A
Project Report
on
Bicycle Renting Website

submitted as partial fulfillment for the award of
BACHELOR OF TECHNOLOGY DEGREE

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in

COMPUTER SCIENCE AND ENGINEERING

By

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May, 2024

DECLARATION

We hereby declare that this submission is our own work and that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

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CERTIFICATE

This is to certify that Project Report entitled "Bicycle Renting Website" which is submitted by Ujjawal, Akhil Kumar in partial fulfillment of the requirement for the award of degree B. Tech. in Department of Computer Science & Engineering of Dr. A.P.J. Abdul Kalam Technical University, Lucknow is a record of the candidates own work carried out by them under my supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree.

 8/05/2024

Prof. Gaurav Parashar   **Dr. Vineet Sharma**

(supervisor)   **(Head of Department)**

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We also do not like to miss the opportunity to acknowledge the contribution of all faculty members, especially faculty/industry person/any person, of the department for their kind assistance and cooperation during the development of our project. Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

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ABSTRACT

This project was designed to investigate and relate different functional, operational and technical requirement of a dedicated web application for online Bicycle rental website. This Website will facilitate the functioning of web-based Rental Bicycle store. Each type of Bicycle should have a different rental fee per day. Rental fee depends on number of day, brand andhow fast the Bicycle runs.

The website equipped to answer Customer's inquiries about the availability and rental fee of various types of Bicycles for certain dates in the future. When the customer makes a decision about the type of Bicycle and the Dates, the website should be able to reserve or earmark the requested type of Bicycle for requested dates. The customer should be given a confirmation number.

The website process a Bicycle Pick Up. Customer walks in and supplies either the confirmation number, or name. The website should pull up all the reservation information about this customer. The customer is then asked to supply a drivers license. The website process a return. The website should record the date, time and processed by Depending on these parameters, the website calculate the final rental amount. Bicycle Rental Website gives Bicycle rental service for both foreign and local customers. Thisorganization carries out its daily work by providing; their service to the customers using manually website. The organization uses a manual website for reserving, renting, register and to keep record of all the rental activities and customer information. It provides Bicycle reservation facility online. Customer can visit the website and check for various Bicycles. If customers are feasible with requirement, then booking can be done and the transformative potential of bicycle renting websites extends far beyond mere convenience or efficiency. At its core, this movement embodies a profound ethos of sustainability, resilience, and social equity. By promoting bicycling as a viable alternative to carbon-intensive modes of transportation, these platforms mitigate traffic congestion, reduce greenhouse gas emissions, and foster healthier, more livable urban environments. As cities worldwide grapple with congestion, pollution, and dwindling resources, the resurgence of bicycling as a viable mode of urban transportation signals a paradigm shift towards more sustainable mobility alternatives .

The allure of bicycle renting websites lies in their ability to transcend traditional transportation paradigms, empowering individuals to navigate urban landscapes with newfound freedom and flexibility. By harnessing the power of digital technology, these platforms seamlessly integrate bicycling into the fabric of urban life, catalyzing a cultural shift towards healthier, greener, and more community-centric modes of transportation.

bicycle renting websites serve as catalysts for community engagement, fostering social connections, and grassroots activism. Through partnerships with local businesses, advocacy groups, and municipal authorities, these platforms galvanize support for cycling infrastructure, safety initiatives, and urban revitalization efforts. In doing so, they catalyze a virtuous cycle of positive change, wherein individual actions converge to shape the collective future of urban mobility.

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LIST OF ABBREVIATIONS

Nam	Network animator
1. UCD	User-Centered Design
2. UX	User Experience
3. WCAG	Web Content Accessibility Guidelines
4. FAQ	Frequently Asked Questions
5. GPS	Global Positioning System
6. API	Application Programming Interface
7. UI	User Interface
8. CSS	Cascading Style Sheets
9. HTML	Hypertext Markup Language
10. ROI	Return on Investment
11. HTTPS	Hypertext Transfer Protocol Secure
12. SSL	Secure Sockets Layer
13. CDN	Content Delivery Network

CHAPTER 1

INTRODUCTION

1.1 Introduction

A Database is a collection of related data organized in a way that data can be easily accessed, managed and updated. Any piece of information can be a data. Database is actually a place where related piece of information is stored and various operations can be performed on it.

A database management website (DBMS) is software that allows creation, definition and manipulation of database. DBMS is actually a tool used to perform any kind of operation on data in database. DBMS also provides protection and security to database. It maintains data consistency in case of multiple users. Here are some examples of popular DBMS: MySQL, Oracle, Sybase, Microsoft Access and IBM DB2 etc.

A DBMS makes it possible for end users to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and the end users or application programs, ensuring the data is completely organized and remains easily accessible. Ex: A real estate database stores information of different types of properties and the preferences of the owner regarding the tenant.

The information stored in the database can be accessed by registered or valid users upon login. The users can also update, retrieve or insert data into the database

Bicycle Rental website is named as Bicycle on Rent Management Website. This website is designed to help the customers to take Bicycles or two-wheelers on rent. When people go on any trip outside the town or country and want to be free of time so instead of going through metros and taxis people prefer to have our own vehicle for rent.

Transport facility is a matter of headache for those people who do not have any personal transport. On occasions like Wedding, Vacation, tour and on many other situations people feel the necessity of a vehicle to sort out the problems. So if it is possible to design or develop a web based application for availing transport whenever and wherever possible, then it will be beneficial for both renter and transport provider. Online facilities like the online shopping, e-banking, online booking of seats for movies, transportation etc. Similarly, The Bicycle Rental Website is the online facility to book Bicycles online within few clicks only. Some people cannot afford to have a Bicycle, for those people this website becomes very helpful. This website includes various Bicycles, as per the customer order and comfort. For travelling a long distance, booking can be done via internet service only.

Using this website user can register as customers who want to take Bicycles on rent can register themselves as renters and can take any Bicycle on rent. User need to login to use the website or canregister as a new user. Address of the customers are required as the customer can only takeBicycle by going to the address of the nearest terminal and providing necessary information. The customer also has to upload some proofs to take the Bicycle on rent.

Proofs like license, pan card and identity card are compulsory so that no one could run taking the Bicycle. Any customer whose proofs are not uploaded and are not valid will not be allowed to take any Bicycle on rent. This has one admin account who verifies the registering user and theuser account. This website has only one admin account and cannot have more than one admin account. Admin can verify and register the user who is registering. If the admin does not verify, the user cannot register. All other features are explained further with details.

A Bicycle rental is a rented vehicle that can be used temporarily for a fee during a specified period. Getting a rental Bicycle helps people get around despite the fact they do not have access totheir own personal vehicle or don't own a vehicle at all. The individual who needs a Bicycle must contact a rental Bicycle company and contract out for a vehicle. This website increases customer retention and simplify vehicle and staff management.

