Northumbria University
NEWCASTLE

KV6003: Individual Computing Project

Project Terms of Reference

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Computer Science with Web Development

Table Reservation System for a Restaurant

General Computing Project

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CONTENTS

BACKGROUND

Since the COVID-19 pandemic, it has become a necessity to reserve tables at restaurants to avoid queues and prevent congestion from customer walk-ins due to the new government health guidelines. It is also useful for restaurant owners to minimize queues from walk-ins so that the customers don't have to wait long to be seated and in turn be disappointed. A table reservation system can help tackle these problems by allowing the user to reserve a table for a specific timeslot. The table will then become available again for another user once the allotted time has occurred. With the data collected from the table bookings, the restaurant owner can also see when his restaurant is most popular on a seasonal, weekly, and daily basis. On top of this, the user will have the ability to create and account and opt-in for special offers from the restaurant. This data can be very important in a customer relationship context, as they can promote their brand on popular trends with special offers etc. It is important for the restaurant to try and build a customer relationship, as it is a sure-fire way to boost sales.

A client has reached out to me to design a system that allows the user to book a table at their restaurant based on such perimeters as date, time, and table size. They have requested that the reservation system is to be integrated into a website that promotes their restaurant, with a booking page that takes the user directly to the table booking form. Being able to view the table layout visually would also be a bonus, so that they can choose exactly where they want to sit inside the restaurant. The client has requested an interface for him as the admin, so they can view all the bookings that are submitted on a daily and monthly basis. The admin page can also display analytics for the data collected from the reservation system; so that they can see extent of when most bookings occur and on what days. The user can also create an account when reserving a table at the restaurant. With the account, the user can build up loyalty points with every successful booking they have at the restaurant. This is great for both the restaurant owner and the user, as the user gets a discount, and the owner gets invaluable data and a returning customer.

There are two different literature focuses for my project. The first aspect is the actual functionality of the booking system - how you can integrate user-centered design and HCI principles to make it as fluid and easy to use as possible. I also want to look at literature regarding existing booking systems and the best way to go about creating one. This will involve looking at existing reservation system reports and seeing what I can use in my own design. The other is the CRM aspect, in which a business should integrate it to identify and understand the need of customers. Both components complement each other as the user data gained from the booking system can be used as the basis of the CRM system.

The idea of the project was first created from the need of my client. They are a new restaurant owner with the need of a booking system so that they can fill up the tables at their restaurant without the need of people contacting him directly. The CRM aspect was something I proposed to them after they contacted me with their request. I feel like the idea of a CRM system is interesting and a great strategy to boost his overall sales; the world is becoming entirely digital now since the Millennial era and CRM is a great way to target users in the digital world to gain and retain customers. It has been shown that when a customer has a positive attitude towards a brand, they will continue to purchase from them. Although obvious, this is something I want to try and implement into my own design. I will do this with a loyalty system and by making the overall product as fluid and user friendly as possible.

PROPOSED WORK

There are three different parts to the project that need to be carried out. The first part is the front-end of the web application. This is going to use HTML, CSS and JavaScript to display the client-side booking system that the user will see and use to input their data. The front-end will also include an admin dashboard area. The second part is the back-end database which takes the information from the booking form and inputs it into a database. The last part is going to be the CRM system, and how it can use the user data generated from the database for things such as special offers and a loyalty system.

The front-end web application will initially display a home page, and then there will be a button for the user to click on to navigate to the booking form. The booking form will then display a calendar plugin created with JavaScript, asking the user to input a date and time, and then displaying all the available tables on that specific slot with a visual representation of the table layout. Once they have chosen a slot, they will be asked if they want to create an account or use guest credentials. The front-end aspect will also involve creating a dashboard for the restaurant owner (admin) to see all the confirmed booking reservations for the month. From this dashboard, they will also be able to control different settings and booking restrictions such as cancelling specific days for bookings due to holidays or other reasons. They can also cancel existing booking reservations and set specific tables as unavailable for certain days.

The back end of the system is going to use a MySQL database integrated with PHP. When the user inputs their data on the client-side, the information will be inputted into the database. The information from the database will then be used and displayed in the admin dashboard. The backend is essentially all the data that will be displayed on the front-end. It will hold all the data regarding the booking slots and user details. For example, once the user confirms their table reservation, every bit of information will be stored in the database for that specific person, and the email address they inputted can be used to send them a booking confirmation to their slot.

The final part is the CRM system, and this will use the data in the database as means to increase customer relationship with the restaurant. One part of this is using the email data that the user can opt-in to when they book a slot and sending them special offers on specific dates that they usually attend the restaurant. Another part of this is integrating a loyalty system for the user. Each time they successfully book a slot at the restaurant, they can gain loyalty points which eventually builds up to a discount.

To carry out all the above, I will need to investigate how existing table reservation systems are made using a literature review. My literature review will need to cover all the different aspects of the web application: the booking system, the calendar plugin, how a CRM system is implemented and privacy and data protection. Learning about all these things in a literature review will help me develop my own version by bringing all the things I've learnt together.

AIMS

- To investigate how a table reservation system is created and how the data can be used in Customer Relationship Management.
- To build a web application for a pizza restaurant that integrates a table reservation system and a CRM for the restaurant owner.

