University of Arkansas – CSCE Department
Capstone II – Final Report – Fall 2021

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Abstract

Covid-19 has changed the ways of our living in a variety of aspects, and these changes forced in-person activities to be transformed. Among all these forms of industries, restaurant business was one of the business models that have been affected the most. They had to shut their businesses or had to move to online ordering and curbside pickups after the COVID-19 outbreak, and it was required for them to reduce on-site contact.

Menu was one of the most obvious media that made contacts between people in restaurants, and the physical menus disappeared at a number of restaurants. They transformed it into the digital form and started using QR code as a media. However, people often find it not user-friendly to look at small pdf files to choose a menu. Our team are proposing a solution to it, which is the idea of creating a platform where restaurants can upload their menu with more details including menu names, short descriptions of theirs, and optionally ingredients that customers can access from the QR code chips attached to each table.

1.0 Problem

There are several problems with the traditional paper menu list. First, every time a menu was updated, the restaurant had to print out a new menu. This meant that it was not easy to update the menu list, and new menus had to be prepared on different paper. Even if a particular menu item was out of stock, it was difficult to tell from the menu list, so staff had to tell the customers.

Also, since the COVID-19 pandemic, paper menu lists have been avoided as people are now hesitant to touch them because they are worried about the bacteria on the paper. This pandemic has necessitated a variety of measures in restaurants. One of them is the digital transformation of menus in restaurants. However, it is not easy for many restaurants to prepare a digital menu list, and many menu lists are difficult to read on a small cell phone screen.

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Therefore, we have developed a platform that allows restaurants to easily prepare digital menu lists and provide services to facilitate the digital transformation of restaurant menu lists.

2.0 Objective

Providing both restaurants and customers a more user-friendly and effective platform where restaurants can manage their menu and customers can access the menus in a familiar template.

We provide the restaurant side with a platform that allows them to create menus easily. We have created a web page with a great layout and design, which allows you to create menus intuitively. You can also add pictures and simple descriptors to your menu, and the operation of adding a menu is very simple.

Customers can access the menu by scanning the QR code placed on the table with their cell phone. With the extensive use of category bars and pop-ups, the menu can be viewed comfortably on cell phones.

3.0 Background

3.1 Key Concepts

The key concept of this platform is to provide restaurants and customers with an elaborate and easy-to-use platform that will ultimately improve the user experience in the restaurant.

The main parts of the project are to implement two main components: a web page where menus can be created and edited, and an actual menu that can be accessed from cell phones. We decided to use React in order to adopt a simple and modern layout. AWS is used to implement the database and login functions to ensure stable information management.

3.2 Related Work

Some other similar platforms like Google Maps and Yelp have digital menus, but I have found out that restaurant owners are not satisfied with the flexibility on digital menu management that these existing services offer through our interviews with local restaurant owners in northwest Arkansas.

4.0 Design

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

Web-based platform for restaurants to register their restaurants and menus

Web-based platform where customers can see the menu from QR code.

4.2 Detailed Architecture

The architecture for our web application is shown below. The core components of our architecture are hosted on AWS environments. To deploy and host our web app, we use AWS Amplify, which makes it easy to deploy our codes directly from specific Github branches. The web app is driven by React framework.

