University of Arkansas – CSCE Department
Capstone I – Final Proposal – Fall 2020

Rezerve

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Abstract

Due to the COVID-19 pandemic, many smaller barbershops and salons were hurt tremendously due to restrictions preventing customers from doing in-person business with them. This caused some of these shops to go out of business entirely and caused others great financial loss. Our application, Rezerve, aims to solve the problem of these barbershops reopening and trying to regain customers in a post-pandemic society. We will do this by partnering with these businesses and creating a hub in which customers can search their local area for barbershops and salons.

Since barbershops and salons are some of the most personal of customer service businesses, we want to capitalize on that by creating a web application that allows customers to find and make relationships with the specific people working at these businesses rather than just seeing a business name. Rather than simply being an appointment-making service for the business, Rezerve aims to allow customers to browse various barbershops and salons and see and learn about the people working there. That way, when a customer shows up for an appointment, it isn't a brand new experience, but instead already somewhat familiar. Creating these meaningful relationships will allow customers to put a name to the face of the person cutting their hair and make them more likely to want to return in the future or recommend the environment of the shop to a friend, thus creating more business.

1.0 Problem

The first facet of the problem is that, due to the outbreak of coronavirus, many businesses have had to shut their doors for a while. Now that restrictions are slowly being lifted, many smaller businesses are having trouble keeping their doors open due to lack of customers. This is especially relevant with businesses that handle hair care, since hair care has both the problem of being an industry in which you cannot social distance effectively and one that is often not a large company conglomerate, instead being smaller self-owned shops. When the pandemic winds to a close and society starts to regain some sense of normalcy, barbershops and salons will likely have a hard time recovering after exhausting their financial stores during the time of the virus. If

there is no solution found for this problem, then, as these businesses reopen, they will likely have difficulty regaining their clientele, as well as finding new clients.

The second facet comes from the fact that barbershops and salons are very personal businesses and need a way to leverage that. When most people enter a salon for the first time, they may not know what to expect or have any idea how they want their hair cut or styled. This often leads to dissatisfaction with the level of service provided to them, because it ended up being different from what they expected. Because of this, barbershops and salons, and more importantly the employees of these businesses, need a reliable way to directly interact with and talk to potential new customers beforehand in addition to just scheduling appointments.

As stated before with coronavirus, many small local businesses have been having hard times trying to get people in their doors and spending money. Many have gone under because they did not get enough exposure or traffic from customers. Without this application many of these types of businesses will continue to go under or be forced to shut down locations in more towns and cities.

2.0 Objective

The objective of this project is to design and implement an application that will bolster a multitude of features that seamlessly connect people to barbershops and salons in their area. The application will feature a two-pronged approach with functionality for both businesses and customers to display important information to each other. The primary focus is to create an application that serves as a fast and fluid method for potential customers to get in touch with barbershops and salons.

3.0 Background

3.1 Key Concepts

In order to solve this problem, we are leveraging several different technologies. The first is React, a frontend framework used to design the view of our application. React utilizes a combination of JavaScript, HTML, and CSS in order to provide a user interface (UI) that both users and businesses using our product can interact with. It allows us as developers to include outside libraries, such as Firebase, Stripe, and styling components that are used throughout the application as a whole.

The second main technology used in development is Firebase. Firebase is a service provided by Google that allows developers to create databases to store application information, authenticate users who are using the application, and provide notifications and messaging services. It also provides a dashboard where developers are able to monitor the application as a whole and see things like how many users are currently using it and the space available in our database.

The third main technology being used is Stripe. Stripe is a secure and reputable payments service that provides an API for developers to use. This way, developers do not have to worry about dealing with the storage of personally identifiable information such as credit card numbers, instead just passing it on to Stripe. We are using this API for the Payments section of our project, where users can schedule and pay for appointments with various barbershops and salons.

The last main technology we are utilizing is Heroku. Heroku is a service used for deploying applications. It is a way that developers can put their application onto a server so that it can be accessed at any time from any user. Instead of having to deal with hosting the server ourselves and all the configuration needed for that, Heroku provides a pre-existing computing network to which our application can be added.

3.2 Related Work

Currently, there are already several applications out there allowing customers to manage their hair care appointments and search for new businesses. theCut[1] and The Barber Post[2] are apps which already have much of the same functionality that we plan to develop, such as searching for locations via Google Maps and setting up appointments with barbers and salonists. Another application, Taper[3] allows businesses to build out their own pages for clients to discover when searching. Our goal is to build something similar to these applications, and then add additional functionality that sets Rezerve apart. The most important thing will be allowing customers to interact with each other, as well as directly with employees at barbershops and salons, creating a sort of hair care hub.

