### **FoodJunkies**

### A Food Recommendation Application: From Design to Implementation

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Platforms: Android and iOS Programming Languages: Swift, Java, PHP

#### 1. INTRODUCTION

The FoodJunkies application has begun its life as an idea meant to help indecisive, picky eaters or simply people looking to discover new foods quickly decide on what they could eat at the current moment. As creators we've had experiences where we were out exploring the city, whether alone, with a date or family, and a time always came when we became hungry and started looking for something to eat. Going through food sites, such as Yelp, in order to decide on what to eat was always cumbersome as you have to look through many restaurants, make sure that they are in your area and decide on what type of food you're in the mood for. This was especially awkward when you're out on the street and trying to decide where to go next. This problem is often exacerbated by the fact that people can be provided with too many options at once, leading to even harder decision making. The opposite is also possible, where a person may not be aware of enough variety when it comes to cuisines and dishes. The goal of our application, FoodJunkies, is to minimize these problems by providing our users quick and seemingly simple recommendations based on their likes, budget, time, distance while avoiding foods that might go in conflict with their allergies.

The way we went about accomplishing this goal was through careful design process with the experience of our users as our main consideration. The first most basic requirements were that the application had to work on both, iOS and Android, the two most popular platforms for mobile phones. It also had to be intuitive to use plus simple and efficient enough that it can be used on the go. During design process we have come up with basic strategy processes for the ways we implemented our solutions. One example is the way we went about creating the recommendation process:

Goal 1: Provide quick dish recommendations that relate to users tastes

### Strategy:

- 1. Establish what the user cannot eat (Ask about allergies)
- 2. Establish a base for users tastes/likes (Brief food quiz)
- 3. Give recommendations based on provided info and filters used
- 4. Gather feedback on any new food that the user has tried (Rating)
  - 5. Incorporate the new data into user's tastes
  - 6. Give recommendations using updated info and filters used

### 2. FEATURES

The features of FoodJunkies came down to this:

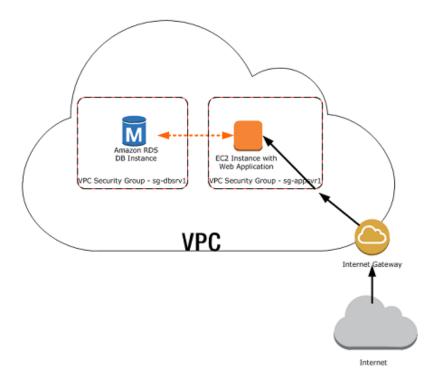
- Way of establishing users tastes and likes, done through a quiz and a rating page
- Dish recommendations based on users tastes and likes while eliminating food that the user cannot consume due to allergies or food they have previously disliked
- Use of constraints such as budget, time to spend on eating, distance to filter results
- Ability to search for specific food and displaying restaurants carrying the searched food
- History of visited restaurants
- Simplicity and ease of use in order to avoid wasting users time

### 3.1. BACKEND DEVELOPMENT

To create FoodJunkies we needed to first design and create a database that will store the necessary data. After research we have settled for using Amazon Web Services to host our EC2 apache webserver and MySQL database due to its popularity, options and cost.

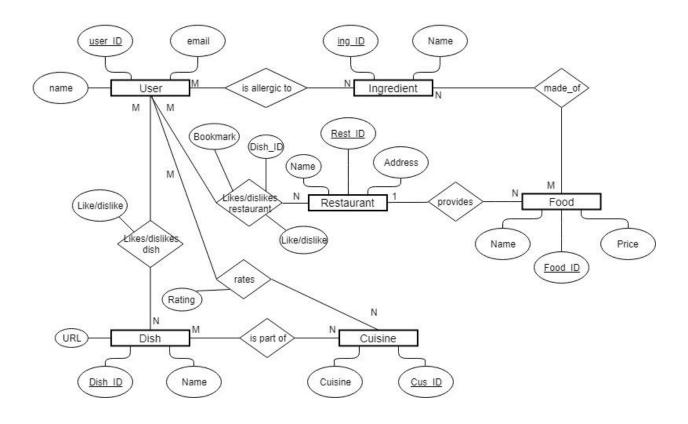
Our application does not connect directly to the MySQL database but the EC2 server which then transfers the connection to the database and also holds our PHP scripts that interact with database.

