

# Bike Sharing and Rental System: An Android Application

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**Abstract**— Bike sharing systems offer a low cost transportation for short journeys. It can also be used as a complementary mode to other public transport such as buses, local trains. Bike sharing systems has the advantages of public and private transportation to better exploit the given transportation infrastructure. This will be an android application which will provide sharing and rental service. Most modern cities face traffic congestion problems with all the associated costs, such as environmental damage, and economic loss. There is little doubt that better provision and use of public transport systems can reduce these externalities. This application is an attempt to make a system which is user friendly and provides an opportunity to share and rent bikes.

**Key words:** Transportation Infrastructure, Android Application, Traffic Congestion, Economic Loss, User Friendly

## I. INTRODUCTION

For many drivers, the cost of carrying an extra passenger would be small or null, and they would be willing to offer a ride to others provided there were a system that could coordinate all the trips, guarantee safety and eliminate potential awkward social interactions that may emerge. A key aspect of this system is that it does not involve intermediaries between users and bike: reserving, acquiring and releasing a bike are all done automatically through software running on the system of user's smartphone. This application will allow the user to create new trips or search for trips near his/her area to travel from pre-determined location. It can also be used as a complementary mode to other public transit such as buses, local trains. Each station is a different product, the distance to a station and the bike availability are main characteristics, and the set of stations with available bikes is the consumer's choice set. This choice is made by the traveller, according to his distance from the different station. Bike-share systems eliminates the inconvenience of bike ownership, the need to find parking places, and the fear of theft.

## II. LITERATURE SURVEY

### A. Survey 1

Traditional sharing services are based on the two-way scheme, where the user picks up and returns the vehicle at the same parking area. Some services allow also one-way trips, where the user can return the vehicle in another station. The one-way scheme is more effective for the users, but may pose a problem for the distribution of the vehicles, due to a possible unbalancing between the user demand and the availability of vehicles or free slots at the stations.[1].

### B. Survey 2

Handling and managing data automatically collected by Intelligent Transport Systems (ITS) is a huge opportunity

and challenge for transport agents nowadays. This study tells the management of smartcard data from public bikes by providing criteria to recognize travel patterns that describe the specific use of bike-share systems and which cannot be encountered in other transport modes. Full electric vehicles are beginning to be popularized. The principle restrictions that full electric vehicles have are expansive expenses, impediments in battery innovations, constrained driving range and absence of sufficient electrical base.[3].

### C. Comparison of Approaches

Parameter	Survey 1	Survey 2	Proposed Solution
(1) Type of service	Sharing	Rent	Sharing & Rent
(2) Transportation Scheme	One way	One way	One way & Two way
(3) Vehicle not working	Returned to the source point	Returned to the pick up point	Providing location of nearest service center
(4) Type of vehicle	Only for Cars	Only for Bicycles	Only for Bikes

Table 1. Comparison of Approaches

## III. PROPOSED SYSTEM

### A. Architectural Design

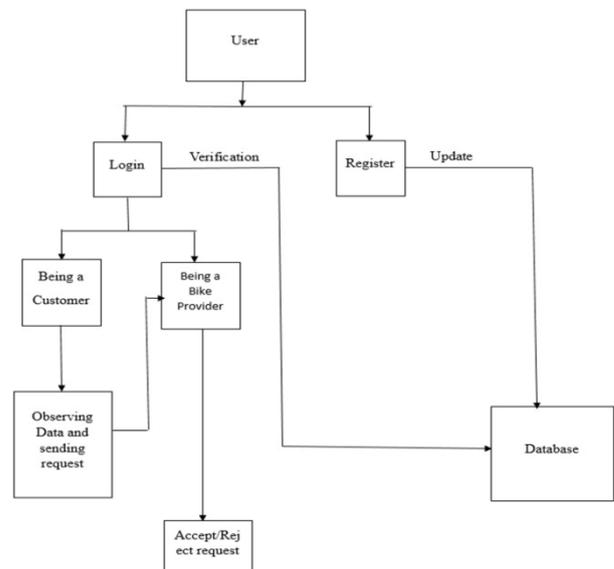


Fig. 1: Architectural Design of Application

### B. Purpose

Bike sharing systems are the key to sustainable mobility. They need to possess adaptation features to answer the different user needs, and should be automated to avoid intermediaries between users and system. Finally, they must

be based on a wide variety of bikes and on an open ownership model to become a viable alternative to private bikes. This letter presents the solution devised in the Green Move project to tackle this challenge. In particular, it focuses on the Green Move bike on-board units, for which a dedicated middleware is being developed. The middleware allows developers to create applications that can be loaded/unloaded while preserving the needed safety levels of the vehicle motion functions [5]. A key aspect of this system is that it does not involve intermediaries between users and bike: reserving, acquiring and releasing a bike are all done automatically through software running on the system of user's smartphones.

