American International University- Bangladesh

SOFTWARE REQUIREMENT ENGINEERING

PROJECT PROPOSAL
FALL 2022-2023

Project Title:
AUTOMATIC PARKING CHARGE COLLECTION SYSTEM

Section: E
Group:05

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AUTOMATIC PARKING CHARGE COLLECTION SYSTEM

1.0 Introduction:

Automatic parking charge collection system is an automated system by which cars will able to pay parking charge without any hassle. The main objective of this system is to collect parking charge from a car without stopping the car. Now a days, especially in our country car owners have to face problems while they want to park their car in hospitals, malls or in any paid car parking. cars have to drive through long line and this line accurse because of the manual system of collecting parking charge, at the time of entrance every car have to stop for taking paper slip from the guards where guards write the entering time which consume lots of time. This problem can be solved by using an automated online payment system. In this system whenever any vehicle approaches the parking gate, then it will check if the vehicle's RFID (Radio-frequency identification) tag is activated or not. If the chip is activated then it will check user's information from the database and deduct balance from the car owner's account automatically. When the tag is inactive or the tag is not found the laser will trigger the camera and the camera will take two photos, one on the rear number plate and another of the back name-plate. Then according to the registered number plate, a mail will be sent to the respective owner for paying the money within certain amount of time to avoid fine. Using this RFID tag, both time consumption is decreased and extra security measures are ensured. In this way, people don't have to stop at the toll gate even if they don't have registered for a RFID tag. Authority can still collect the fee from the unregistered users. This will completely remove any kind of traffic congestion at the entrance gate.