The way the connection works can be illustrated this way:



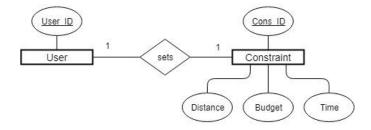
The first stage of database design was the creation of ER Diagram:

### Full Database ER Diagram Design v.3F



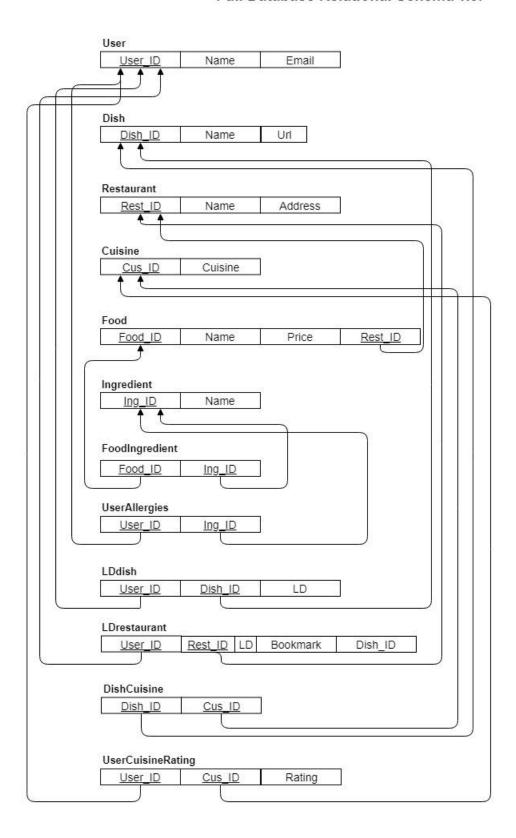
And a small SQLite for our constraints:

#### **SQLite Constraint Database**



User_ID	Distance	Budget	Time
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### Full Database Relational Schema v.3F



As you can see our database stores items such as:

- User info
- List of ingredients
  - Used in users allergies
  - Used in food
- Restaurants
- List of general dishes
- Food served by restaurants aka menus
- List of cuisines
- Likes and dislikes of the user
  - Restaurants
  - Dishes
- Users ratings of cuisines

### 3.2. Table Construction

```
CREATE TABLE User
(User ID INT(5) NOT NULL AUTO INCREMENT,
Email VARCHAR (40) NOT NULL,
Password VARCHAR(32) NOT NULL,
PRIMARY KEY (User ID),
UNIQUE KEY (Email));
CREATE TABLE Dish
(Dish ID INT(5) NOT NULL AUTO INCREMENT,
Name VARCHAR (10) NOT NULL,
Url VARCHAR (100),
PRIMARY KEY (Dish ID),
UNIQUE KEY (Name));
CREATE TABLE Restaurant
(Rest ID INT(5) NOT NULL AUTO INCREMENT,
Name VARCHAR (200) NOT NULL,
Address VARCHAR (200) NOT NULL,
PRIMARY KEY (Rest ID),
UNIQUE KEY (Name, Address));
CREATE TABLE Cuisine
(Cus ID INT(5) NOT NULL AUTO INCREMENT,
Cuisine VARCHAR (20) NOT NULL,
PRIMARY KEY (Cus ID),
UNIQUE KEY (Cuisine));
CREATE TABLE Food
(Food ID INT (5) NOT NULL AUTO INCREMENT,
Name VARCHAR(20) NOT NULL,
Price DECIMAL(5,2) NOT NULL,
Rest ID INT(5) NOT NULL,
PRIMARY KEY (Food ID),
FOREIGN KEY (Rest ID) REFERENCES Restaurant (Rest ID));
```

