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CLup - Customer Line-up

RASD
Requirement Analysis and Specification Document

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Todo list

Contents

1 Introduction

General introduction. Text.
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General introduction. Text.

This is a todo

This is a warning

This is a request

This is an info

1.1 Purpose

This document is the Requirement Analysis and Specification Document for the Customers Line-Up system. The purpose of this document is to describe the system focusing on scenarios, use cases, requirements and specifications, analyzing what the software will do, how it will be used and the constraints under which it will operate. This document is intended both for users and developers.

1.2 Scope

here we include an analysis of the world and of the shared phenomena

Customers Line-Up (CLup) is a tool that allows supermarket managers to regulate the influx of people inside physical stores and aims reduce the time spent by customers waiting in line, especially in emergency lockdown scenarios. The system allows users to This tool reaches the goal by offering a number of functionalities, including:

revise/add more

- access to the service via mobile app or website
- physical alternatives for people that do not have Internet access
- monitor the amount of people in a store
- book a visit, notifying customers of any change in the schedule
- suggest alternate stores and/or time frames
- track the time spent by customers to estimate waiting times

1.2.1 Current System

While there are already existing similar services, they are usually indipendent from store chains and therefore have limited functionalities. CLup is a service that supermarket chains can implement alongside their existing services. The system is as indipendent as possible from existing infrastructures, and it can be used with minimal setup.

1.2.2 Goals

[G1] Allow a User to sign up for an Account after providing a mobile phone number.

[G2] Allow a User to book a visit to a specific store.

(a) Allow a User to book a visit via Mobile App.
(b) Allow a User to book a visit via Website.
(c) Allow a User to book a visit in a specified time.
(d) Allow a User to book a visit as soon as possible.

[G3] Allow a User to find Stores nearby their current location.

[G4] Allow a User to find Stores nearby a specified location.

[G5] Allow a User to preview an estimate of the queue time.

[G6] Allow a User to cancel their reservation.

[G7] Allow a User to retrieve a scannable QR Code/Barcode that they must present in order to be granted access to a store.

[G8] Allow a User without Internet access to retrive a ticket from a physical location that counts as a reservation for a certain time.

[G9] Allow a User to book for someone else.

[G10] Allow a User to link their Account to the Store Loyalty Program.

(a) Users do not have an Account cannot are not entitled to this feature.

[G11] The System notifies the Users affected by delay.

[G12] The System shall postpone Users visits in case of a delay.

[G13] The System shall not anticipate User visits when a User delete their reservation.

Are we sure about this?

[G14] The System must enforce the limits on the allowed number of concurrent Customers inside a store.

(a) There can be less Customers than the limit.

(b) There cannot be more Customers than the limit.

(c) The queue is updated each time a Customer exits or enters the store.

[G15] The System shall not admit Users that arrive earlier, even if the current number of Customers isn't maximum.

[G16] The System shall grant a User access only after the User's time of reservation.

[G17] The System shall invalidate a User's reservation if they do not show up during a certain time interval.

[G18] The System shall reserve a certain number of the allowed quote of customers for a special category of Users.

(a) The system shall grant access to Users without a reservation that show up at the store and are pregnant women, elderly or with disabilities.

[G19] Allow System Managers to set a limit to the people allowed into the store at a time.

[G20] Allow System Managers to not provide the physical ticket option.

[G21] Allow System Managers to enable the link Account to Loyalty Program feature.

1.3 Definitions, Acronyms, Abbreviations

1.3.1 Definitions

- *Customer* (also *User* or *Visitor*): A person that intends to shop at a store.
- *Registered User*: A User that has registered an Account withing the System.
- *System Manager*: A stakeholder (owner, employee, manager etc.) of the Store chain that can tweak the parameters of the System and access informations and statistics.
- *Account*: A reference to a specific User in the System, that allows to track the User across multiple visits.
- *Reservation* (or *Booking*): Arrangement made between a User and the System in which the System shall grant the User access to Store at the arranged time.
- *Visit*: The time frame in which the User enters the store, shops and exits.
- *Time slot*: The time at which a Customer with a Reservation is expected arrive at the store.
- *Store*: Any physical location (e.g.: building) where it is possible to utilize the System.

1.3.2 Acronyms

- RASD: Requirement Analysis and Specification Document.
- API: Application Programming Interface
- CLup: Customer Line-up
- REST: REpresentational State Transfer

1.3.3 Abbreviations

- [Gn]: n-goal.
- [Dn]: n-domain assumption.
- [Rn]: n-functional requirement.

1.4 Revision History

1.5 Reference History

- Problem Specification Document: “Assignment AY 2020-21.pdf”
- https://standards.ieee.org/standard/29148-2018.html

Should we upload it?

1.6 Document Structure

2 Overall Description

2.1 Product Perspective

here we include scenarios and further details on the shared phenomena and a domain model (class diagrams and state charts)

Customers Line-Up is developed for both shop managers and customers. The intent is to provide functionalities adding value to the interactions between the two. Managers have access to a website that will help them to avoid large crowds inside and outside their stores, providing them with useful analytics. Customers may avoid queues by booking visits to stores via website or mobile application, and will be guided in selectiong the best place and time. Customers must register an account in order to utilize the website or the mobile app. Customers who do not possess an Internet-connected device may still utilize the service via physical totems outside the stores.

