ride booking and management, allowing users to select vehicle types, view estimated costs, and track their rides in real-time.

The system which embodies the future of urban transport, technology and user convenience to meet the needs of the modern commuter. It is about the systems that will play a vital role in developing efficient, safe, and user-centric mobility solutions as cities change and face new transportation challenges.

This growing urban population that has more people in congested cities will require the increase of more efficient, safe and reliable transport mechanisms.

These include conventional transports like public transit and individual vehicles that are inadequate, mainly concerning their convenience and availability. The smart ride booking and navigation system aims at addressing the above shortcomings of then transport mechanisms through incorporating the potential of technology towards an uninterrupted journey experience.

II. PROPOSED METHODOLGY

A. User Interface

- Mobile App: Users can book rides, view available options and manage their profiles.

- User Registration and profile Management: Users can create accounts to save preferences, payment methods and ride history.

- Map Display: A map interface displays nearby bikes, highlighting their locations with icons. Users can also see their current location marked on the map.

B. Ride Booking Process

- Locate Idle Bike: The users browses the map to identify available bikes nearby. Each bike icon may show additional information, such as battery status or distance.

- Real-Time Matching: Using algorithms that take into account variables like distance and projected time of arrival, the system pairs the user with drivers in the vicinity.

C. **Scan QR code**

● Arrival at Bike: Once the user arrives at the bike, they locate the QR code affixed to the bike frame.

● Scanning Process: The app prompts the user to scan the QR code using the phone's camera.

● Successful scan: If the QR code is scanned correctly, the app sends a signal to unlock the bike.

● Unlock Confirmation: The bike's lock disengages, and the app displays a message confirming that the ride has started.

● Failed Scan: If the scan is unsuccessful, an error message appears, prompting the user to try again.

D. **Start Ride**

● Ride Initiation: Once the bike is unlocked, the user can start riding.

● Charging Begins: The app begins tracking the ride duration and automatically starts charging the user based on the rental rates, which could be a per-minute or fixed fee.

● Real-Time updates: The app may provide real-time notifications about ride stats, such as time elapsed and estimated cost.

E. **End ride**

● Completing the Ride: When the user finishes their ride, they can end it using the app. The bike's lock engages automatically once the ride is ended.

F. **Payment Process**

● Cost and Duration summary: The app displays a summary of the ride, including total cost duration of the ride o distance traveled (if applicable)

● After successful payment the users can confirm payment through the app, which may save payment details for future rides.
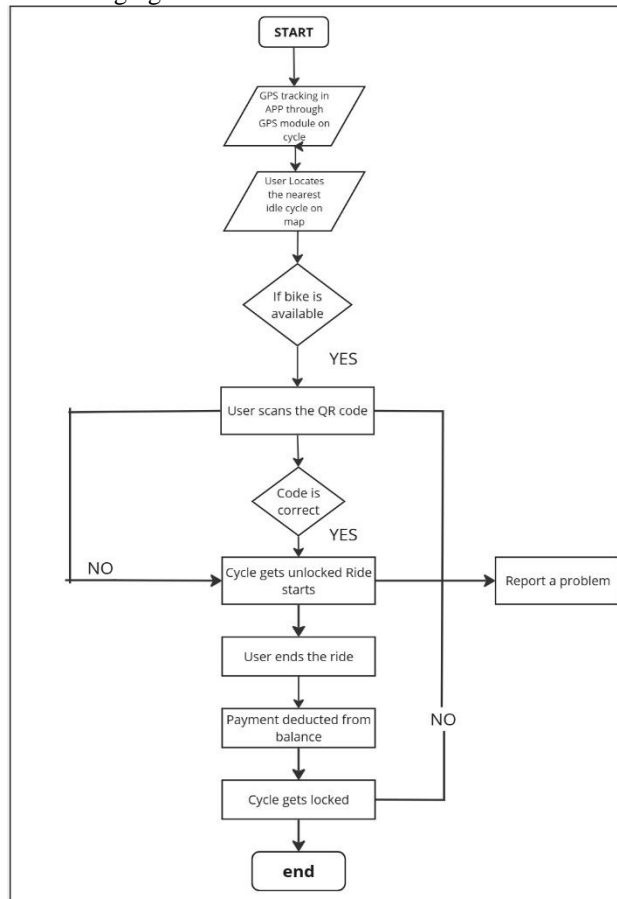