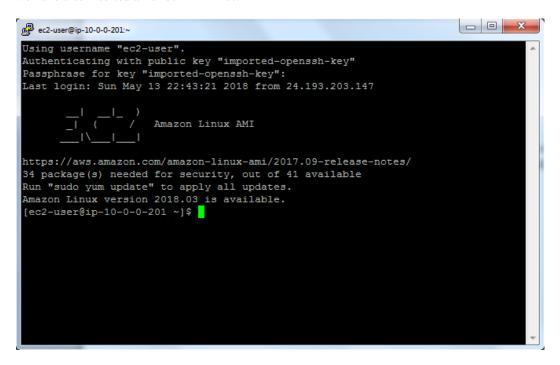
```
CREATE TABLE Ingredient
(Ing ID INT(5) NOT NULL AUTO INCREMENT,
Name VARCHAR(20) NOT NULL,
PRIMARY KEY (Ing ID));
CREATE TABLE FoodIngredient
(Food ID INT(5) NOT NULL,
Ing ID INT (5) NOT NULL,
PRIMARY KEY (Food ID, Ing ID),
FOREIGN KEY (Food ID) REFERENCES Food (Food ID),
FOREIGN KEY (Ing ID) REFERENCES Ingredient(Ing ID));
CREATE TABLE UserAllergies
(User ID INT(5) NOT NULL,
Ing ID INT(5) NOT NULL,
PRIMARY KEY (User ID, Ing ID),
FOREIGN KEY (User ID) REFERENCES User (User ID),
FOREIGN KEY (Ing ID) REFERENCES Ingredient(Ing ID));
CREATE TABLE LDdish
(User ID INT(5) NOT NULL,
Dish ID INT(5) NOT NULL,
LD VARCHAR (1) NOT NULL,
PRIMARY KEY (User ID, Dish ID),
FOREIGN KEY (User ID) REFERENCES User (User ID),
FOREIGN KEY (Dish ID) REFERENCES Dish (Dish ID));
CREATE TABLE LDrestaurant
(User ID INT(5) NOT NULL,
Rest ID INT(5) NOT NULL,
LD VARCHAR (1),
Bookmark VARCHAR(1) NOT NULL,
Dish ID INT(5),
PRIMARY KEY (User ID, Rest ID),
FOREIGN KEY (User ID) REFERENCES User (User ID),
FOREIGN KEY (Rest ID) REFERENCES Restaurant (Rest ID));
CREATE TABLE DishCuisine
(Dish ID INT(5) NOT NULL,
Cus ID INT(5) NOT NULL,
PRIMARY KEY (Dish ID, Cus ID),
FOREIGN KEY (Dish ID) REFERENCES Dish (Dish ID),
FOREIGN KEY (Cus ID) REFERENCES Cuisine (Cus ID));
CREATE TABLE UserCuisineRating
(User ID INT(5) NOT NULL,
Cus ID INT(5) NOT NULL,
Rating INT(2) NOT NULL,
PRIMARY KEY (User ID, Cus_ID),
FOREIGN KEY (User ID) REFERENCES User (User ID),
FOREIGN KEY (Cus ID) REFERENCES Cuisine (Cus ID));
```

### 3.2. PHP, MySQL AND CONNECTIONS

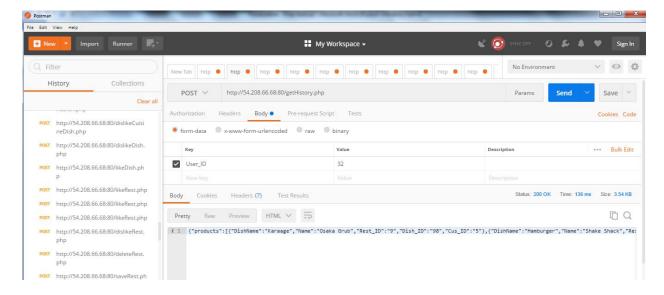
As previously stated our interactions with the server are done through the use of PHP scripts located on our EC2 webserver. Each connection is done by sending a POST message carrying the necessary parameters and values to the servers URL containing a specific PHP file.