Specific Objectives are

- To produce a web-based website that allow customer to register and reserve Bicycle online andfor the company to effectively manage their Bicycle rental business.
- To ease customer's task whenever they need to rent a Bicycle.
- Availability of vehicle round the clock
- Wide range of vehicles
- Maintaining record of each booking history
- Online Payment option
- Login and Account generation

1.1 Project entity

- An Entity called **ADMIN** is created with the **Email** as a Primary Key and **Password** for storing admin password.

- An Entity called **USER** is created with the **Email** as a Primary Key, which should be unique. This entity also includes **First_Name**, **Last_Name**, **Password, Phone**, **Driving Licence number**. Attributes like **Email**, **Driving_Licence_number** should be unique. This Entity contains user information.

- An Entity **TERMINAL** is created with the **Terminal_ID** as a Primary Key, which should be unique. This Attribute is also followed by **Terminal_Name**, **No_of_Bicycles**. This entity contains information about the terminal and its capacity and status.

- Entity **BICYCLE** is created with the attribute **Bicycle_ID** as a Primary Key, which should be unique. This entity also includes attributes like **Bicycle_name**, **Color**, **Model, Bicycle_type, Price, Terminal_ID, Availability. Terminal_ID** refers to the **TERMINAL** table. This entity holds the information about all the Bicycles available.

- Entity **TRANSACTION** is created with the attributes **Email**, **Bicycle_id**, **Start_Time**, **End_Time**. Attribute **Email** refers to the **USER** and **Bicycle_id** refers to the **BICYCLE.** This entity keeps track of every transaction in the application.

- An Entity **PAYMENT** is created with the attribute **Receipt_no** as its primary key which should be unique. This Entity also includes regular entities like **Mode_of_Payment**, **Date, Cost**. This also includes **Email and Bicycle_id** which refers to the **USER** and **BICYCLE** entity. This entity is used to keep records for every payment the user does.

Testing and Maintenance for CycleEase Bicycle Renting Website System:

Testing:

1. Unit Testing:

   - Conduct unit tests for individual components, functions, and modules of the CycleEase system to ensure they perform as expected.

   - Use testing frameworks such as Jest for frontend components and Mocha/Chai for backend APIs.

2. Integration Testing:

   - Perform integration tests to verify the interaction and interoperability between different modules and components of the CycleEase system.

   - Use tools like Supertest for testing backend APIs and React Testing Library for testing React components.

   - Mainly based on integration technique that follow the testing capability to perform well.

3. End-to-End Testing:
  - Conduct end-to-end tests to simulate user interactions and workflows across the CycleEase website and mobile apps.
  - Use frameworks like Cypress or Selenium for automated end-to-end testing of user journeys.

4. Performance Testing:
  - Perform performance testing to evaluate the responsiveness, scalability, and reliability of the CycleEase system under various load conditions.
  - Use tools like Apache JMeter or K6 for load testing and stress testing of backend APIs and frontend interfaces.

5. Security Testing:
  - Conduct security testing to identify and mitigate vulnerabilities in the CycleEase system, including SQL injection, cross-site scripting (XSS), and authentication bypass.
  - Use tools like OWASP ZAP or Burp Suite for automated security testing and vulnerability scanning.

Maintenance:
1. Bug Fixing:
  - Monitor user feedback, error logs, and system metrics to identify and prioritize bugs and issues in the CycleEase system.
  - Implement timely bug fixes and patches to address identified issues and ensure system stability and reliability.

2. Performance Optimization:
  - Continuously monitor system performance and identify opportunities for optimization, such as improving database queries, optimizing frontend rendering, and caching static assets.
  - Implement performance optimizations to enhance the responsiveness and scalability of the CycleEase system.

3. Security Updates:
  - Stay informed about security vulnerabilities and updates for the technologies and frameworks used in the CycleEase system.
  - Regularly update dependencies, libraries, and frameworks to patch security vulnerabilities and protect the system from potential threats.

4. Feature Enhancements:

   - Gather user feedback and analytics data to identify opportunities for enhancing existing features and adding new functionalities to the CycleEase platform.

   - Prioritize feature enhancements based on user needs, market trends, and business objectives,.

CHAPTER 2
LITERATURE REVIEW

2.1 Software Requirements

The Software Requirement deal with defining software resource requirements and prerequisites that needs to be installed on a computer to provide optimal functioning of an application.

2.1.1 Front End

- User interface : HTML/CSS/JavaScript
- Operating Website : Microsoft Windows 7 or above
- Web Browser : Chrome, Internet Explorer

2.1.1 Back End

- Programming language : Java / J2EE,JavaScript
- Database : My SQL
- Application Server : XAMPP server(v3.2.2) for Apache server (localhost)
- PHP (v7.2.10) for server side scripting
- Sublime3 (Source Code Editor)

2.2 Hardware Requirements

The software should run on any sort of desktop or laptop environment, regardless of the operating website. Essential input/output devices are keyboards, mouse, and printers; nothing else is required but can be recommended if desired.

- Processor : Pentium IV and above
- Hard Disk: 100 GB
- RAM : 2 GB or above
- Display Resolution : 1366 x 768 (1920 x 1080 Recommended)
- Other standard physical devices like keyboard, mouse etc

CHAPTER-3
PROPOSED METHODOLOGY

Website designs the process of defining the architecture, modules, interfaces and data for a website to satisfy specific requirements. Website design could be seen as the application of website theory to product development. There is some overlap with the disciplines of websites analysis, websites architecture and websites engineering.