2.0 An overview of the system:

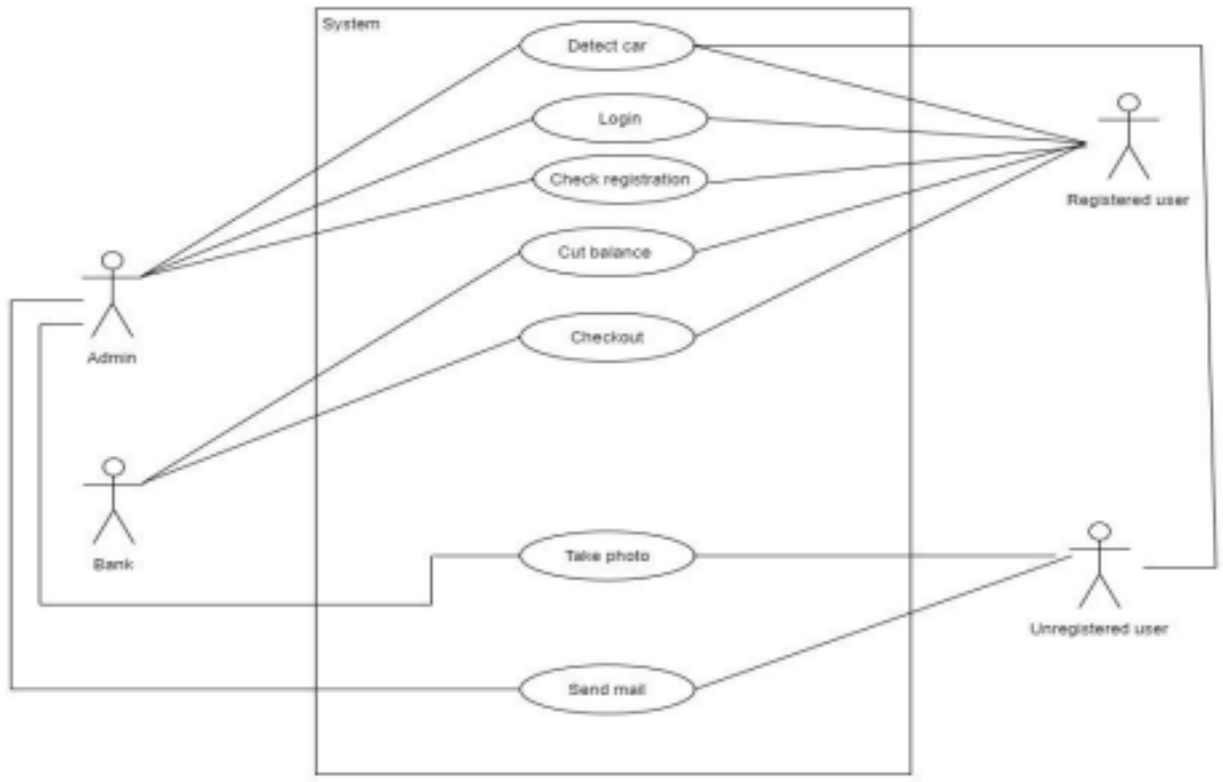

Figure 1: - Use case Diagram

3.0 Justification:

- Cars don't have to stop at the entrance gate
- congestion at the entrance gate will be removed
- Hassle free payment
- Higher security will be ensured
- Less manpower will be needed

4.0 Stakeholder analysis:

4.1 Primary Stakeholder:

4.1.1 Employees
4.1.2 Clients
4.1.3 Users
4.1.4 Hardware suppliers
4.1.5 Bank

4.2 Secondary Stakeholder:

4.2.1 Bangladesh Road Transport Authority
4.2.2 Dhaka Metropolitan Police
4.2.3 General People

4.3 Internal Stakeholder:

4.3.1 Owner
4.3.2 Programmers
4.3.3 employees
4.3.4 investors

4.4 External Stakeholders:

1. Clients
2. Users
3. Hardware suppliers
4. Bank
5. Bangladesh Road Transport Authority
6. Dhaka Metropolitan Police

5.0 Product Vision and Scopes:

It will be completely hassle free and the parking charge fee will be automatically deducted from the user's account. No manpower will be needed to run the automatic parking charge collection system so, there will be no human errors and delay. The congestion and collision of vehicle due to previous manual method will be little to no longer exist. This feature will be very helpful for the registered users.

6.0 Classes for the system:

Here in the Class diagram, There are six classes:

- Admin
- User
- Detector
- Vehicle
- Bank
- Transaction

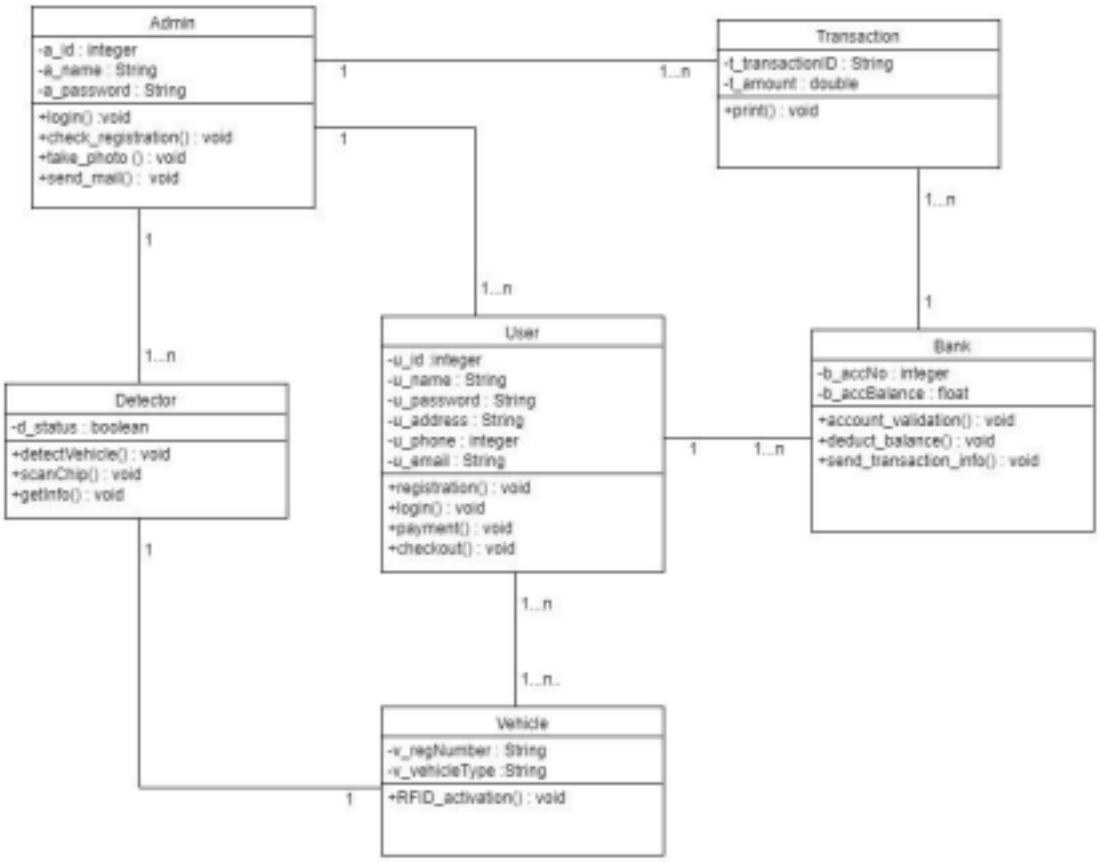

Figure 2: - Class Diagram

7.0 Component/Modules of the system:

7.1 Registration:

This is where the Vehicles will be registered. Users will have to register to our system first when they decide to use our system. Users will have to provide Name, Email-id, Phone number, Vehicle Reg. No and Password to register in the system.

7.2 Scanning:

This component does not have high UI Requirements; it might as well run without any interface at all. This component will receive information from the vehicle using the vehicle's RFID tag. Data is then transferred to the database which aid in the report generation method, and then also used in the payment gateway

7.3 Payment:

There will be three payment methods which users can use. First comes Bank

Account transactions where users will be able to directly transfer from their respective bank accounts.
Second option will be online payment gateways like Bkash, Nagad, Upay and Rocket. Simultaneously users can remove any previously selected payment method. Lastly is the credit/debit card option where users will be able to pay through their cards like Mastercard, Visa or any local bank cards.

7.4 Report Generator:

Since every entrance has to maintain records of the vehicles that pass through them for accounting, and security purposes, Report Generation is an important component. This module provides well compiled reports based on the number of vehicles that pass through the toll gate every day and check-in, check-out time. This is where the toll prices are set according to check-in and check-out time.

7.5 Check History:

By this component users will be able to check their parking history and how much they have paid.

7.6 Report Vehicle Loss:

If suppose a vehicle gets missing or disappears then they could be reported to our system and then authority will take necessary actions required. With this feature vehicles could be tracked and can be returned to the original owner safely.

8.0 Functional Requirement for the system in tabular format:

Functional Requirements:

Req ID	Date	Req Description	Dependencies	Originator	Testing Criteria
AD1	4/12/2022	This system should able to do the login process of Admin	Admin Name, password	Mr. Hossain	Admin successfully login or an error message occurred.
AD2	5/12/2022	Admin must be able to view or update data of registered users.	AD1, User Registration	Ms. Tasnim	successfully Updated or an error message occurred.
AD3	6/12/2022	Admin Should able to check unregistered car information and send email to them.	AD1	Mr. Mahim	Email sent Successfully or an error message occurred.

AD4	6/12/2022	This system should provide reports based on number of vehicles that pass through the toll gate every day and check in, check-out time	AD1, check in, check-out time	Ms. Afrin	Report Generated Successfully or an error message occurred.
U1	6/12/2022	This system should able to do the registration process of Users	Valid Email, Valid Phone Number, Car information	Mr. Hossain	User Registered Successfully or an error message occurred.
U2	7/12/2022	This system should able to do the login process of Admin	U1	Mr. Mahim	Admin successfully login or an error message occurred.
U3	8/12/2022	Users must be able to view the details of the parking area such as the name, worth per minute, number of total available lots.	U1	Mr. Mahim	All the Information will be visible
U4	8/12/2022	Users should be able to pay bill for their service.	U1, payment getaways, Sufficient Balance	Ms. Tasnim	Payment successful or an error message occurred.

U5	12/12/2022	User should be able to check their parking history and how much they have paid	U1	Ms. Afrin	History will be visible.
U6	12/12/2022	User should be able to report vehicle lost	U1, Car information	Ms. Afrin	Lost reported Successfully or an error message occurred.