An example of such URL: http://54.208.66.68:80/getHistory.php

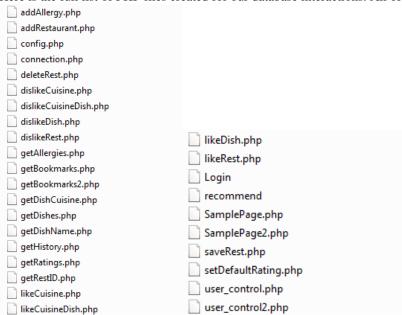
Our non-application connections to the EC2 apache server have been done using the program Putty, through which we have also inserted all of our PHP files.



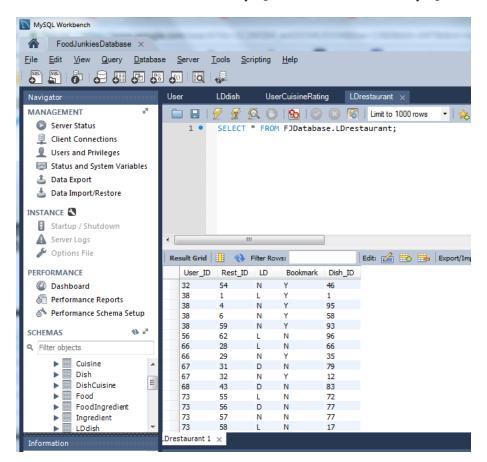
Testing of the connections and the scripts was done through the use of Postman program.



Here is the full list of PHP files created for our database interactions. All of these will also be found on our github:

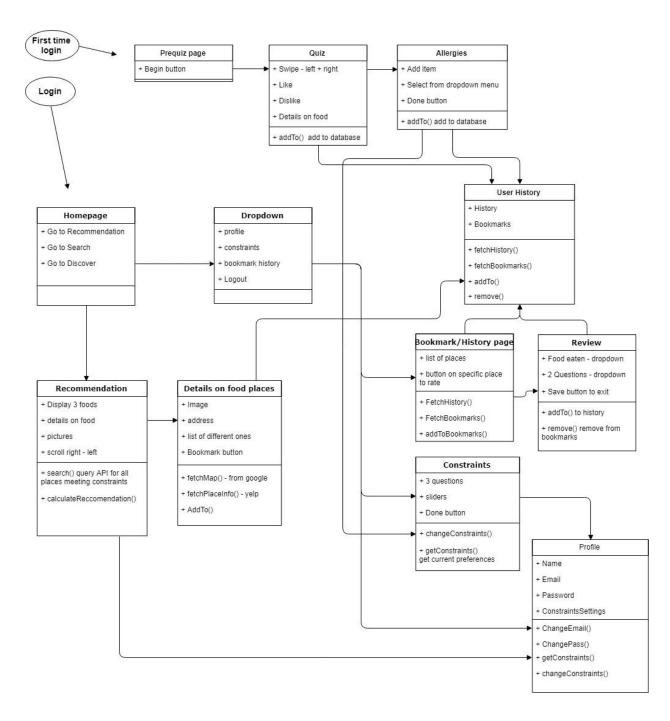


For the creation and maintenance of our MySQL database we have used MySQL Workbench program.