This would be done by adding in features like direct messaging between clients and businesses, a forum to let customers to talk to each other about their experiences at different companies, and a data analytics section for business owners to determine how well their shop is doing and what needs to be improved. Besides these added features, we would still do things like "Check Out as Guest" and setting reviews for businesses, to make sure that customers have the same functionality that they would expect from other similar applications.

As we develop, we plan on receiving feedback from actual customers and businesses about the kinds of features they like and what can be improved. This way, the functionality can be adapted to cover usability concerns and requests that arise. This is something else that will help set our application apart from the other applications currently out there. Since these customers and businesses will likely have used other services in the past, we will be able to adapt Rezerve to address any concerns they had with other applications.

4.0 Design

4.1 Requirements and/or Use Cases and/or Design Goals

- The app will allow customers and barbers to create an account.

- The app will allow customers to search for barbershops and salons on a map, either in their area or areas they will be visiting

- Customers should be able to research particular barbershops.

- The app will allow customers to schedule an appointment.

- The app will enable customers to pay the barber within the app.

- Customers should provide feedback, rating, and interact with other customers that go to that same barbershop.

- The app will allow barbers to interact with customers.

- The app will allow employees of businesses to manage their own pages and interact with potential and existing clients

- The app will allow businesses to view information about their number of customers and profits

4.2 High Level Architecture

The main flow of this application has two parts - one for businesses using the applications and one for customers using the application. Both of these flows are built using the React framework. Users will be navigated to one or the other upon logging in to the application.

Flow 1 - Businesses:

The first flow contains businesses. Since our goal is to help barbershops/salons regain and maintain a customer base, as well as create relationships with customers, most of the components were based around that. First, there will be a page where businesses can view statistics like their profit and average number of customers. Next, there will be a page for the employees of that business. Since we want to create an environment where employees can connect with their customers, there will be a separate section for each employee that they are able to manage themselves and add information like the specific services they offer, when they are available, and a personal to-do list of items they need to get done. From this page, employees will be able to schedule appointments with customers and accept payments. Finally, the last component of the business flow is the Business Info page. This will be where businesses can set info about themselves, such as location, hours, etc., which will be viewable by customers.

Flow 2 - Customers:

The second main flow covers customers. As in the business flow, there will be multiple components that customers can interact with in order to connect with businesses. First will be the search component, where a customer will be able to use Google Maps to find barbershops/salons in their local area. Once found, these businesses will be displayed to the customer in a list, where the customer will be able to see the Business Info set by the company. From here, the customer will be able to drill down and see the various employees of the company, information about them, and the various services they offer. If the user wanted to, they could even go ahead and schedule an appointment with an employee from here. Scheduling an appointment would take the user to a checkout page, where they would enter their card details and use the Stripe API to process their payment.

Another component available to customers is the Dashboard. This is where a customer can see their own information, such as user details, past and future appointments, and unread messages from other users/businesses.

The final component available to customers is the Forum. This will be a way for customers to interact with other users on the site, whether it be other customers or the employees of businesses. Having a forum will allow this application to become the hub that we want it to be, a method to help customers feel at ease with the process of finding a new salon or keeping up-to-date with their current one. This forum will contain several different message boards that users can view and post to, whether it is announcements coming in from businesses or simply users talking about new hairstyles they tried.

4.3 Risks

Risk	Risk Reduction
User payment data storage	Used a reputable outside payment company (Stripe)
User personal information storage	Using Firebase, a product made by Google, that provides authentication

4.4 Tasks

Note: Apart from our Capstone team working on this application, there are also a few developers working on it who are colleagues of our Champion. They also had tasks, such as building the routing between components and login and authentication. This work will not be included in our task list as it is not work that our team specifically performed.

Overall, our application development is split up into two sections, the fall and the spring. In the fall, we worked with our product owner to start gaining an understanding of the project and the technologies with which we would be using. Then, we started building out basic pages for the application. After seeing the structure of the basic application we decided to discuss making some user experience changes with our product owner. Following this discussion, we began working on fully fleshing out mocks (to be used more in the spring). This way, we as developers would have a better idea of what we needed to build and the data we needed to be taking into account.

Fall Task List:

- Read documentation on the React framework and how it works (all members)
- Set up example React project to understand the flow of the React framework (all members)
- Design of the Business Info page
  - Create the HTML layout of the page
    - Needs to be able to see information about the business, such as name, contact info, address, and workers
  - Load mock data into the page
  - Connect the Business Info page to the rest of the application
- Design of the Customer Appointments page within the dashboard
  - Create the HTML layout of the page
    - Need to be able to see past and future appointments a customer has scheduled with a business, including name of business, date time, and cost
  - Load mock data into the page