3.1 Entity – Relationship Diagram

An Entity Relationship model, also called as Entity – Relationship (ER) Diagram, is a graphical representation of entities and their relationship to each other, typically used incomputing in regard to the organization of data within databases or information websites.
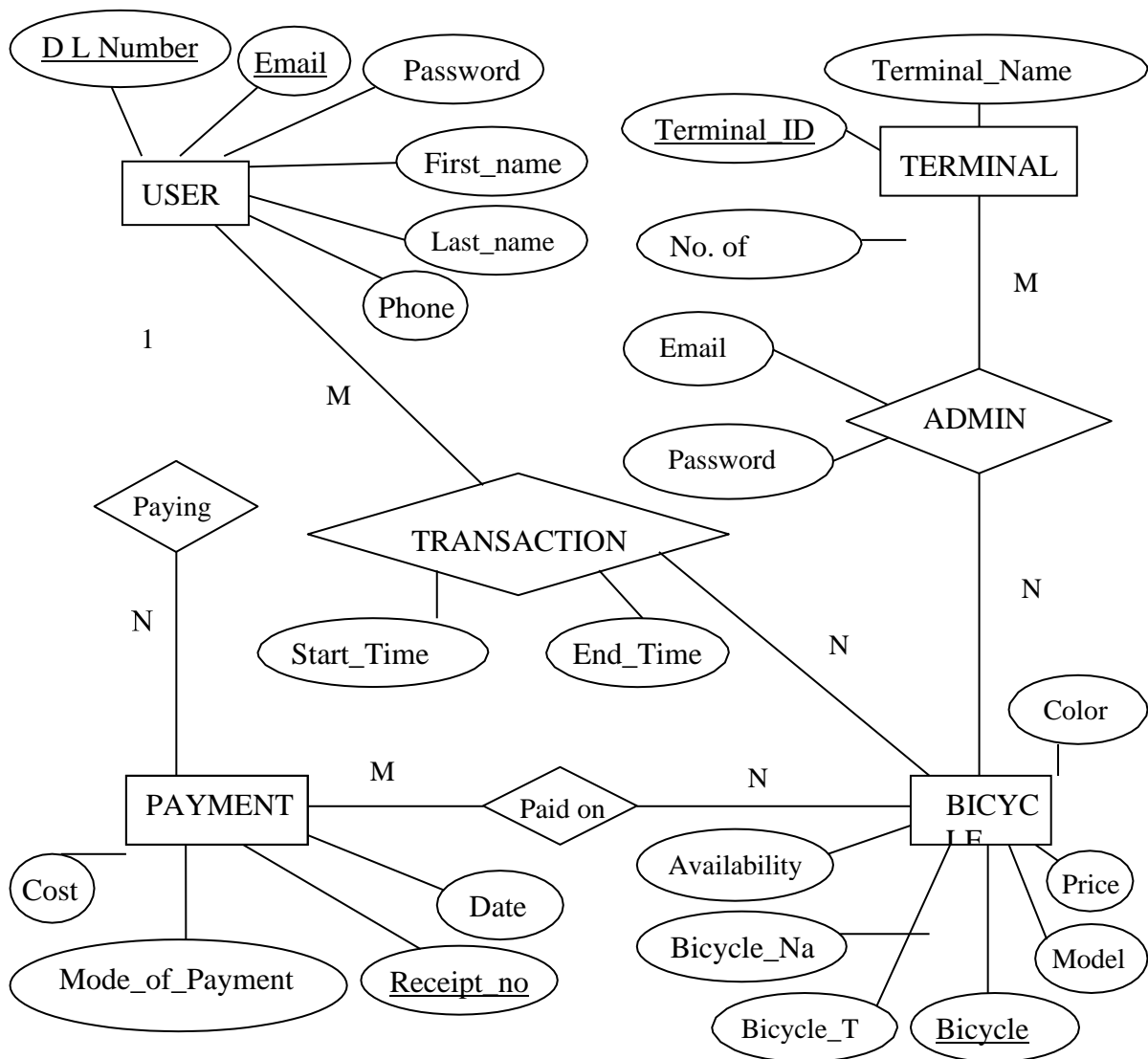
Fig 3.1 ER Diagram

3.2 Schema Database Relationship Diagram

A Database schema is the skeleton structure that represents the logical view of the entire database. It formulates all the constraints that are to be applied on the data. A database schema defines its entities and the relationship among them. It contains a descriptive detail of the database, which can be depicted by means of schema diagrams.

ADMIN

Email	Password

USER

Email	First_name	Last_name	Password	Phone	D L Number

TERMINAL

Terminal_ID	Terminal_Name	No_of_Bicycles

BICYCLE

Bicycle_ID	Bicycle_Name	Model	Color	Bicycle_Type	Price	Terminal_ID	Availability

TRANSACTION

Email	Bicycle_ID	Start_Time	End_Time

PAYMENT

Email	Bicycle	Cost	Mode_of_Payment	Receipt_no	Date

Fig. 3.2 Schema Database Relationship Diagram

3.3 Overview of GUI

A graphical user interface (GUI) is an interface for the user to communicate with a computer application using graphical symbols rather than typing the instructions in. The GUI of the proposed Bicycle Rental website will be developed using HTML5, CSS and PHP(PHP Hypertext Processor).

Hypertext Markup Language (HTML) is the standard markup language for creating web pages and web applications. HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects, such as interactive forms, may be embedded into the rendered page. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. HTML elements are delineated by tags,written using angle brackets. The Bicycle Rental website uses HTML as the building blocks for creating UI elements.

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language. CSS is used to format the pagesto make it appealing to the user. CSS is designed primarily to enable the separation of presentation and content, including aspects such as the layout, colours and fonts. The Bicycle Rental website application uses Bootstrap 4.1 a boilerplate designed with CSS to reduce development times on the GUI design.

PHP (PHP Hypertext Processor) is a server-side scripting language used to dynamically create webpages. PHP code may be embedded into HTML code, or it can be used in combination with various web template websites, web content management websites, and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface (CGI) executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page. PHP code may also be executed with a command-line interface (CLI) and can be used to implement standalone graphical applications. The Bicycle Rental website uses PHP for interacting with the database using MySQL and to display dynamic content on the webpage based on the users queries.

The following buttons have been used in my project:

1. Sign Up Button
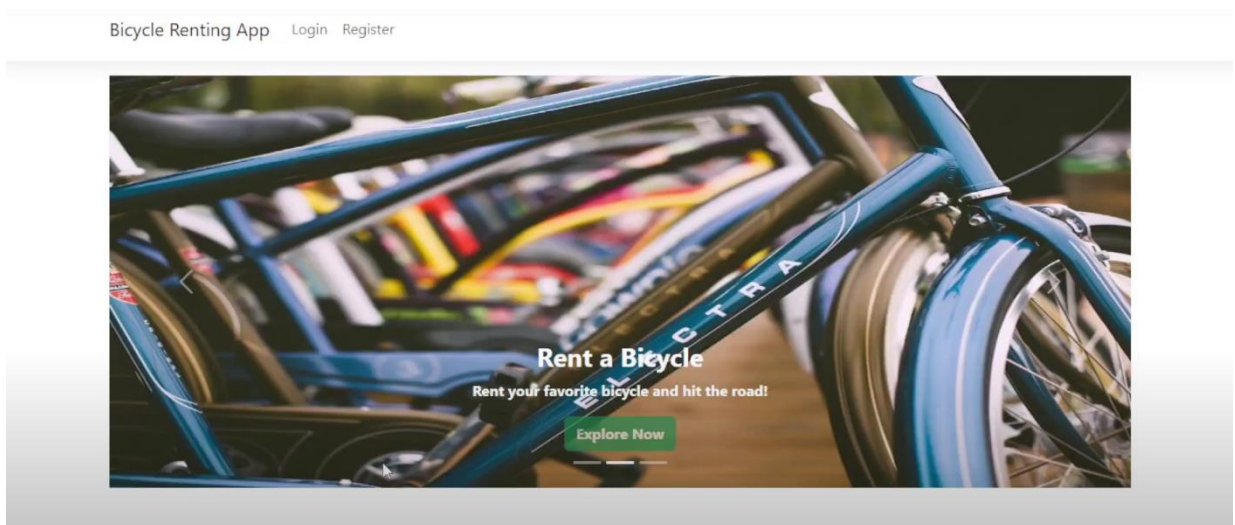
Figure 3.3 Sign Up

2. Navigation Bar
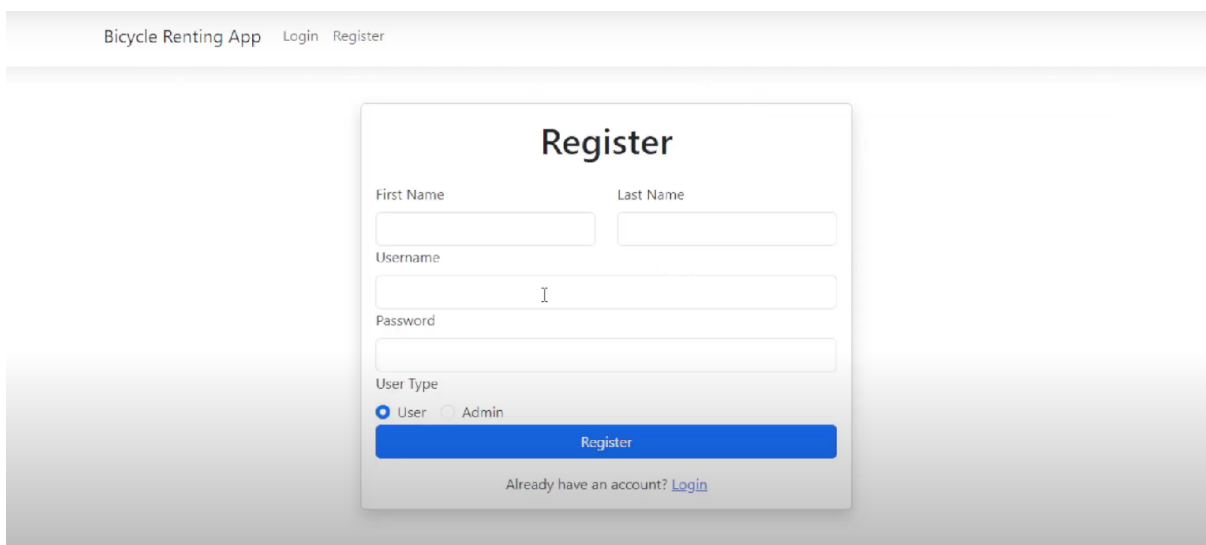
Figure 3.4 Navigation Bar

3.Footer
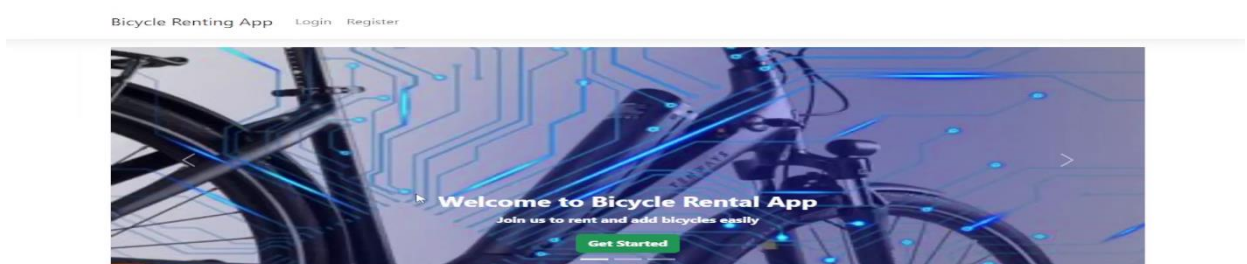
Figure 3.5 Footer

3.4 Normalization

Normalization is the process of analyzing the given relation schema based on their functional dependencies and primary key to achieve desirable properties of minimizing redundancy and minimizing insert, delete, update anomaly. The normalization process takes a relation schema through a series of tests to certify whether it satisfies a certain normal form. The normal form of a relation refers to the highest normal form condition that it meets, and hence the degree to which it has been normalized.

There are two goals of the normalization process: eliminating redundant data (for example, storing the same data in more than one table) and ensuring data dependencies make sense (only storing related data in a table). Both of these are worthy goals as they reduce the amount of space a database consumes and ensure that data is logically stored.

3.4.1 First Normal Form(1NF)

This is the simplest stage of normalization and involves making sure that each individual field within the table can hold only one piece of data and no repeating groups, there should not be multi-valued attributes and the relations should be simple and atomic. For example, the Bicyclel table is in 1NF.

1NF Rules:

- Each table cell should contain a single value.
- Each record needs to be unique.

The table holds atomic values for Bicycle ID , Bicycle Name, Color,as as shown in the figure.

Bicycle ID	Bicycle Name	color
101	herculas	Black

Table 3.1 Bicycle Table is in 1NF

3.4.2 Second Normal Form(2NF)

This normalization is used when the primary key is dependent upon more than one field, if another field within that table is only dependent on a part of the key unnecessary redundancies could result. In the second normal form a non-key attribute of an entity must depend on the entire primary key. In second normal form every non-prime attribute should be functionally dependent on prime key attribute. That is, if X $\rightarrow$ A holds, then there should not be any proper subset of Y on X, for which Y$\rightarrow$A also holds true.

2NF Rules:

- The Table should be in 1NF.

- The Primary key of the table should compose of exactly one column.

Bicycle Name	Model	Color
Pulsar	2013	Black
Activa	2015	White
Pulsar	2019	Blue

Table 3.2 Bicycle table data

In the above table, Bicycle Name column is not unique as it contains 2 entries corresponding to same Bicycle name. Similarly, Color column is not unique as it contains 2 entries corresponding tosame Bicycle Name.

To achieve the 1NF to 2NF,

Bicycle ID	Bicycle Name	Model	Color
101	herculas	2013	Black
103	herculas	2015	White
112	atlas	2019	Blue

Table 3.3 The Bicycle table is in 2NF

3.4.3 Third Normal Form(3NF)

The table must contain no transitive determinants, meaning that all fields must be determined directly by the primary key. If this is not the case, then the transitive determinant field should be transferred to another table with the field that determines it, reducing redundancy further. For a relation to be in the Third Normal Form, it must be in Second Normal Form and the following must be satisfy – No non-prime attribute is transitively dependent on prime key attribute. For any non- trivial functional dependency, $X \rightarrow A$, then either- X is a super key or, A is a prime attribute.

3NF Rules:

- The Table should be in 2NF

- There should not be any functional dependency

Bicycle Id	Bicycle Name	Terminal Name
101	herculas	Banashankari
112	atlas	J P Nagar

Table 3.4 Bicycle table data

Here, when we change the name of the Bicycle, we also had to change the Terminal Name column. This is not desirable since someone who is updating the database may remember to change the name of the Bicycle, but may forget updating the Terminal Name value. This cancause inconsistency in the database.

