Bilkent University

Department of Computer Engineering

Senior Design Project

whotello: time to interact with your hotel

Project Specification Report

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Contents

1. Introduction

The number of hotel users around the globe is quite large, surpassing the benchmark of 15.5 million rooms available for active usage scattered around the globe [1]. However, despite the fact that hotel service exists from 705, even nowadays using hotel services sometimes becomes challenging for both the guests and the administrators [2]. Reserving restaurants, chaise longues, requesting the cleaning or food, learning answers to frequently asked questions and even managing the room temperature for guests; managing the personnel, user preferences, food habits, overall hotel statistics for administrators may present itself a bit difficult due to the human factor in all of the processes and all of them may be optimized for the both groups benefits.

Our system is designed in a way to tackle and solve all of those problems, making the guest experience at the hotel as effortless and pleasant as possible and at the same time easing and simplifying the managing process for the administrators, giving the latter undesired benefits such as specified statistics and data for the further improvement of the hotel service - and all of this is automated, removing the human factor.

1.1. Description

Whotello system consists of two main parts - hotel guest application and administration website. Both parts are connected to each other, even though it is invisible to their related users.

The guest application is just an ordinary cross-platform application that the users will be able to download from Google/App Store and use once they are assigned a certain room at the hotel. As the guests get their room cards, hotel staff is also gonna provide the user with a scannable QR code, which is connected to a specified room. If the group of guests is going to stay in one room, the person who got connected to the room first can share newly generated codes to the room with the rest of the group, in order for them all to be connected. Once setup is ready, the users can experience their application to the fullest, as all the functionality related to the room and hotel is now enabled in the application. Guests can both control their room through the app and also manage the hotel facilities. Control of the room includes managing the air conditioners, television, lights and also the heating system if the latter is available. They can be controlled both from the inside and outside the room. These features will enable guests to change the room temperature before entering the room if they want to, turn off the lights/TV/AC if they forgot to and many

more, depending on the guest preferences: full control of the equipment is at user's disposal. Also, guests can request the cleaning of the room, food being brought to the room and medical personnel in case of an emergency. Hotel facilities, on the other hand, is a functionality that allows guests to interact with their "hotel experience": guests can view all the events, brochures online; view the food menu for every restaurant for any time of day; reserve seats at the available restaurants; reserve places at the beach - chaise longues, to name but a few; get 24/7 help from the chatbot, which will be able to answer most of the guest questions and provide the guests with all the needed number and information about the hotel they are staying in. Chatbot that is going interact with users will also provide answers to most frequently asked questions by guests by combining keyword analysis of a pool of previous conversations and machine learning technique of clustering which will alleviate the workload of hotel administration. In case of unsatisfactory response, guests will be able to communicate with the administration directly.

The administration website is responsible for managing the all user's requests coming from the application, that are specified above, as well as collecting the statistics on the guests' choices, suggesting the administration what is most used/popular among guests and what is, on the contrary, can be removed or updated. Also, the administration account corresponding to the specified hotel is responsible for creating the QR codes that are going to be provided to the hotel guests. In order to create an administrator account corresponding to the hotel, the hotel must send the request to the website, and if the hotel is legal and is suitable for hosting guests, the hotel administration will receive an encrypted key that will allow them to go to the registration page and create their account. Administration can also choose which functionality does their hotel provide and which is not provided.

Together, the two parts - website and the application are merged into a full working system that is going to bring comfort and coziness into the lives of the hotel administration and hotel guests.

1.2. Constraints

1.2.1 Technical Constraints

- Depending on user type our system will have mobile and web-based implementations. While administrators will use the web-based system, guests will be provided with the mobile environment.

1.2.2 Social Constraints

- Service will provide social interactions between guests, bots and facility staff.
- Guests will be able to send anonymous feedback to improve the service of the facilities registered in the system.

- Credentials of the guests will not be stored.
- A minimal amount of facility data will be stored in order to provide customer support.