The auth part of our web app is handled by Amazon Cognito, which manages access to our websites so only owners can edit their menu data. Those menu data and restaurant info are all stored in DynamoDB and S3. The operation on those data is handled by GraphQL.
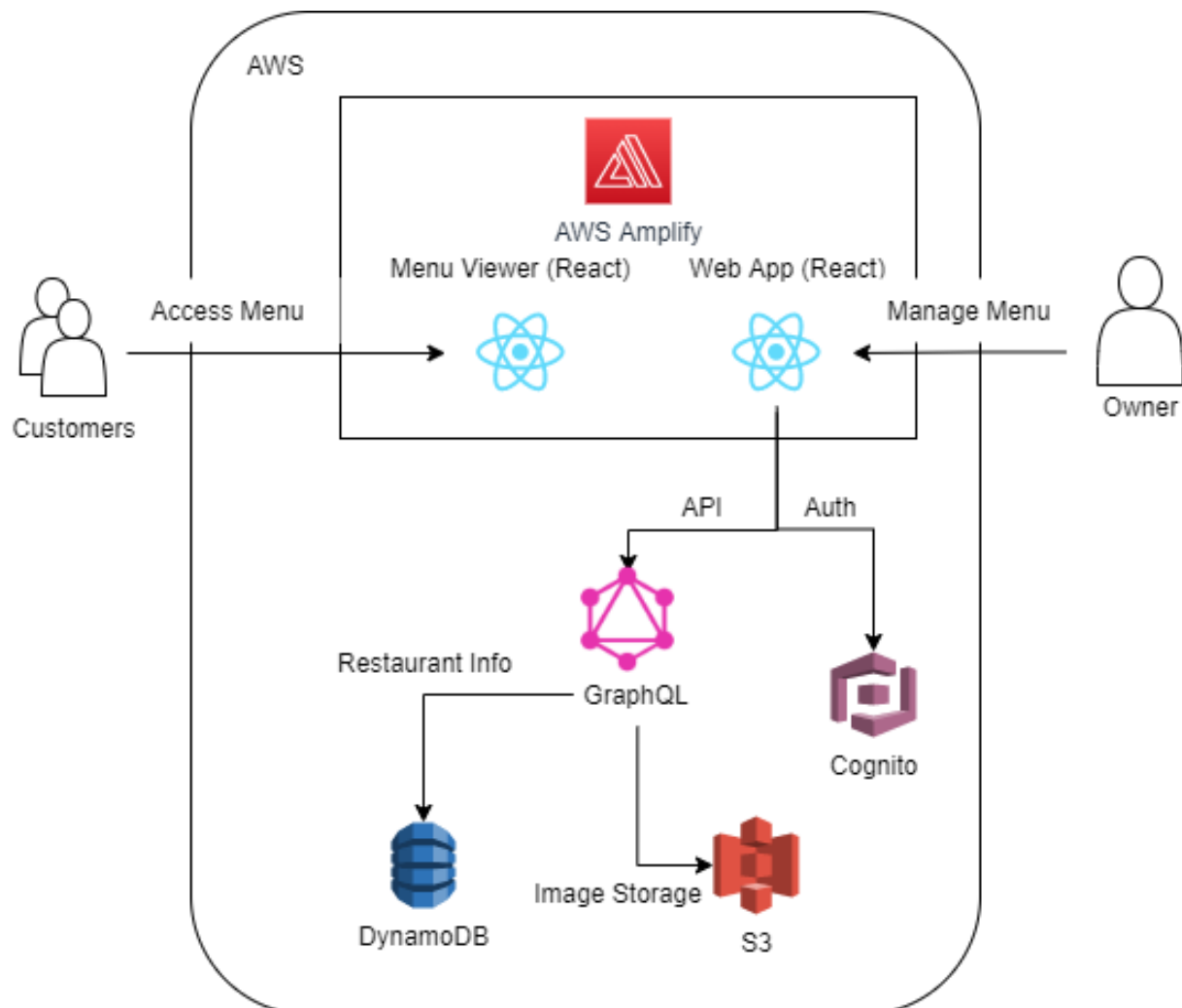
4.3 Tasks

1. Design front end visually and decide what features exactly we are going to implement.

2. Set up the AWS environment and build and test an hello world program.

3. Check what we have created so far and decide what we exactly need to build the whole service including necessary web services, database structure, and APIs we are going to use on the client side.

4. Start building the service (both backend and frontend)

5. Test the app

6. Deploy the service

4.4 Schedule

Tasks	Dates
1. Finish web design on Figma	-9/19-
2. Set up the AWS environment and build and test an hello world program.	-9/31
3. Decide what we exactly need including web service, database structure, and APIs we are going to implement.	-10/3
4. Start building the service	-11/7
5. Pilot run	-11/21

4.5 Deliverables

- Github link to source code
- Website link
- Final Report

5.0 Key Personnel

Toma Tomonari -Tomonari is a senior computer science major in the computer science and computer engineering department at the University of Arkansas. He has completed multiple internships in both computer science and business fields. The recent internship he finished is a data science internship at P&G in summer 2021. He is mainly going to be in charge of front-end development.

Takeshi Yamada -Yamada is a senior Computer Science major in the Computer Science Department of University of Arkansas. He has completed Networking, Artificial Engineering, Security courses. Couple of experiences of implementing web services. He will be responsible for server-side coding.

Tomohiro Nishimura– Nishimura is a Senior Computer Science Major and a Minor in Mathematics in the Department of Computer Science and Mathematics at the University of Arkansas. He has completed Networking, Artificial Engineering courses, and experienced an internship in application development. He will be responsible for coding the cloud side of the project.