Third normal form avoids this by breaking this into separate tables:

Bicycle ID	Bicycle Name	Term ID
101	herculas	1010
112	atlas	1013

Term ID	Terminal Name
1010	Banashankari
1013	J P Nagar
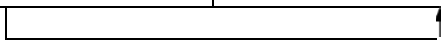
Table 3.5 The above two tables together forms 3NF

3.5 Table Creation

ADMIN

CREATE TABLE ADMIN (EMAIL VARCHAR2(20),
                        PASSWORD VARCHAR2(15));

USER

CREATE TABLE USER (FNAME VARCHAR2(15),
                    LNAME VARCHAR2(15),
                    EMAIL VARCHAR2(20) PRIMARY KEY,
                    PASSWORD VARCHAR2(15),
                    PHONE BIGINT(12),
                    DLNO VARCHAR2(15) UNIQUE);

TERMINAL

CREATE TABLE TERMINAL (TERM_ID INT(5) PRIMARY KEY,
                        TERM_NAME VARCHAR2(15),
                        NO_OF_BICYCLES INT(2));

BICYCLE

CREATE TABLE BICYCLE (BICYCLE_ID INT(5) PRIMARY KEY,
                    BICYCLE_NAME
                    VARCHAR2(10),MODEL
                    YEAR,
                    COLOR VARCHAR2(10),
                    BICYCLE_TYPE
                    VARCHAR2(8),PRICE
                    INT(4),
                    TERM_ID   REFERENCES   TERMINAL(TERM_ID)   ON
                    DELETE CASCADE,
                    AVAIL INT (1));

TRANSACTION

CREATE TABLE TRANSACTION (EMAIL REFERENCES USER(EMAIL) ON DELETE
ON DELETE CASCADE,
BICYCLE_ID REFERENCES
BICYCLE(BICYCLE_ID) ON
DELETE CASCADE,
START_TIME DATETIME,

PAYMENT

CREATE TABLE PAYMENT (EMAIL REFERENCES USER(EMAIL) ON DELETE

CASCADE,

BICYCLE_ID REFERENCES BICYCLE (BICYCLE_ID)

ON DELETECASCADE,

COST DECIMAL(6,2),

MODE VARCHAR2(10),

RECEIPT_NO INT(10) PRIMARY KEY,

DATE DATETIME);

3.5 Description of Tables

ADMIN

DESC ADMIN;

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action		
☐	1	email 🔑	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More
☐	2	password	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More

Figure 4.1 ADMIN

USER

DESC USER;

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action		
☐	1	fname	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More
☐	2	lname	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More
☐	3	email 🔑	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More
☐	4	phone	bigint(13)			No	None			🖉 Change	⊝ Drop	▾ More
☐	5	dlno 🔑	bigint(20)			No	None			🖉 Change	⊝ Drop	▾ More
☐	6	password	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More

Figure 4.2 USER

TERMINAL

DESC TERMINAL;

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action		
☐	1	term_id 🔑	int(5)			No	None			🖉 Change	⊝ Drop	▾ More
☐	2	term_name	varchar(20)	latin1_swedish_ci		No	None			🖉 Change	⊝ Drop	▾ More
☐	3	no_of_bikes	int(2)			No	None			🖉 Change	⊝ Drop	▾ More

Figure 4.3 TERMINAL

BICYCLE

DESC BICYCLE;

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
☐	1	bike_id 🔑	int(5)			No	None		AUTO_INCREMENT	🖉 Change ⊖ Drop ▾ More
☐	2	bike_name	varchar(20)	latin1_swedish_ci		No	None			🖉 Change ⊖ Drop ▾ More
☐	3	model	year(4)			No	None			🖉 Change ⊖ Drop ▾ More
☐	4	color	varchar(10)	latin1_swedish_ci		No	None			🖉 Change ⊖ Drop ▾ More
☐	5	bike_type	varchar(10)	latin1_swedish_ci		No	None			🖉 Change ⊖ Drop ▾ More
☐	6	price	int(4)			No	None			🖉 Change ⊖ Drop ▾ More
☐	7	term_id 🔑	int(5)			No	None			🖉 Change ⊖ Drop ▾ More
☐	8	avail	int(1)			No	1			🖉 Change ⊖ Drop ▾ More

Figure 4.4 BICYCLE

TRANSACTION

DESC TRANSACTION;

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
☐	1	email 🔑	varchar(20)	latin1_swedish_ci		No	None			🖉 Change ⊖ Drop ▾ More
☐	2	bike_id 🔑	int(5)			No	None			🖉 Change ⊖ Drop ▾ More
☐	3	start_time	datetime			No	None			🖉 Change ⊖ Drop ▾ More
☐	4	end_time	datetime			Yes	NULL			🖉 Change ⊖ Drop ▾ More

Figure 4.5 TRANSACTION

PAYMENT

DESC PAYMENT;

	#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
☐	1	email 🔑	varchar(20)	latin1_swedish_ci		No	None			🖉 Change ⊖ Drop ▾ More
☐	2	bike_id 🔑	int(5)			No	None			🖉 Change ⊖ Drop ▾ More
☐	3	cost	decimal(6,2)			No	None			🖉 Change ⊖ Drop ▾ More
☐	4	mode	varchar(10)	latin1_swedish_ci		No	None			🖉 Change ⊖ Drop ▾ More
☐	5	receipt_no 🔑	int(10)			No	None		AUTO_INCREMENT	🖉 Change ⊖ Drop ▾ More
☐	6	date	datetime			No	None			🖉 Change ⊖ Drop ▾ More

Figure 4.6 PAYMENT

3.6 Populated Tables

ADMIN

SELECT * FROM ADMIN;

←T→			▼	email	password
☐	🖉 Edit	⊰ Copy	⊖ Delete	admin@gmail.com	admin

Figure 4.7 ADMIN

USER

SELECT * FROM USER;

				fname	lname	email	phone	dlno	password
☐	Edit	Copy	Delete	Harish	K	harish@gmail.com	9521087224	86883682	harish
☐	Edit	Copy	Delete	Mithun	Kumar	mithun@gmail.com	9986210223	6589821	mithun
☐	Edit	Copy	Delete	Pavan	Kumar	pavan@gmail.com	9752412672	76768688	pavan
☐	Edit	Copy	Delete	Vinay	H	vinay@gmail.com	9662143215	546765456	vinay

Figure 4.8 USER

TERMINAL

SELECT * FROM TERMINAL;

				term_id	term_name	no_of_bikes
☐	Edit	Copy	Delete	1020	BSK	2
☐	Edit	Copy	Delete	1021	J P Nagar	2
☐	Edit	Copy	Delete	1022	Hebbal	3
☐	Edit	Copy	Delete	1023	Kormangala	2

Figure 4.9 TERMINAL

BICYCLE

SELECT * FROM BICYCLE;

				bike_id	bike_name	model	color	bike_type	price	term_id	avail
☐	Edit	Copy	Delete	101	Pulsar	2017	Black	bike	30	1020	1
☐	Edit	Copy	Delete	102	RX100	1999	Red	bike	32	1021	1
☐	Edit	Copy	Delete	103	Activa	2018	Blue	scooter	25	1022	1
☐	Edit	Copy	Delete	104	Jupiter	2016	Grey	scooter	26	1022	1
☐	Edit	Copy	Delete	105	ApacheRTR	2019	white	bike	30	1020	1

