Group 27: Fresh Food App Final Report Summary

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The Fresh Food application is a mobile application which will let the user know if food has gone bad by analyzing the odor released by spoiled food. Some chemicals released include methane (greenhouse gas given by rotting vegetation) or Ammonia (rotting fish and meat). The chemical makeup of the odor is read by external odor sensors and the live sample data is sent to the app which will calculate edibility and estimate days of freshness depending on the type of food. This will remove the guesswork of deciding whether food has gone bad. The main purpose of the Fresh Food app is to save money for businesses and ordinary people by reducing food waste, increasing food safety, and reducing greenhouse gas emissions.

Our application will be to provide an easy to use simple UI. Many different kinds of users will have access to the app including consumers, buyers, suppliers, vendors, and shippers. It is crucial that it is easily accessible to all. It is also important to have an efficient database, the database is where the information of the foods and their data will be stored for an accurate reading when foods are being tested. The separate hardware has a built-in sensor to detect different gasses and chemical emitting from the food. This hardware can be placed on, wrapped around, inserted in, or hovered over the food item.The main idea of this app is to provide expiration dates to each food tested so it will eliminate possible food waste and make monitoring foods easier for vendors/ suppliers. As of right now there currently is not an existing system of the Fresh Food App.

The proposed system architecture is a client -server architecture and the proposed system design includes a type of measurement system which will be done by an Arduino. The Arduino will then need compatible gas sensors so that functionality of reading the harmful gasses emitted from outdated food is possible. Along with the sensors is a breadboard to connect the components of the sensors together for the Fresh Food App to operate correctly and efficiently. A key to testing whether or not the sensors are connected and working as expected is to include a Bluetooth arduino module and a WiFi arduino module. These two modules will give the user feedback when connected and will be responsible for giving the data from the sensor to the user. A cloud database is necessary to keep track of what food has been tested, what the results indicate, and all user information. To create an Android application Android Studio, Java, XML is what is needed. As for creating an iOS application Xcode, Swift, and SwiftUI are the tools needed to do so.
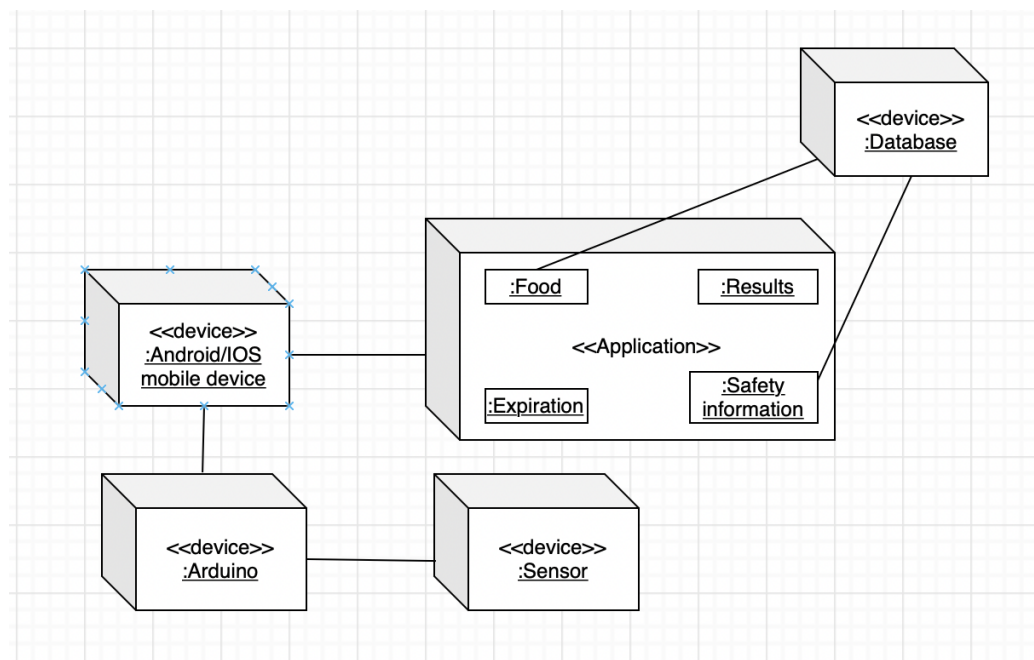
The Fresh Food App will be a three-part system, with a sensor(Arduino), a mobile app, and a database shown in Figure 1. The sensor will pick up gas odors and measure them with classes that control the sensor and a class to handle the transmission of data between the sensor and mobile app. The mobile app will show all relevant information to the user in the form of classes of food and its inner classes such as result and expiration. The mobile app must also have a class that controls the sensor as well as a class that handles database calls. Lastly, the database must hold previous samples with data including food names, gas percentages, and edibility.

Some of the most important classes that will need to be created and utilized are the Food, Expiration, Results, Sensor, Safety, and lastly we will need to include the Arduino class to help

with testing for the gasses. Each of these classes serves a specific purpose. Food class gives the user a chance to input the food item they're testing, the Expiration class gives the dates starting and ending with days included to keep track of when to dispose of food, and the Results class gives a percentage and whether it is edible or not. The Sensor class will read the gasses emitted, Safety class will include ingredients, nutrition, health, and safety tips, lastly the arduino is what will be used to measure the gasses we are looking for.

The user can use an android or IOS mobile device to access the Fresh Food application. When searching a specific food item or searching factual information regarding that food item, a food database will be used. Through bluetooth and wifi connection, the user will be able to use a hardware system to test the food. The final hardware system will require intensive research and testing, therefore for the scope of this course, an arduino system can be used along with multiple sensors, where each sensor is responsible for detecting a unique gas/odor. In the case of system failures, issues, or maintenance/updates, a backup database can be used to keep a copy of the food data which can be implemented later on when the main database contains too much information.

For the next group of developers that decide to take on this project they are most likely to encounter the following problems. Arduino Bluetooth and WiFi data transfer to the app might be too difficult. The group should consider just sending measured data and calculations to the cloud database for the app to query. Some of the gasses have lower density than air which will cause the gas to rise making measurements inaccurate in an open environment. Consider using an enclosed container to put the food and sensors in. Many gasses emitted by spoiling food are variant compounds of Methane, Ammonia, and Sulfur that may not be detected and should be factored in the prediction calculations if they are determined to be important enough.

Figure 1. Subsystems diagram