GTU Department of Computer Engineering

CSE 222/505 - Spring 2022

Project Proposal – Group 12

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PROBLEM DEFINITION

Bridge crossings constitute an important part of highway transportation. In fact, more than half a million cars pass through some bridges daily. Therefore, the access system on bridges must be complete and error-free. However, the excess of vehicle passage, the security risks arising from the excessive speed of the vehicles, the deficiencies in the vehicle tracking system are some of the problems of the bridge automation system.

Our goal is to ensure the passage of vehicles in the most efficient way and to solve the above-mentioned problems in the most rational way.

In the bridge automation system, there are users, ticket controllers, officer, and admin. Each user has some characteristics: a balance, vehicles etc. User's vehicles also have some characteristics: owner, in blacklist (can be stolen) etc. We aim to increase the security and quality of access by controlling this information. We have manual passes for our unregistered vehicles that are not in our database. Ticket controllers control these passes. We also have a speed control mechanism to prevent excessive speed. This system provides a deterrent by notifying the police about speeding violations according to the vehicle's entry time and exit time.

By using this system, we aim to provide an uninterrupted, secure bridge crossing experience where waiting is minimized.

USERS OF THE SYSTEM

Administrator manages the system by

+ adding, removing, and updating by vehicle, officer, ticket controller

+ can track passing summary

+ can display total revenue

User use the automation system by

+ adding, removing and updating by vehicle

+ can display own balance

+ can add money to own account

+ show own penalties

+ pay own penalties

Toll Clerk check manual passes by

+ controlling manual passes check in-out

+ can query passing summary

+ can query total revenue

Officer can

+ send penalties and warnings

+ remove penalties

+ show passing summary

+ edit blacklist

+ display vehicle information

REQUIREMENTS IN DETAILS

FUNCTIONAL REQUIREMENTS :

- Users should be able to check their balance.
- Users should be able to add money to their balance.
- Users should be able to check their penalties and warnings.

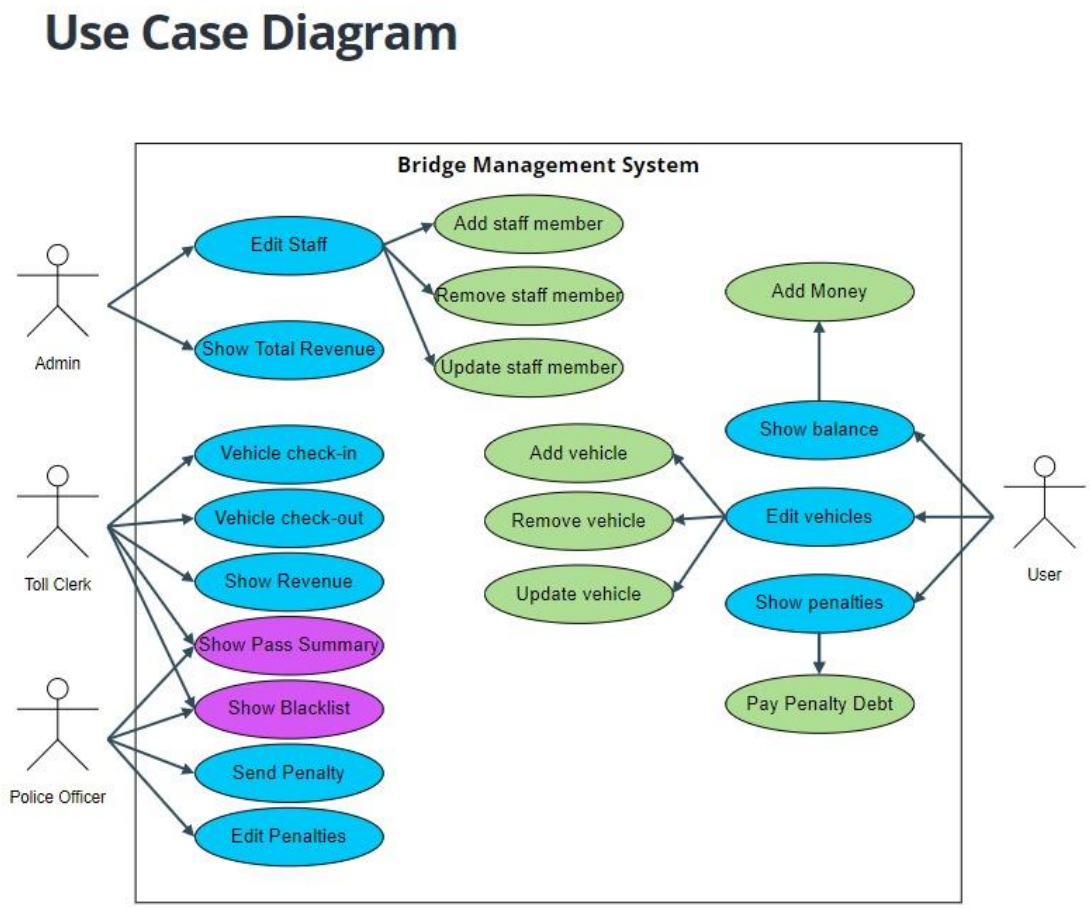
- Users should be able to pay their penalty debts.
- Users should be able to view their passing history.
- Users should be able to add / delete / update vehicles.
- Toll Clerk should be able to check-in / check-out vehicles. (manually)
- Toll Clerk should be able to check the blacklist.
- Toll Clerk should be able to view the passing summary.
- Toll Clerk should be able to view the total revenue.
- Officer should be able to send / remove penalties and warnings.
- Officer should be able to update the blacklist.
- Officer should be able to view the vehicle information.
- Officer should be able to view the passing summary.
- Admin should be able to add / remove / update users.
- Admin should be able to add / remove / update toll clerks.
- Admin should be able to add / remove / update officers.
- Admin should be able to view the passing summary and total revenue.
- All users in the system should be able to log in/log out to/from the system.
- All users in the system should be able to update their password.