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- o Connect Customer Appointments page to the rest of the application
- ● Creation of a Firebase project and connection of it to our React project
  - o Create a project in Firebase for the application and add the necessary library configurations to connect our application to its API
- ● Creation of a NoSql Firestore database within Firebase
  - o Create a database within Firebase that will contain all the customer and business data for our application
  - o Load mock data into the database
  - o Connect the database to our application so the mock data can be pulled in
- ● Design of the Payments checkout page
  - o Create the HTML layout of the page
    - ▪ Use Stripe API to take care of payments
    - ▪ Need a customer to be able to enter their card information and other needed Stripe components so they can schedule appointments
  - o Verify that the checkout page successfully links to Stripe
  - o Connect the Payments checkout page to the rest of the application
- ● Design nearby businesses page
  - o Create HTML layout of page
    - ▪ Using Google Maps API to handle location tracking
    - ▪ Ability to search for business based off user address and built in location services
  - o Set up appointments by clicking on a marker placed on business's location

Spring Task List:
- ● Creation of the Shop Performance Page
  - ○ This page will be accessible by businesses and allow them to track how well they are doing
  - ○ They will be able to see things like their profits generated and the rate of appointments they have been making
- ● Creation of the Employee Accounts Page
  - ○ This page will be accessible by employees of businesses
  - ○ This will allow employees to set their appointments, take payments for the business, as well as have a to-do list of what they need to get done (such as things like getting new equipment, learning new styles, etc.)
- ● Creation of the Employee Services Page
  - ○ This page will be accessible by employees of businesses

- ○ This will show information about the specific services an employee offers (since different employees specialize in different things), a description of those services, and a schedule for when those services are available)
- ● Creation of Customer Rating and Review Page
  - ○ This page will be accessible by customers
  - ○ This will allow customers to rate and review the shops they have been to
  - ○ These ratings/reviews will be posted on the businesses page so others can see them
  - ○ Ratings/Reviews will be stored in a DB to be pulled in when people view the list of businesses
- ● Creation of the Customer Service Page
  - ○ Accessible by customers
  - ○ This page will be almost the same as the Employee Services page, just not editable
  - ○ This will show the customer what the services offered by an employee are
- ● Creation of the Forum Page
  - ○ Accessible by customers
  - ○ This will be a large message board separated into general topics, where customers can talk to each other over things like their experiences at businesses, different hair styles they have been trying, etc.
- ● Deploy the Application via Heroku
  - ○ We will set up a Heroku account for the application and do the configuration in order to hook our application up to Heroku
  - ○ Then we will deploy the application and start load testing it to make sure it can handle multiple users accessing it at once
- ● Testing
  - ○ We will continuously test our application throughout the development process to make sure that later changes aren't breaking earlier ones

4.5 Schedule

Fall Tasks	Dates
1. Read documentation on React and how it works	Week 1 (10/19 – 10/25)
2. Set up example projects of React to understand the flow	Week 1 (10/19 – 10/25)
3. Design of the Business Info page	Week 1 (10/19 – 10/25)
4. Creation of the Firebase project and connection of it to the React project	Week 2 (10/26 – 11/1)
5. Creation of the Firestore database	Week 2 (10/26 – 11/1)
6. Design of the Payments checkout page	Week 3 (11/2 – 11/15)
7. Design of nearby business page	Week 3 (11/2 - 11/15)

Spring Tasks	Dates
1. Create Shop Performance Page	Sprint 1 (01/11 - 01/25)
2. Create Employee Accounts Page	Sprint 2 (01/26 - 02/08)
3. Create Customer Rating and Review Page	Sprint 3 (02/09 - 02/22)
4. Create Employee Services Page	Sprint 4 (02/23 - 03/08)
5. Create Customer Service Page	Sprint 5 (03/09 - 03/22)
6. Creation of the Forum Page	Sprint 6 (03/23 - 04/05)
7. Deploy the application via Heroku	Sprint 7 (04/06 - 04/19)
8. Testing	Continuous

4.6 Deliverables

For the final project, we plan to submit the following items:

- Software Framework Document: This will contain the major software frameworks we used throughout the project and why we chose to use them. Currently, we are using React as a framework, which includes HTML, CSS, and JavaScript.
- Design Document: This document will include an overview of each of the pages within our application and how they contribute to the overall goal of the application
- API Document: This will contain the APIs and outside services we used throughout our project. In this document will contain the API, a description of how and why it was used, and what we had to pay in order to access it. Currently, this list includes Firebase, Stripe, and Heroku.
- Website Code: This will be code for the Rezerve website that our team created throughout the project. Since this is a project that our product owner wants to move into a real startup however, the API keys and any sensitive information will be removed from the codebase
- Link to the Deployed Website: Since this project aims to be one that continues on as a startup, the work we do on it will be the implementation needed to get all the necessary features fully created and deployed to a server where it can be accessed 24/7.
- Final Report: This will contain the full description of our project, containing the work each of the team members accomplished from start to finish. It will also contain a fleshed out description of why the project was a necessary solution to the problem of barbershops and salons reopening their doors to customers post-pandemic, and how the solution we came up with solves the various facets of that problem. It will describe the design decisions we made, as well as the timeline of the project. Finally, it will describe any references we used when writing the report/coding the project.