The system will be developed from scratch, giving great flexibility and scalability. The privacy of the customers will be guaranteed according to the latest privacy related norms.

2.1.1 Scenarios

A. **Customer with the mobile app arrives in time**
Ian wants to buy groceries to make a cake. Ian uses CLup to get a ticket for the supermarket with the shortest queue in his area. The app provides Ian with an estimate on the travel time (by car or by foot) and the time of the reserved slot. Ian arrives at the supermarket in the correct time slot, scans a code generated by the app and is granted access the store. Once he pays for his groceries he scans again his code, so that he can increase the loyalty points associated with his store chain account.

B. **Customer with no knowledge on the booking system**
Pino is an elderly man. Pino knows nothing about Smartphones or Computers. Pino needs to buy a cake for his nephew's birthday party, so he decides to go to the local supermarket. When he arrives, he notices that the doors of the supermarket aren't opening. He reads the sign pointing him to a totem. As soon as he approaches the machine, the machine activates itself an starts speaking with a reassuring voice. The machine allows Pino to book a reservation to enter the store and instructs Pino on how to do so. As soon as the time is up, Pino places his ticket onto the reader beside the door of the store, and he is granted access.

C. **Customer cancels the reservation**
Luigi, after booking a visit to the store, remembers that he had a visit to the dentist at the same time. Since Luigi cares about others, he cancels his reservation, freeing up a time slot to be used by other customers.

D. **Customer is unable to provide their code**
Andrea books visit and reaches the store in time, but has forgot to charge his phone, which turns off as he pulls it out of his pocket in order to scan his code. Andrea goes at the totem, makes a new reservation, and receives a new code and a new time slot.

2.2 Product Functions

fare dettagliato e numerare

The functions of Customer Line-Up can be clearly divided in two categories, based on the type of the stakeholder that is being addressed.

2.2.1 Manager functions

The manager is the owner of the store or store chain that is using the system. The functions targeted at the manager regard the management of the queue and the knowledge of statistics about the behavior of the clients. The system will let managers select the type of commercial exercise (whether single store or chain), manage independently every physical store, select the number of slots dedicated to reservation and the ones dedicated to a classical queue, as well as to create a high priority queue for special categories of people. At the same time the system will provide info about the number of people who are currently in a store, how the number of people changes over time and the average visit length.

2.2.2 Customer functions

The customer is the person who visits a store. The functions targeted at the customer regard the possibility of skipping queues. The system will let people book visits at specific time slots or queue up at the moment. If the user is in the queue, they will be updated live with their estimated time of

entrance in the store. If the user has booked a visit, they will be notified immediately if the system realizes that their visit has become unfeasable and automatically assign a new time or, in the worst case, cancel completely the visit. The system will offer the possibility of creating an account and of logging in. Users using their personal accounts will be able to check their past history.

2.3 User Characteristics

Customers Line-Up is mainly aimed at essential and widely used services. Because of this its audience will be wide and diversified, and the system will be easy to use and accessible in several of ways, accounting in particular for people with disabilities or people who are not familiar with technology. On one side of the system there is the system manager (single or multiple), who will monitor how the system is used and obtain useful information. They are usually already familiar with othe customer relationship managers and already know what to expext from a control panel. On the other side there is the customer, who uses the system in order to avoid boring lines and to prevent contact with others. The main categories of customer are:

- **Tech-friendly**
  People who are familiar with modern technologies. They find it easy to navigate the menus of a complex application. They are able to use the system in an autonomous way and are the ones who will benefit the most from the more complex and advanced features.
- **Tech-unfriendly**
  People who are not familiar with modern technologies. They have problems navigating complex application, and are more accustomed to talking to humans. They might need aid using the system or misuse the system. They benefit from a system designed around clarity and simplicity, or from different, easier ways of using the system. This category includes people with disabilities.

The objective of Customers Line-Up is to be as inclusive as possible, providing utilities targeted at all possible users.

2.4 Assumptions, Dependencies, and Constraints

here we include domain assumptions

[D1] The number of people in a store cannot go over a certain fixed amount

[D2] If an user enters the store they will exit the store before it closes

[D3] The system reliably counts the number of people entering and exiting the store

Dobbiamo mettere che ci sono i tornelli o c'è una persona

[D4] The time of real operation of the store corresponds with the one registered in the system

[D5] A customer cannot enter the store without using the system

[D6] External software dependencies the system relies on always provide true data and never fail

3 Specific Requirements

Here we include more details on all aspects in Section 2 if they can be useful for the development team.

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.2 Hardware Interfaces

3.1.3 Software Interfaces

3.1.4 Communication Interfaces

3.2 Functional Requirements

Definition of use case diagrams, use cases and associated sequence/activity diagrams, and mapping on requirements

3.3 Performance Requirements

3.4 Design Constraints

3.4.1 Standards Compliance

3.4.2 Hardware Limitations

3.4.3 Any Other Constraint

3.5 Software System Attributes

3.5.1 Reliability

3.5.2 Availability

3.5.3 Security

3.5.4 Maintainability

3.5.5 Portability