Parking Assignment Problem

Software Engineering Lab - Implementation Report 2

Build 2

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Basic Information

The Requirements for our software did not vary much. Changes only took place in the design of the project (Class structure, Dataflow). No new functional requirements were added and non-functional requirements were fulfilled in their entirety.

This build mainly consists of improvements from the previous build. Some functional requirements were deprioritized and integral requirements like Network error handling and communication, Algorithm efficiency and effectiveness, were prioritized.

While some functional requirements were not implemented, the system is functioning. The number plate detection model has been trained to a very high accuracy and has an error rate of less than 2%. This module was highly prioritized because of its importance in the system. If the number plate detection fails, the entire software is rendered useless.

The console and the SOU simulation apps are android based application that use android's networking permissions to communicate with our desktop "server". The devices communicate using the TCP/IP stack. Redundant checks have also been implemented to prevent discrepancies and errors.

New Functional Requirements - Implemented

Following are the functional requirements that were newly implemented. Refer to the SRS document for more details on the functional requirements.

FR-ID	NAME	TYPE	DESCRIPTION
1.6	Return ideal Slot	Pending	Returns the optimal slot calculated by the main java application back to the console application.
3.1	Login	Pending	Provides administrator to create an account as well log in to the system as and when it is required.

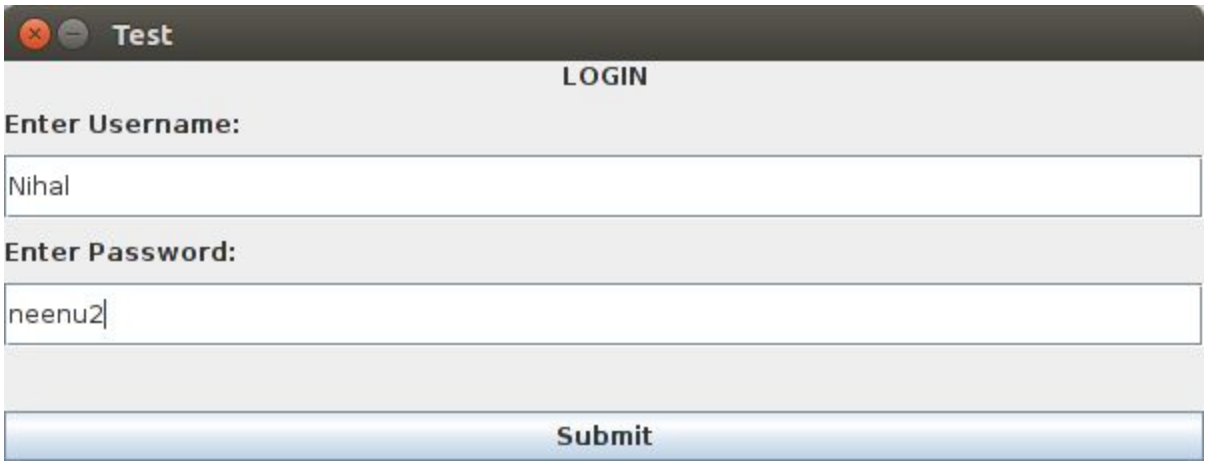
Functional Requirements - Not Implemented

Following are the functional requirements that were not implemented. Refer to the SRS document for more details on the functional requirements.