9.0 Non-Functional Requirements for the system:

9.1 Efficiency Requirement

Persons can pay their vehicle's parking fee in an efficient manner.

9.2 Usability Requirement

The system is designed for a user friendly environment and ease of use.

9.3 Delivery Requirement

The whole system is expected to be delivered in TWELVE months of time with weekly evaluation by the project guide.

9.4 Security Requirement

Unauthorized person cannot access the panel and database, and do not read and write the information.

10.0 System's Requirements:

10.1 RFID chip
10.2 RFID scanner
10.3 CC Camera
10.4 Display Board
10.5 Computer

11.0 Manpower Requirement for implementation:

11.1 Developer Team:

Team Member	Number of Member
Business Analyst	1
Requirement Engineer	2
UX Designer	2
Front-end Developer	3

Back-end Developer	3
Quality Tester	2
Total	13

11.2 Office Employees:

Team Member	Number
CEO	1
Managing Director	1
General Manager	1
Marketing Manager	1
Accounts Executive	1
Receptionist	1
Total	6

Total number of manpower: Developer Team+ Office Employees=13+6=19

12.0 Budget:

12.1 Developer Team:

Team Member	Total Number	Monthly Salary (Per Person)	Total Salary
Business Analyst	1	90,000/-	90,000
Requirement Engineer	2	120,000/-	240,000
UX Designer	2	60,000/-	120,000
Front-end Developer	3	70,000/-	210,000
Back-end Developer	3	100,000/-	300,000
Quality Tester	2	84,000/-	168,000

12.2 Office Employees:

13.0 **Team Member**	**Total Number**	**Monthly Salary (Per Person)**	**Total Salary**
CEO	1	300,000	300,000
Managing Director	1	200,000	200,000
General Manager	1	120,000/-	120,000
Marketing Manager	1	80,000/-	80,000
Accounts Executive	1	80,000/-	80,000
Receptionist	1	20,000/-	20,000

Estimated Monthly Salary for Developers:
= 90,000 + 240,000 + 120,000 + 210,000 + 300,000 + 168,000 = 1,128,000/- The time it will take to finish development is estimated to be around 15 weeks or 3.5 months Estimated Total Salary During Project Development: 1,128,000 X 3.5 = 3,948,000 BDT

Total Salary for office employees (During project development + 8 month of software release): = (300,000 + 200,000, 120,000 + 80,000 + 80,000 +20,000) X 11.5= 9,200,000

So, the total cost of salary during project development is:
(3,948,000 +9,200,000)
=13,148,000

12.3Annual Office Rent and other Cost:

12.3.1 Office Space Rent:

Approximately 100,000 BDT Per Month Total Office Rent (During project development + 8 month of software release):
= 100,000 X 11.5 = 1,150,000

12.3.2 Bills

Average electricity bill for a typical office space is around 40,000 BDT So, Total electricity bill 40,000 X 11.5 = 460,000 BDT

12.3.3 Others:

(During project development 8 month of release)
=100,000

Total: (1,150,000+460,000+100,000) =1710,000

12.4Annual Marketing Cost:

12.4.1 Advertisement:

Package that includes a total of 30 minutes advertisement 3,00,000/-

12.4.2 Social Media Sponsored Post:

Facebook/Instagram sponsored post cost per month 25,000/-
Sponsored post cost in 8 month = 25,000 X 8 = 200,000/-

Total: (3,00,000+200,000) =500,000

Grand total: (13,148,000+1710,000+500,000) =15,358,000 BDT

13 Constraints of this documents:

13.1 The budget estimation may not accurate
13.2 Some requirements may be missing
13.3 The number of estimated codes may vary

14.0 Conclusion:

As our country is making progress and getting closer to being a developed country, the activity and number of vehicles on the road have increased significantly in the last two decades. If the Manual parking charge Collection system is replaced with our Automated parking charge Collection system, people will get to know the benefits of it as it will save a lot of valuable time. People in Bangladesh spend a big amount of time in queues when giving parking fees. But in our system the registered user's RFID will be scanned automatically after detecting the vehicle with a laser sensor. It will be completely hassle free and the charge will be automatically deducted from the user's account.