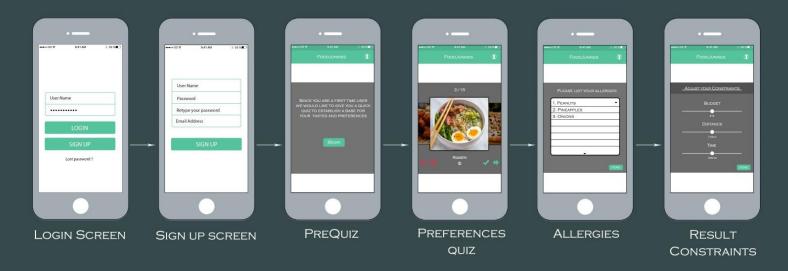


### 4. EARLY STAGE CODE DESIGN AND WIREFRAMES

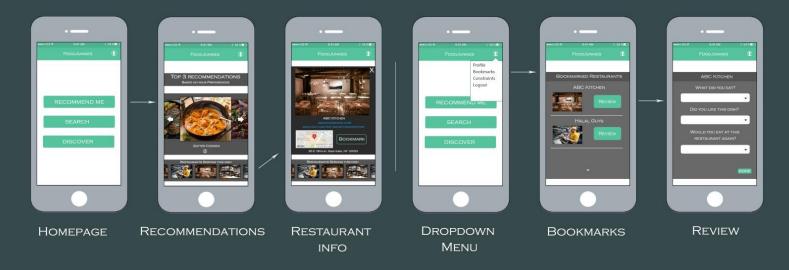
As we worked on the application and learned more about the creation process the code design went through many changes. The following is the first design which ended up quite lacking when we finally started implementing everything so this does not reflect the final application code structure at all but is part of the design process.



## SIGN UP PROCESS



### RECOMMENDATION PROCESS



### 5. EARLY STAGE VISUAL DESIGN







# VISUAL DESIGN CONCEPTS







### 6. QUIZ

During the design of our quiz we ended up with two choices on how to implement it. Each choice came with its own cons and pros.

### Choice 1:

Show X number of preselected items from the Dish table in order to provide a specific predefined variety. Rating the dish adjusts score of all the cuisines it belongs to.

For example: 3 dishes per cuisine for a total of 30 items if there are 10 cuisines.

Pros: Higher precision in rating Cons: Too many items to rate

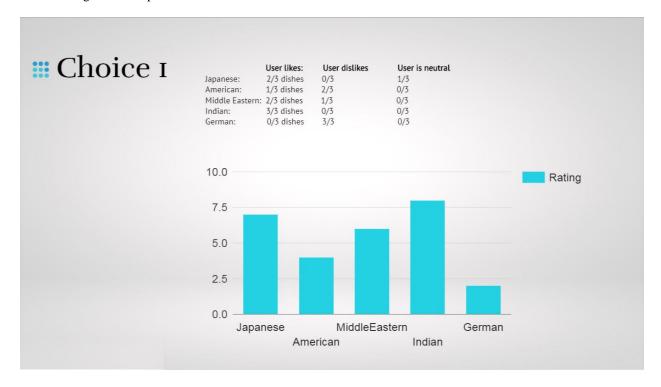
### Choice 2:

Show all the cuisines from the Cuisine table for user to rate directly

Total of 10 items shown for 10 cuisines

Pros: Quick and simple

Cons: Ratings aren't as precise





In the end we went with choice number 2

#### 7. RECOMMENDATION ALGORITHM

Each cuisine gets a rating during the initial one time quiz and later from liked/disliked dishes.

First the algorithm picks a cuisine. The selection is semi random, where the score of the each cuisine affects how likely the cuisine is to be picked.