Figure 4.10 BICYCLE

TRANSACTION
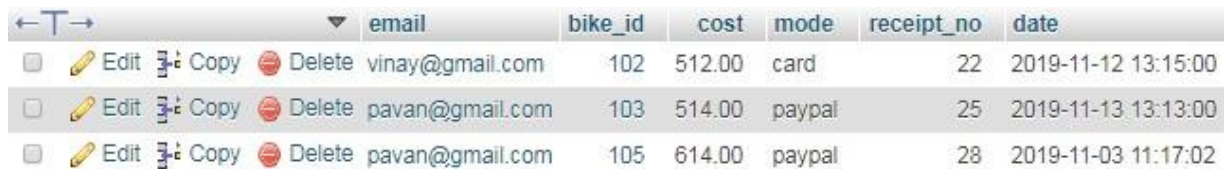
SELECT * FROM TRANSACTION;

email	bike_id	start_time	end_time
vinay@gmail.com	102	2019-11-11 13:05:00	2019-11-13 19:41:00
pavan@gmail.com	103	2019-11-06 16:25:39	2019-11-13 20:29:15
pavan@gmail.com	105	2019-11-06 16:25:39	2019-11-13 20:29:15

Figure 4.11 TRANSACTION

PAYMENT

SELECT * FROM PAYMENT;

Figure 4.12 PAYMENT

3.7 SQL Triggers and Stored Procedure

3.7.1 Triggers

Triggers are stored programs, which are automatically executed or fired when some event occur. Triggers are, in fact, written to be executed in response to any of the following events:

- A Database manipulation (DML) statement (DELETE, INSERT, or UPDATE)

- A Database definition(DDL) statement (CREATE, ALTER, or DROP)

- A Database operation(SERVERERROR,LOGON,LOGOFF,STARTUP,SHUTDOWN)

Triggers can be defined on the table, view, schema, or database with which the event is associated. The trigger used in this application is used to increment the value of no_of_Bicycles inTerminal when Bicycle is added to that terminal. Another Trigger is used to decrement the no_of_Bicycles when a Bicycle in that terminal is deleted. By knowing the value of no_of _Bicycles, it iseasier to get count of Bicycles in particular terminal.

The Trigger is:

CREATE TRIGGER `Bicycleadd` AFTER INSERT ON

`Bicycle`FOR EACH ROW UPDATE terminal

set no_of_Bicycles =

no_of_Bicycles + 1WHERE

term_id = new.term_id;

CREATE TRIGGER `Bicyclerem` AFTER DELETE ON

`Bicycle`FOR EACH ROW UPDATE terminal

set no_of_Bicycles =

no_of_Bicycles - 1WHERE

term_id = old.term_id;

Show Triggers:

Figure 4.13 Triggers

3.7.2 Stored Procedure

A stored procedure is a prepared SQL code that can be saved and can be reused over and over again. So if a query has to be written over and over again, instead of having to write that query each time, it can be saved as a stored procedure and can be executed just by calling the procedure. In addition, parameters can also be passed to the stored procedure. So depending on the need, the stored procedure can act accordingly.

Stored procedures are useful in the following circumstances:

- If a database program is needed by several applications, it can be stored at the server and invoked by any of the application programs. This reduces duplication of effort and improves software modularity.

- Executing a program at the server can reduce data transfer and communication cost between the client and server in certain situations.

- These procedures can enhance the modelling power provided by views by allowing, more complex types of derived data to be made available to the database users via the stored procedures. Additionally, they can be used to check for complex constraints that are beyond the specification power of assertions and triggers.

The Stored procedure used in this application is to calculate the cost by accepting 2 parameters. When calling this Stored Procedure, 2 parameters needs to be passed with a call.

Stored Procedure is:

DELIMITER $$

CREATE DEFINER=`root`@`localhost` PROCEDURE `spcost`(IN `hour` INT(3), IN `id` INT(5))

BEGIN

DECLARE price int;

DECLARE Bicycleid CURSOR FOR SELECT price FROM Bicycle WHERE

Bicycle_id=id;OPEN Bicycleid;

FETCH FROM Bicycleid INTO

price;UPDATE payment

SET cost = (hour * price1)

WHERE Bicycle_id =id and date is

NULL;CLOSE Bicycleid;

END$$
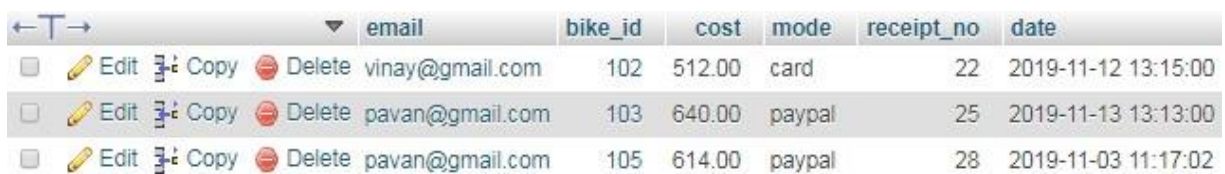
DELIMITER ;

Show Procedure:

<p align="center">Figure 4.14 Stored Procedure</p>

3.8 Database Connectivity

The front end can easily be connected to the back end/database (i.e., MySql) by adding a few
instructions in PHP. The following instructions are to be added.

```php
<?php
//initializing variables
// function OpenCon() {
$servername = "localhost";
$username = "root";
$password = "";
$db ="Bicyclerental";
//connect to server
$conn = mysqli_connect ($servername , $username , $password,$db) or die("unable to connect
to host");
 //return $conn;
 //}
?>
```

CHAPTER 5

RESULT AND DISCUSSION

1. Homepage
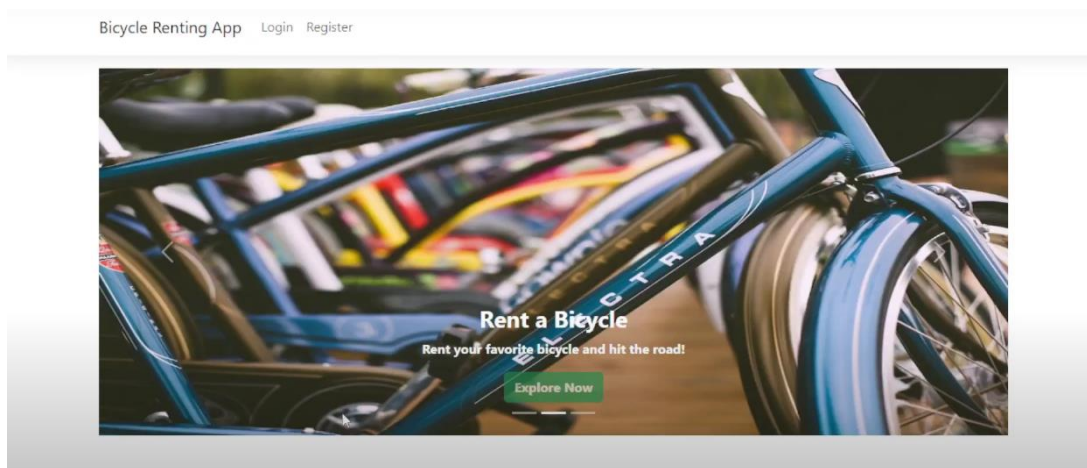
Figure 5.1 Homepage of the application

Existing user can login or can register as a new user. It also provides Admin Login

2. User Login

Figure 5.2 Login page for User login

Already Existing user can login to their account on entering correct username or password.