5.0 Key Personnel

Tyler Gerth – Gerth is a senior Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. He has completed relevant courses to this project such as Software Engineering and Programming Paradigms which allows

him to have an understanding of the software design process and how to work with several different programming languages in order to accomplish his tasks. Gerth has been working as an Applications Development Intern at J.B. Hunt since the summer of 2018, which has allowed him to gain an understanding of how software is actually used in the workplace and excel in creating full stack applications from frontend websites to microservices. So far, Gerth has been responsible for creating the Appointments page, where users can view their upcoming and past appointments created using the application, as well as the creation and initial setup of the Firebase Firestore database, where all the data for the application is being stored. In the future, Gerth will be working on adding payments through Stripe to the application.

Blake Hatch – Hatch is a senior Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. He has completed all required courses for his degree up to the last year, which allows him to have an understanding of the software design process required for this project. Hatch has been working as an Applications Development Intern at J.B. Hunt since November 6, 2018, which has allowed him to gain industry knowledge and excel in all aspects of a project. So far, Hatch has been responsible for the development of the services page as well as ratings and reviews page, alongside Alvarez. Moving forward, Hatch will be adding in the functionality of these pages that require the Firestore.

Landry Emery Ishimwe Karangwa – Ishimwe is a senior Computer Engineering major in the Computer Science and Computer Engineering Department at the University of Arkansas. Ishimwe has studied Software Engineering, which allows him to work in a team and design a register-like website where an employee can check out a customer. He had worked with the Razorbots team, using Ros C++ to implement the lunar robot's functionalities. Ishimwe worked on a web app during the Spring 2020 24 hours hackathon that records high notes and lower notes from voice input and then suggests what songs one can perform. Ishimwe has been working on the business page alongside Tyler Gerth and will be working on its responsive component to make the web pages uniform.

Brayden Alvarez - Alvarez is a senior Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. He has completed Software Engineering, Database, and Programming Paradigms which gave him the knowledge for how to complete his tasks. Alvarez has been working as Application Development intern at J.B. Hunt since June 2020. This has given him knowledge of how tech works in the real world and how a professional development environment works. This far into the project, Alvarez has worked on the development of the services page alongside Dalynn Hatch. The services page lets the user view businesses, rating of the business, and the distance to the business. In the future Alvarez will be working on improving styling and functionality for involved pages.

Rylan McAlister – McAlister is a senior Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. They have completed Programming Foundations and Programming Paradigms along with Software Engineering to give them the ability to take on this project. Other classes they have taken are Computer Networks and Database Management which also helps them be able to complete their work. Though still looking for an internship, they have been able to successfully create their website for software engineering and manage it on their own. So far McAlister has been tasked with creating a page to show nearby businesses for the user to track and see.

Ronaldo Seranllari - Seranllari is a senior at University of Arkansas, currently pursuing a Bachelor of Science Degree in Computer Engineering. On top of completing courses such as Programming Paradigms, Database Management Systems, he has also completed several certifications related to the field such as, Fundamentals of HTML and CSS, JavaScript Bootcamp (React) etc. This has helped him get an understanding of how to complete his tasks. Seranllari is working on creating the Log In and Create Account page for the website alongside the back end functionality of it.

Colton Tucker - Tucker is a senior Computer Science student at the University of Arkansas, and is currently pursuing a Bachelor of Science degree in Computer Science. They have completed numerous CSCE courses such as Programming Paradigms, Algorithms, and many others. The experience gained from these courses as well as working as a part-time DevOps Engineering intern for First Orion will help him work with the team to develop this application. Over the course of the past two years at First Orion, Colton has worked in depth developing web applications, experiencing both the frontend and backend side of things. Tucker will be working with the team to help out wherever it is needed during the development of Reserve.

Nathaniel Bekele (Product Champion) - Bekele is a senior Architecture & Graphic Design student at the University of Arkansas with a focus on Environmental Design. He is a driven and curious individual with both personal and professional experience in many different fields. Bekele's desire is to create solutions for problems he encounters in his community, which has resulted in him diving into CS and tech due to its accessibility. Currently, Bekele is taking a managerial role of the project, where he is leading sprint plannings, providing mocks for the application, and working with the team to ensure understanding of the project.

6.0 Facilities and Equipment

Currently, this project has not required any external facilities or equipment outside of the technologies described in previous sections

7.0 References

[1] https://www.thecut.co/barbers

[2] https://gopanache.io/

[3] http://www.taper.app