OBJECTIVES

1. Create a literature and technology review:
    - Look at existing booking/reservation systems and identify their good and bad features. Take ideas that could be implemented in my own design.
    - Examine existing plugins used for calendars which can be integrated in the reservation system.
    - Find existing CRM systems used in restaurants and find ways I can use user data created from the reservation system.
    - Find academic articles on CRM system and table reservation systems.
    - UCD design for restaurant website and booking systems.
    - Look at privacy and data protection issues regarding storing user data.
2. Establish and prioritize the requirements of the product:
    - Find out client's requirements
    - Create storyboard and initial vision of the application
    - Find target audience(s)
    - Persona(s) and Scenarios
    - User requirements document
3. Create designs for the web application:
    - Initial design storyboard and wireframes.
    - Low & High-fidelity prototypes
    - Use case diagrams
    - Class diagrams
    - Entity Relationship diagrams
4. Create the product based on the design specification.
5. Test the product:
    - Functional testing
    - Usability testing (Users and admin)
6. Make changes to the application based on the testing process.
7. Evaluate the product.
8. Evaluate the processes and my own performance

SKILLS

I am currently undergoing my degree with a focus on web development, so I have decided to focus my project on a system integrated into a web application. The web modules I have undertook during my time at Northumbria University are going to play a major role in how I create my project. The following modules: Web Programming and Web Technologies, both have extensive content that I can take from. Another module that will be extremely useful is Human Computer Interaction. This module will be useful in the Research & Planning and the design aspect of the system.

For the front-end part of my project, I will need to enhance my knowledge on React so that I can create the client-side booking system and calendar. I am already familiar with CSS and HTML so creating the overall website shouldn't be too hard, but I will need to expand my knowledge on Bootstrap to make the website more cohesive and responsive.

For the back end, I am still new to implementing databases and using PHP to integrate web applications. I will need to study more in-depth both things to successfully complete my project. The Web Application Integration module I'm learning during this semester will come in handy with this.

Finally, I am completely new to the concept of a CRM system. I will enhance my knowledge through the literature review and learn how to use the data gained from the booking system to develop a CRM system for the restaurant owner.

SOURCES OF INFORMATION

SFENRIANTO, LORIO PURNOMO. "View of Customer Relationship Management (CRM) Analysis and Design to Provide Customer Service in The Culinary Field (Case Study Restaurant XYZ)." *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, https://turcomat.org/index.php/turkbilmat/article/view/5787/4827.

Okine, Aaron. "A WEB- BASED RESERVATION SYSTEM." *Theseus*, https://www.theseus.fi/bitstream/handle/10024/36707/Okine_Aaron.pdf?sequence.

"EU General Data Protection Regulation: Changes and Implications for Personal Data Collecting Companies - ScienceDirect." *ScienceDirect.Com | Science, Health and Medical Journals, Full Text Articles and Books.*, https://www.sciencedirect.com/science/article/abs/pii/S0267364917301966.

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RESOURCES

I will require the following resources to complete my project:

- Computer – I have this at home and will be able to use the ones available at the university as well.
- Web Server – I can use Newnumyspace for my server needs. I will also be using XAMPP at home as a local server and then upload to newnumyspace at the final stage.
- UML Diagram Tool – I will need a diagram creation tool to design all the different UML diagrams required in the design process.
- Adobe XD – This will be used to create all the wireframes and prototypes used in the design stage

STRUCTURE AND CONTENTS OF PROJECT REPORT

My report will be structured into the following sections:

- Abstract – Overview of the report and the project. It will tell the reader how the report is going to be structured and telling them if the project was an overall success.
- Introduction – Introduces the purpose and scope of the project. This section will tell the reader what I want to achieve with the system and how I intend to do this. I will also explore the background of the project and what the client wants.
- Research and Planning:
    - Literature Review – this section will look at all the literature I've gathered that is relevant to my project. This will help look at their successes and failures and how I can implement their knowledge in my own design.
    - Requirements Capture – This will look include the requirements proposed by the client and look at potential target audience. I will then tailor my design regarding the user requirement plan.
    - Tools and Techniques – Look at all the methods and tools needed to develop my project. This will include all the programming languages and the database system I will use and how I will go about using them to achieve my goal.
- Design, Implementation and Testing:
    - Design – I will talk about how I designed the product in this section. The design will be based upon the findings of the Research and planning stage and will include all the design documents I have created. The final design of the system will then be identified, and I will talk about how I came to this final design.
    - Implementation – This section will focus on how I developed the system and all the practices and processes I went through to achieve the outcome.
    - Testing – I will look at all the testing processes I went through once my system has been created. I will then look at how successful the testing phase was and what changes I made.

- Evaluation – I will have a thorough evaluation of the final product and the processes I went through. I will first focus on the creation of the product and if It matches the requirements set out in the research and planning stage. I will then evaluate how I managed the project and if the overall aims and objectives were met.
- Conclusions and Recommendations – This final section will talk about if I met the overall outcomes of the project. It will also touch over all the successes and failures I endured. I will propose future improvements that could be made to make the project even more successful.