1.2.3 Implementation Constraints

- React framework will be used to implement the frontend of a web application for administrators of the registered facilities [3].
- React Native will be used to develop cross-platform mobile applications for IOS and Android devices [4].
- Git and GitHub will be used for version control and collaborative work respectively.
- MySQL database will be used to store facility data.
- Firebase Real-time Database will be used to provide interaction between guests and facility staff.
- Python SciPy toolkit will be used in order to implement the main features related to chatbot [5].
- IBM Cloudant will be used to store real-time IoT data [6].
- RapidAPI will be used in order to implement QR code-related features.

1.2.4 Sustainability Constraints

- The system will be constantly updated to reflect user feedbacks and requested services by guests.
- API integration will be adapted to changes in used APIs.

1.2.5 Economic Constraints

- Amazon Web Services will be used for hosting the server of the project. Prices will be taken into account [7].
- Since the Firebase Database provides a limited amount of storage for free, prices will need to be taken into consideration as the size of the data to be stored increases.[8]
- Pricing for IBM Cloudant and RapidAPI will need to be taken into consideration.[9,10]
- Use of open source frameworks and libraries will be free of charge.

1.2.6 Security Constraints

- The system will not store user data to protect privacy.
- Shareable string codes and QR codes will be globally unique to the whole system. Each QR code is going to be scanned only once.
- All kinds of codes in the system will be deactivated after the expiration

date set by the facility administrator.
- In case of failed attempt to gain access to IoT devices of the particular facility, the device that had been used to gain access will be locked out and facility staff will be notified.
- Connections to the website will be protected with TLS certificate.

1.2.7 Language Constraints

- The user interface for the product will be in English since it is considered to be a global language.
- Depending on the size and locational majority of the user base new languages may be added in the feature.

1.3. Professional and Ethical Issues

1.3.1 Professional Issues

- We will implement our system in a way that is robustly and usably secure [11].
- We will do comprehensive testing and thorough analysis of risks related to the implementation [11].

1.3.2 Ethical Issues

- We acknowledge that all people are stakeholders of this project and our aim in working this project is to contribute to society [11].
- We will not store or share any user data without permission [11].
- We will be honest with our users about the limitations and capabilities of the system that we are going to implement [11].
- We will respect ideas, inventions and creative works of others [11].

2. Requirements

2.1 Functional Requirements

There will be two types of users: Guests and Administration.

- Guests will be able to use an app by reading the QR Code given to them by the administration.
- Guests will be able to specify other guests by sharing special code so that people with whom he/she stays in the same room will be able to use an app.
- Guests will be able to manage air conditioners, television, lights in their rooms.

- Guests will be able to view the hotel brochure.
- Guests will be able to view the menus of the restaurants in the hotel.
- Guests will be able to view information about upcoming events and activities in the hotel.
- Guests will be able to reserve a table at a restaurant, chaise longues at the beach.
- Guests will be able to request room cleaning, food, and drink to their room.
- Guests will be able to book slots for facilities of registered property.
- Guests will be able to request medical personnel to the room.
- Guests will be able to get 24/7 help from the chatbot.
- Guests will be able to post comments/feedbacks.
- The administration should be able to provide Guests with the QR Code generated using the website developed for Administration.
- The administration will be able to view requests done by guests.
- The administration will be able to manage requests done by guests.
- The administration will be able to supply menu information.
- The administration will be able to supply activities and events information.
- The administration will be able to view all the reservations done by Guests.
- The administration will be able to view the statistics on the Guests' choices.
- The administration will be able to view Guests' reviews.

2.2. Non-functional Requirements

Usability:

- The system will be implemented in English.
- Both website and application will have a user-friendly interface, pleasing to the eye and easy to use.
- To maximize user domain, IOS and Android versions of the application will be developed.

Privacy:

- To protect privacy, the system will not store user data.

Response Time/Performance:

- The system will have to provide fast and accurate interactions between guests, bots and facility staff.
- Managing TV/AC/Lights should not take more than 2 seconds.
- The system should be able to handle requests from several users at the same time.
- The system should be well functioning 24/7.

Maintainability:

- The system will be developed in a way to be flexible to changes in the future.

3. References

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