C. User Classes and Characteristics

The user classes will be User and management system (Admin).

D. Operating Environment

The application shall operate with the following platform: Android.

E. Design and Implementation Constraints

- Need a mobile handset with all the user present to perform the tasks.
- End User application will be developed in Android Studio
- All server scripting shall be written in PHP and database will be in SQLite.
- Application design pattern shall be Singleton.

F. Assumptions

- 1) There should be GPS and internet in mobile phone.
- 2) Application will be run on Android and IOS only.

IV. TESTING

A. User Acceptance Testing

Sr. No.	Features to be tested	Expected Output	Result
1	Download and installation of application	Application should get downloaded and installed correctly	Successful
2	Registration of User	User's registration information should be valid	Successful
3	Getting valid user information	User's registration information should be valid	Successful
4	Username and Password matching	User's username and password should be valid.	Successful
5	Add bike post	User should be able to add post with desired source and destination	Successful
6	Searching for bike	User should be able to search for bike with desired source and destination	Successful
7	SOS	In an emergency user should be able to send emergency message	Successful

		to the contacts registered by user.	
8	GPS Tracking	Valid and accurate location of user should be determined	Successful

Table 2.

B. Unit Testing (Module Wise Testing) Test Cases

Test Case ID	1
Test Case Description	Apk should get installed properly
Steps	1. Install the application 2. Open the application
Test Case Result	Application should be successfully installed
Action Result	Application successfully started
Status	Pass

Table 3.

Test Case ID	2
Test Case Description	After clicking on android icon, application should be started
Steps	Install the application First click on menu Search the application Run the application as android application
Test Case Result	Application should be successfully started
Action Result	Application successfully started
Status	Pass

Table 4.

Test Case ID	3
Test Case Description	System should provide the menu from which user can select the option
Steps	1. Click on menu button. 2. Option menu should get open.
Test Case Result	After clicking on the particular button of the menu, system should perform the respective operation.
Action Result	After clicking on particular button of the menu, system should perform the respective operation.
Status	Pass

Table 5.

Test Case	4
Test Case Description	System Should provide the Registration button.
Steps	Install the application First click on the menu Search the application Run application as android application Select registration button
Test Case Result	After starting the application it should provide the page to fill user details.
Action Result	After clicking on the submit button system should check the registration details and if correct info, details will be

	saved in database.
Status	Pass

Table 5.

Test Case ID	5
Test Case Description	System should connect to the server and database
Steps	Install the application First click on the menu Search the application Run application as android application. It automatically connect to server and database.
Test Case Result	Application should successfully connect to the server and database.
Action Result	Application should successfully connect to the server and database.
Status	Pass

Table 6.

Test Case	6
Test Case Description	System Should provide the Login to the user.
Steps	Install the application First click on the menu Search the application Run application as android application Go to login page
Test Case Result	System should provide the username, password fields.
Action Result	Application have the username and password fields
Status	Pass

Table 7.

Test Case ID	7
Test Case Description	System should have the back and ok button.
Steps	1. Run application as android application. 2. Click the start button. 3. Create the login.
Test Case Results	After clicking on the back button system should display the previous page.
Action Result	After clicking on the back button system should display the previous page.
Status	Pass

Table 8.

Test Case ID	8
Test Case Description	System should allow user to add post
Steps	1. Run application as android application. 2. Login 3. Click the Menu button. 4. Click on "Add Post" 5. Enter Details and submit.
Test Case Result	Application should add post in database.
Action Result	Application should add post request in database.

Status	Pass
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Table 9.