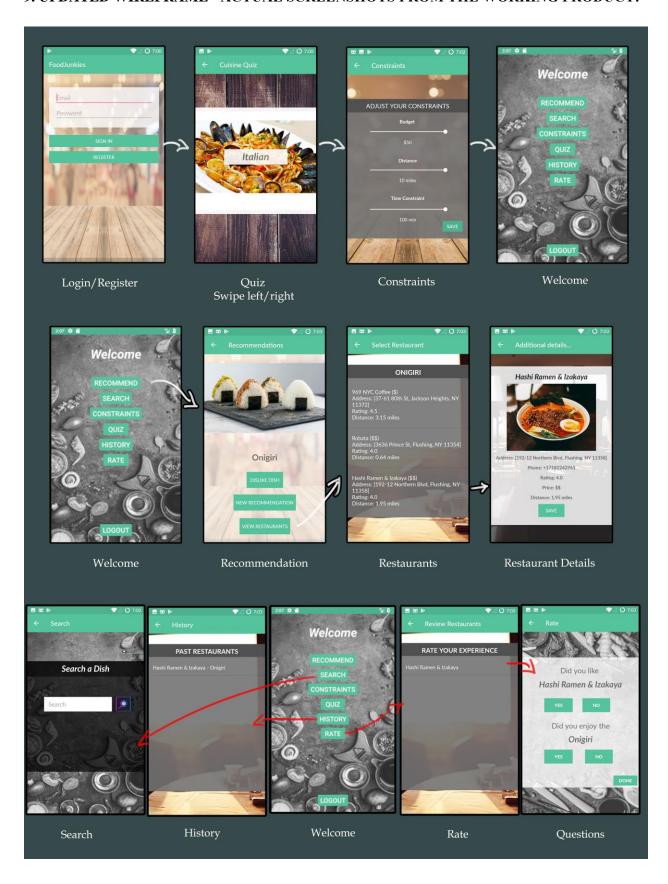
Once a cuisine is picked, the algorithm then selects at random a dish from Dish table.

Algorithm then searches food and restaurant database to find restaurants within specified distance with a food that belongs to this dish type. Any results with ingredients that the user is allergic to are eliminated. Previously disliked foods are eliminated. If no results are found, repeat step two till an acceptable result is found.

### 8. ALLERGIES

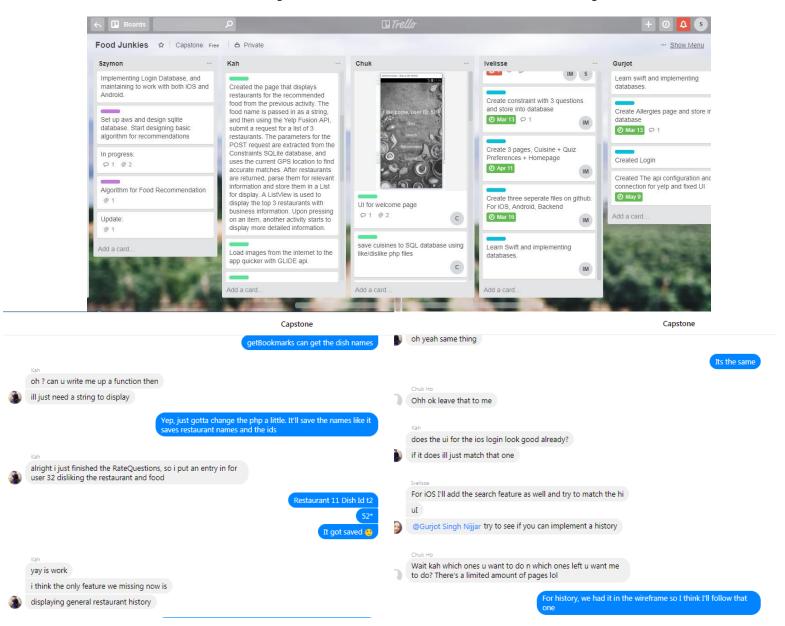
Unfortunately for the final product we had to remove the function of allergies as their implementation would require a monthly subscription of \$500 to the API service. If the subscription is bought then the code can be easily added back.

### 9. UPDATED WIREFRAME - ACTUAL SCREENSHOTS FROM THE WORKING PRODUCT:



### 10. TEAMWORK

For our collaboration we have used few websites and applications: Github for sharing code, Trello for setting up tasks and stories, Facebook Messenger and Discord for live communications and screen sharing



# 2022 - Personal Visual Redesign