3. Bicycle Search

Figure 5.3 Search page for user to Search Bicycle

After login, user can search for their favourite Bicycles from the nearest terminal available on Location. User search a vehicle that is near by of its or walking distance that can affordable to the user.

4. Bicycle

Figure 5.4 Search result page where user makes a selection

Results from the users search is displayed here where user can select one from the list.

5. Confirmation

Figure 5.5 Confirmation about the selection of Bicycle

After selecting the Bicycle, user can book that Bicycle from this window and collect at the terminal.

6. Payment
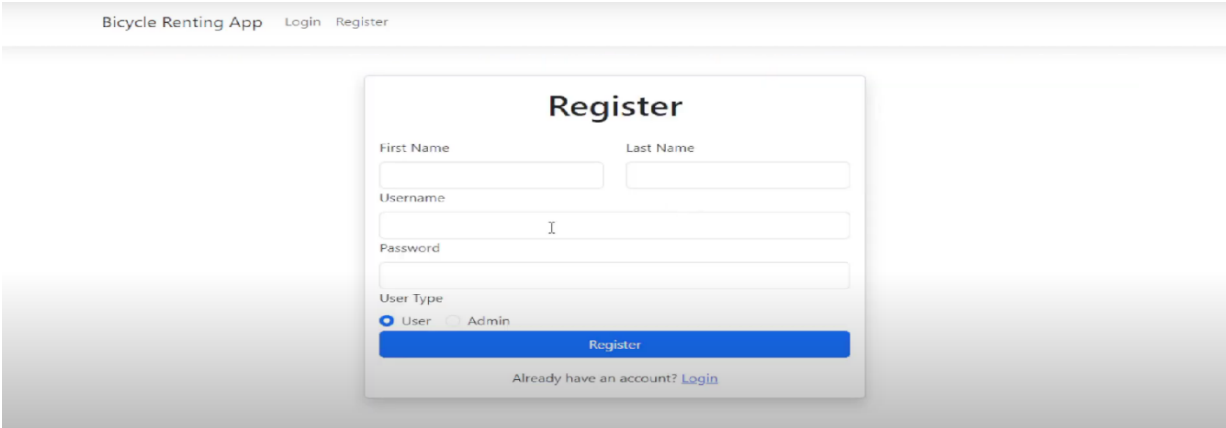
Figure 5.6 Payment page

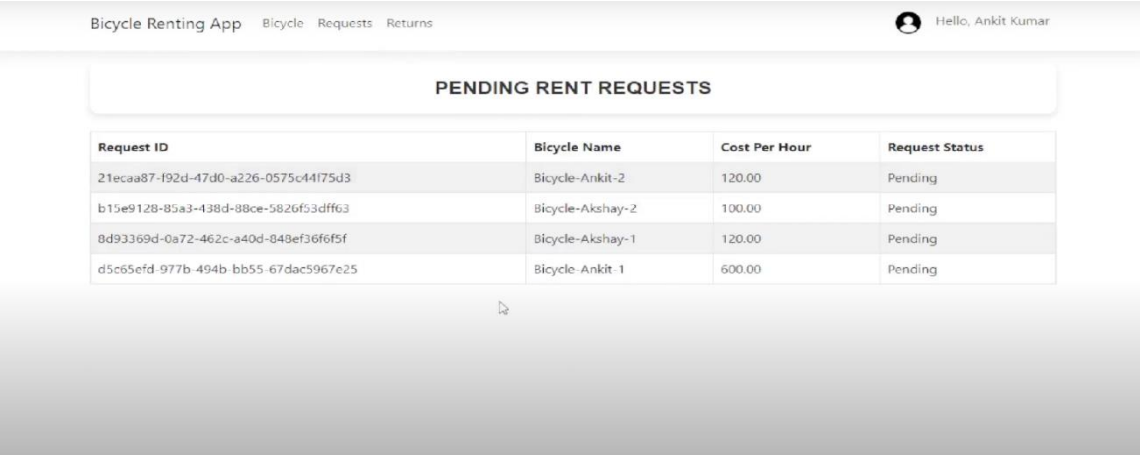This checkout page is used for payment of the rent amount from the user. There are different methods available to pay.

Figure 5.7 Admin homepage

Admin can perform different operations on the database like adding Bicycle and terminal, endingtransaction, view Bicycle, terminal and transactions.
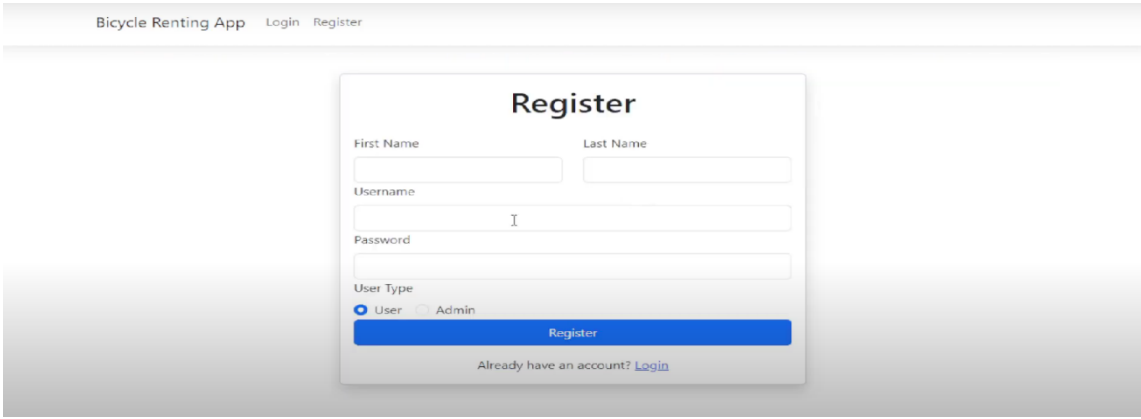
8. Add Bicycle

Figure 5.8 Adding a new Bicycle by the

admin A new Bicycle can be added by only Admin on entering details

of the Bicycle.

9. Add Terminal

Figure 5.9 Adding a new terminal by the admin

A new terminal can be added by only Admin on entering terminal name and id.