Test Case ID	9
Test Case Description	System should allow user to search available bikes.
Steps	1.Run application as android application. 2. Login 3. Click the Menu button. 4. Click on "Search Bike". 5. Enter Details and submit.
Test Case Result	Application should show all posts matching with entered detail from database.
Action Result	Application should show all posts matching with entered detail from database.
Status	Pass

Table 10.

Test Case ID	10
Test Case Description	System should allow the user to send SOS.
Steps	Run application as android application. 2. Login. 3. Press SOS button
Test Case Result	Application should send an emergency message to emergency contacts registered by user.
Action Result	Application should send an emergency message to emergency contacts registered by user.
Status	Pass

Table 11.

Test Case ID	11
Test Case Description	System should allow the user to give feedback about driver after ride.
Steps	1. Run application as android application. 2.Login 3.Search for bikes 4. Apply for bikes. 5. Once ride is over, ask user to feedback.
Test Case Result	Feedback should be saved in Database.
Action Result	Feedback should be saved in Database.
Status	Pass

Table 12.

C. Screenshots of An Application



Fig. 2:

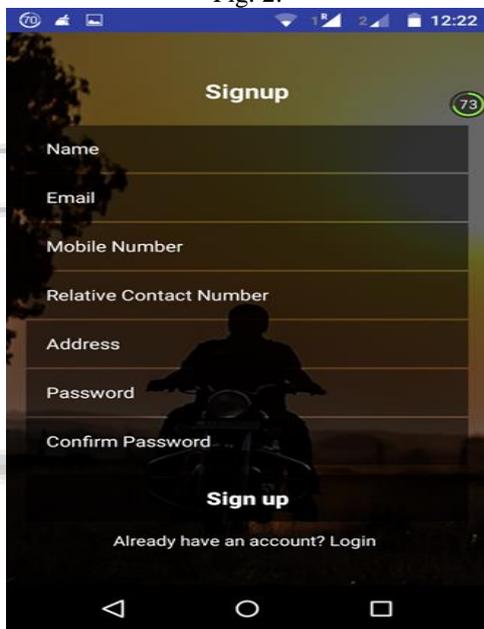


Fig. 3:

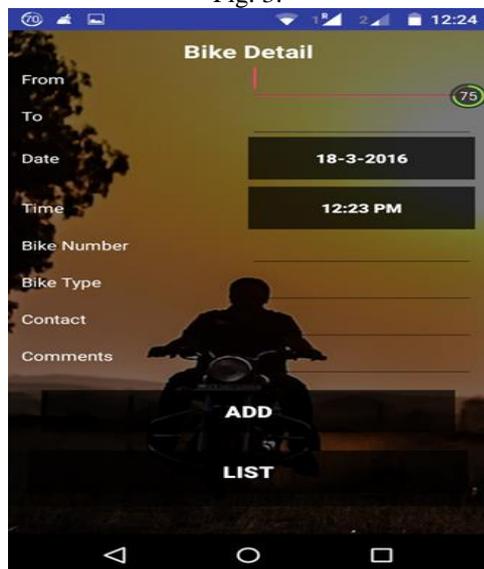


Fig. 4:

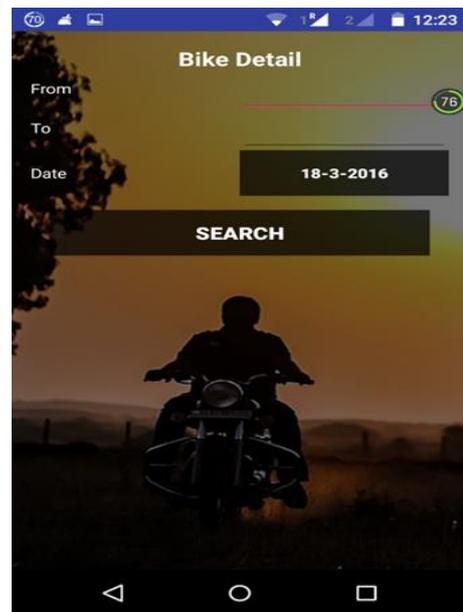


Fig. 5:



Fig. 6:

V. CONCLUSION

The current system is not available for the mobile phone and not especially for the Indian roads. The passenger has to pay the bills by the traditional formulas and many times he/she ended up paying more fare than expected. Also, we cannot guarantee that he/she had travelled by the optimal way in order to save valuable time.

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