Fig. 1. System overflow

III.   EXPERIMENT AND RESULT

This project involves the development of a user-friendly web interface for renting bicycles, designed using the HTML and CSS. The platform aims to facilitate easy access to bicycle rentals while providing users with essential information about cycling routes and destinations within a campus.
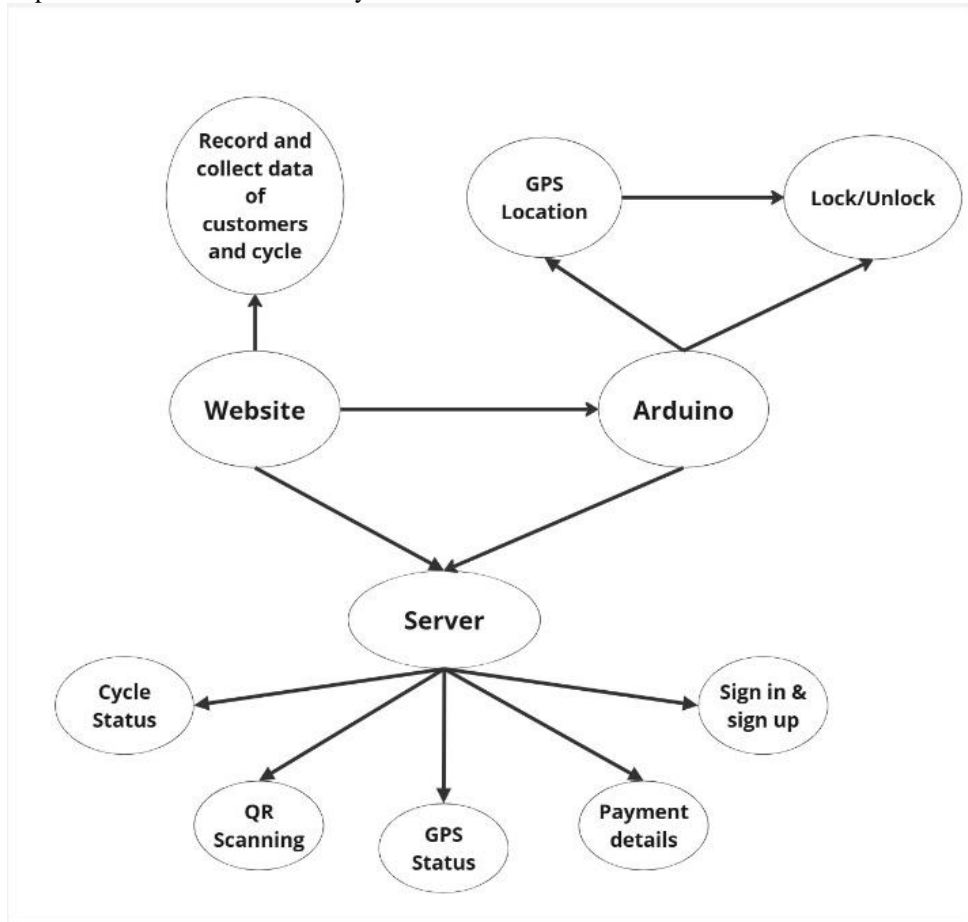

Fig. 2.   Block Diagram
Fig. 3.

A.   Cycle Selection
Users can choose from a variety of bicycle types, including mountain bikes, road bikes and electric bikes. Each bicycle type is accompanied by images and descriptions to assist users in making informed choices.

B.   Destination
The interface allows users to specify their desired destination within the campus, enhancing the relevance of their rental experience.

C.   Time and Price Configuration
Users can select the rental duration, which dynamically updates the total rental cost, ensuring transparency in pricing.

D.   Route Map
An interactive route map of the entire campus is integrated into the interface, helping users navigate easily and plan their routes effectively. The map highlights key points of interest and recommended cycling paths, promoting safe and enjoyable rides.

IV. CONCLUSION

The bicycle rental project can be significantly enhanced by incorporating additional features and functionalities that leverage modern technology. Through effective ride matching, shorter wait times, and better routes, this system improves customer experience by utilizing technologies like real-time data analytics, GPS, and machine learning. Additionally, adding features like in-app payment methods, user feedback, and security measures increases customer pleasure and trust. Such systems can encourage environmentally friendly modes of transportation, lower carbon footprints, and enhance general urban accessibility as cities continue to expand and traffic congestion becomes a major problem.

The further developments should focus on improving data privacy, extending service coverage and integrating electric and driverless vehicles. In the end, a smart ride-booking and guidance system not only revolutionizes personal transportation but also advance the development of smart cities. Also integrating GPS functionality to allow users to track their rented bicycles in real time, enhancing security and reducing theft. Providing users with suggested cycling routes based on real-time traffic and path conditions, improving their overall experience

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