NON-FUNCTIONAL REQUIREMENTS :

- The system should work on any hardware.
- The system should have a simple user interface and perform user's request quickly and accurately.
- No one sees vehicle and user information except officer, toll clerk and admin in terms of security.
- Registration of a new user into the system must require a confirmation of personal information. (identity number, phone number etc.)
- Vehicle license should be required for adding new vehicles to the system.
- User's personal information should be secured should not fall in the wrong hand for any misuse.

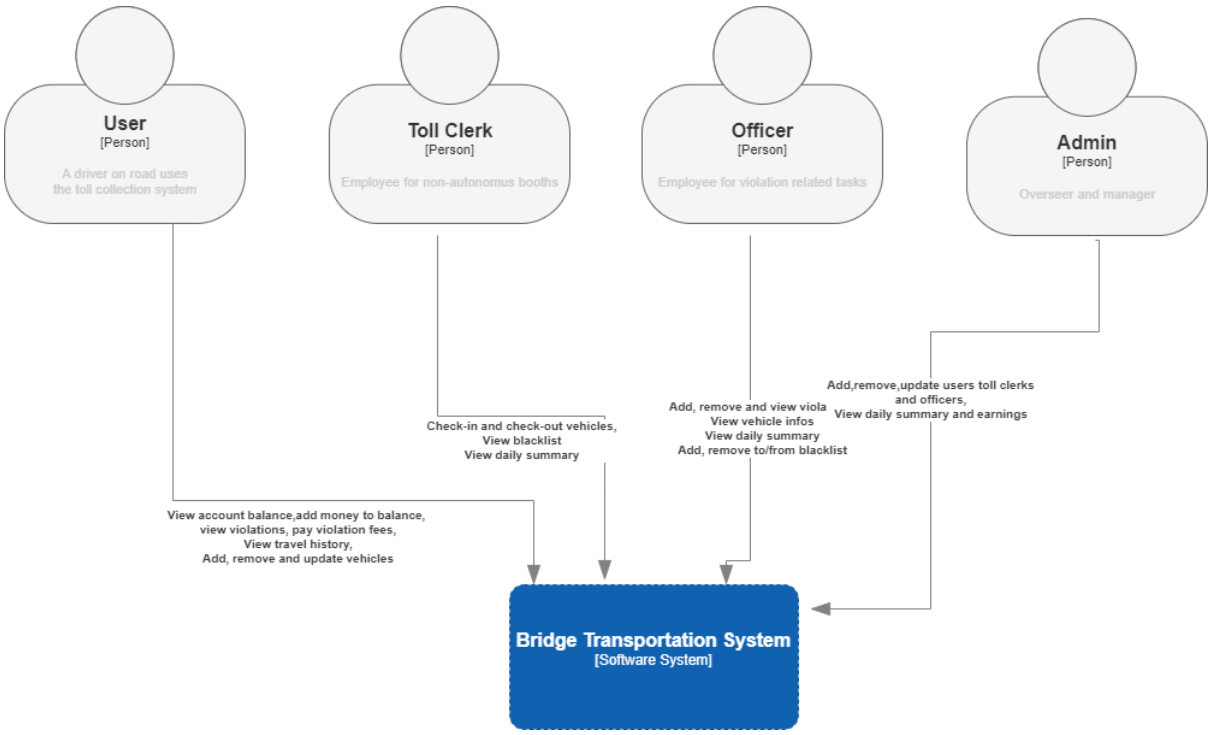
- The login system should be secured and cannot be breached. For this the developer will use some strong encryption system.
- The penalty should be implemented accurately so that even the authorities cannot misuse the system to penalize someone willingly.
- Admin can restrict the usage of bridge for maintenance or any unfortunate incident. So user can have an idea about the traffics beforehand.

USE-CASE DIAGRAMS



THE C4 MODEL OF THE SYSTEM *only the first two levels

Level 1



Level 2