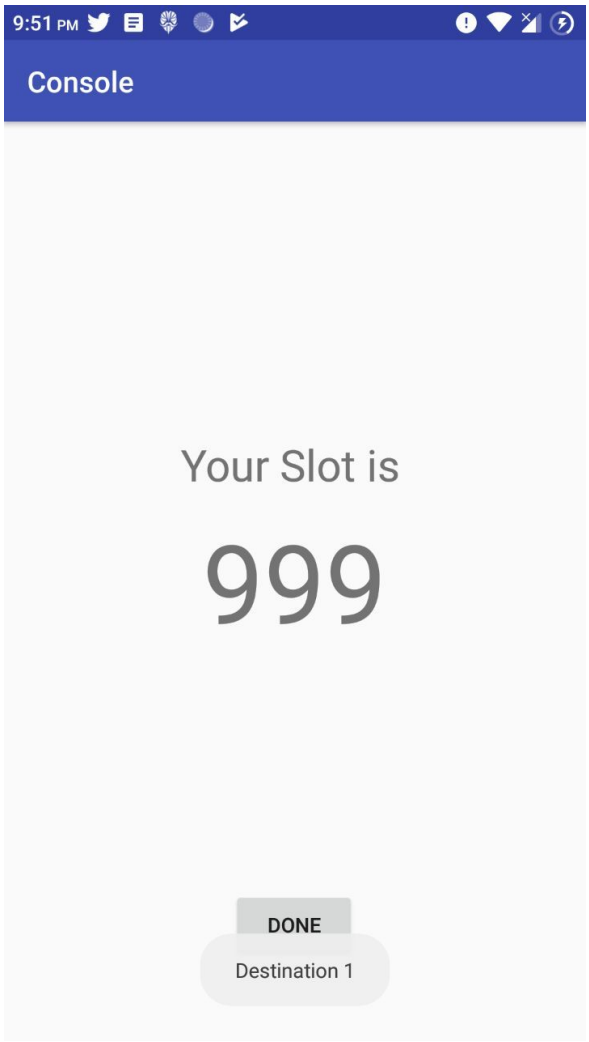
FR-ID	NAME	DESCRIPTION	REASONS FOR NOT IMPLEMENTING IT
3.4	Display Statistics	Displays the statistics of the parking layout like error rate of the sou, daily car intake, peak times etc	Big enough dataset not available for showing the functionality leading to it's deprioritization.
3.3	Display broken SOUs	Displays the SOUs that are acting erratically.	Has a more hardware perspective than a software perspective resulting in its deprioritization.
2.2	Resolve Offenses	To resolve offenses committed by drivers as a result of illegal parking or due to errors in the number plate detection.	The number plate detection model has been trained to a very high accuracy. The SOUs are never wrong.
2.3	Display Offenses	To display the list of offenses committed by drivers as a result of illegal parking or due to errors in the number plate detection.	The number plate detection model has been trained to a very high accuracy. The SOUs are never wrong.

Screenshots of Functional Requirements

1. FR 1.6



2. FR 3.1



Non Functional Requirements - Considered

Following are the nonfunctional requirements that were considered. Refer to the SRS document for more details on the non functional requirements.

NFR-ID	NAME	DESCRIPTION
1	Fastness of Slot Assignment	The Response TIme of a slot assignment. It doesn't go above 2s for each assignment.
2	Usage of Console	The destination list will be clearly displayed and will be clearly grasped by the driver.
3	Usage of manage Layout Feature	The different managing options will be evident, simple and easy to understand
4	System reliability	The reliability that the system always assigns the best possible slot.
5	Identifier Reliability	The error rate of the Identifier should be minimum, that is, the ratio of number of wrong number plates recognized to the total number of plates recognized.
6	Network Connection	The Identifier, PAS, Consoles, Guard Application and SOUs should be connected to the same network.
7	Administrator Login Security	If an administrator tries to log in to the web portal with a non-existing account then the admin should not be logged in. The admin should be notified about log-in failure.
8	Communication Security	The messages should be encrypted for log-in communications, so others cannot get user-name and password.

Summary of Test Plan

- The integrity of all implemented functional requirements would need to be verified and validated. Unit testing will be applied wherever possible (using JUnit or manual testing). Functional testing for module outputs needs to be done extensive to ensure consistency.
- Since, the software is entirely Java based, JUnit would be the go-to testing tool for automated testing. The number plate detection model has already been tested extensively using a validation dataset to ensure its consistency and accuracy.

Summary

The build 2 for the software has been successfully created. The login functionality and optimal slot return functionality have been incorporated successfully.The SOU and console app are properly functioning, meeting all requirements. The main java application is made in such that it shows proof of concept. The testing plan has been outlined too in the report. The non functional requirements that have been met have also been mentioned in this report.