OBJECTIVES

1. Promoting Sustainable Transportation: Encourage the use of bicycles as a sustainable and environmentally friendly mode of transportation, thereby reducing carbon emissions, traffic congestion, and reliance on fossil fuels.

2. Enhancing Urban Mobility: Improve accessibility and convenience for urban commuters by providing an alternative transportation option that is affordable, efficient, and flexible.

3. Improving Public Health and Well-being: Encourage physical activity and healthy lifestyle choices by promoting cycling as a means of exercise, recreation, and active transportation.

4. Fostering Community Engagement: Cultivate a sense of community among cyclists and local residents by organizing events, group rides, and community outreach initiatives.

5. Supporting Urban Planning and Infrastructure: Advocate for the development of cycling infrastructure, bike lanes, and bike-sharing programs in collaboration with local governments, urban planners, and advocacy groups.

6. Enhancing Accessibility and Inclusivity: Ensure that the bicycle renting website is accessible to users of all abilities by implementing features such as keyboard navigation, screen reader compatibility, and alternative text for images.

7. Providing Seamless User Experience: Offer a user-friendly interface with intuitive navigation, real-time availability tracking, secure payment processing, and responsive design across various devices and platforms.

8. Promoting Safety and Awareness: Educate cyclists about safety guidelines, traffic laws, and best practices for cycling in urban environments through informational resources, signage, and interactive training modules.

9. Generating Revenue and Sustainability: Establish a viable business model for the bicycle renting

website through subscription plans, rental fees, partnerships, and advertising revenue, ensuring long-term financial sustainability.

10. Measuring and Monitoring Impact: Track key performance indicators (KPIs) such as ridership numbers, user satisfaction ratings, carbon emissions saved, and community engagement metrics to evaluate the impact of the project and inform future decision-making.
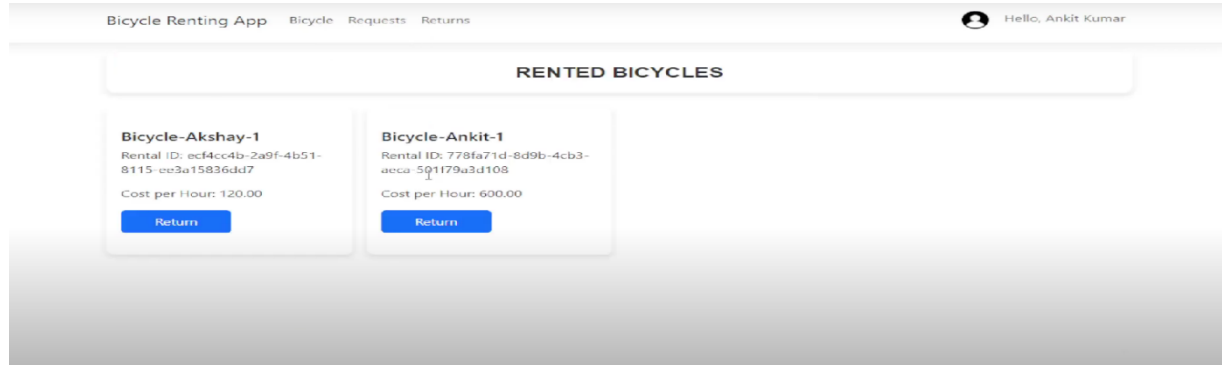
10. End Transaction

Figure 5.10 Ending Ongoing Transactions

Admin can end the ongoing transaction of any user available and the bill will be generated at users page.

11. View Transaction
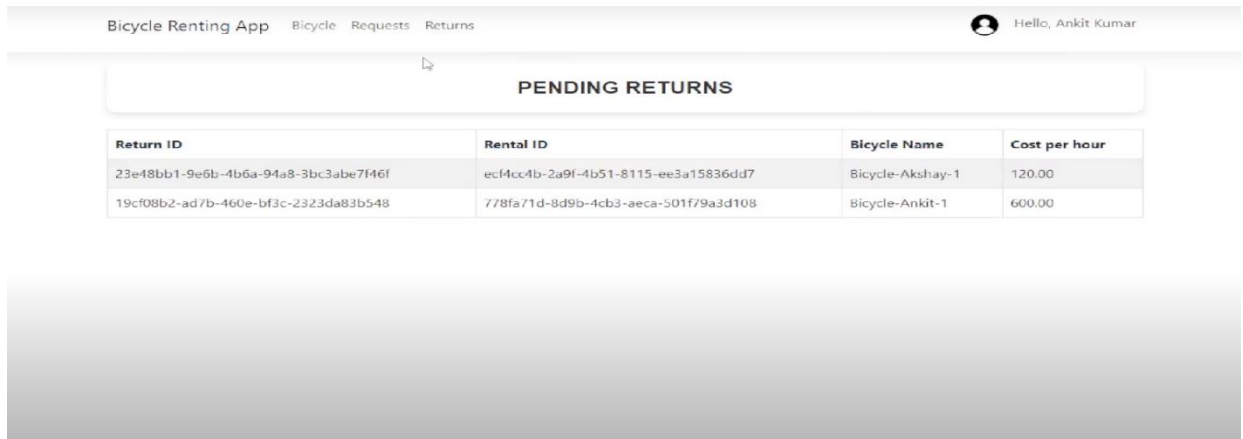
Figure 5.11 View all Transaction

Admin can view all the transaction that has been done by all the users till date.

CHAPTER 5
CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

Bicycle Rental Website is a web application and it is restricted to only limited type of users. In this application, Admin have been given access rights and are restricted up to certainfunctionalities, so that the data is maintained securely and redundant data is prevented. As the Data is stored electronically, it is necessary to have a Computer and Network connection to access the Application. It is a software which helps the user to rent Bicycle base on their need. This software reduces the amount of manual data entry and gives greater efficiency. The User Interface of it is very friendly and can be easily used by anyone. It also decreases the amount of time taken to write details and other modules. At the end, this software can perform all the tasks accurately and can do the work for which it is made.

5.2 Future scope

Once the final Bicycle Rental Website is built, business students will become involved with an economic and marketing analysis. The engineering programs will pay for the construction of the Bicycle website from funds budgeted for the capstone class. An initial thought is for local business to sponsor each of the Bicycles. As an incentive, they will be allowed to put an advertisement for their business on the Bicycle they sponsor. A small monthly fee will then be charged to continue the sponsorship. The fees collected will be used to contract with a local Bicycle shop to maintain the condition Bicycles. The implementation of the final Bicycle rental website istruly the final step in maintaining the community relations link.

Further Enhancement can also be done by providing access permissions to the employees, Try to Implement the GPS Website in Bicycles.

To maximize the use of Bicycle Renting Website, the lead agency needs to have the support of stakeholders and partners. These stakeholders may be including Local municipality (funding and space), Public transit operators, User association and other groups (e.g. vehicle sharing companies).

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