

Automated Vending & Reservation System

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CSE Senior Design



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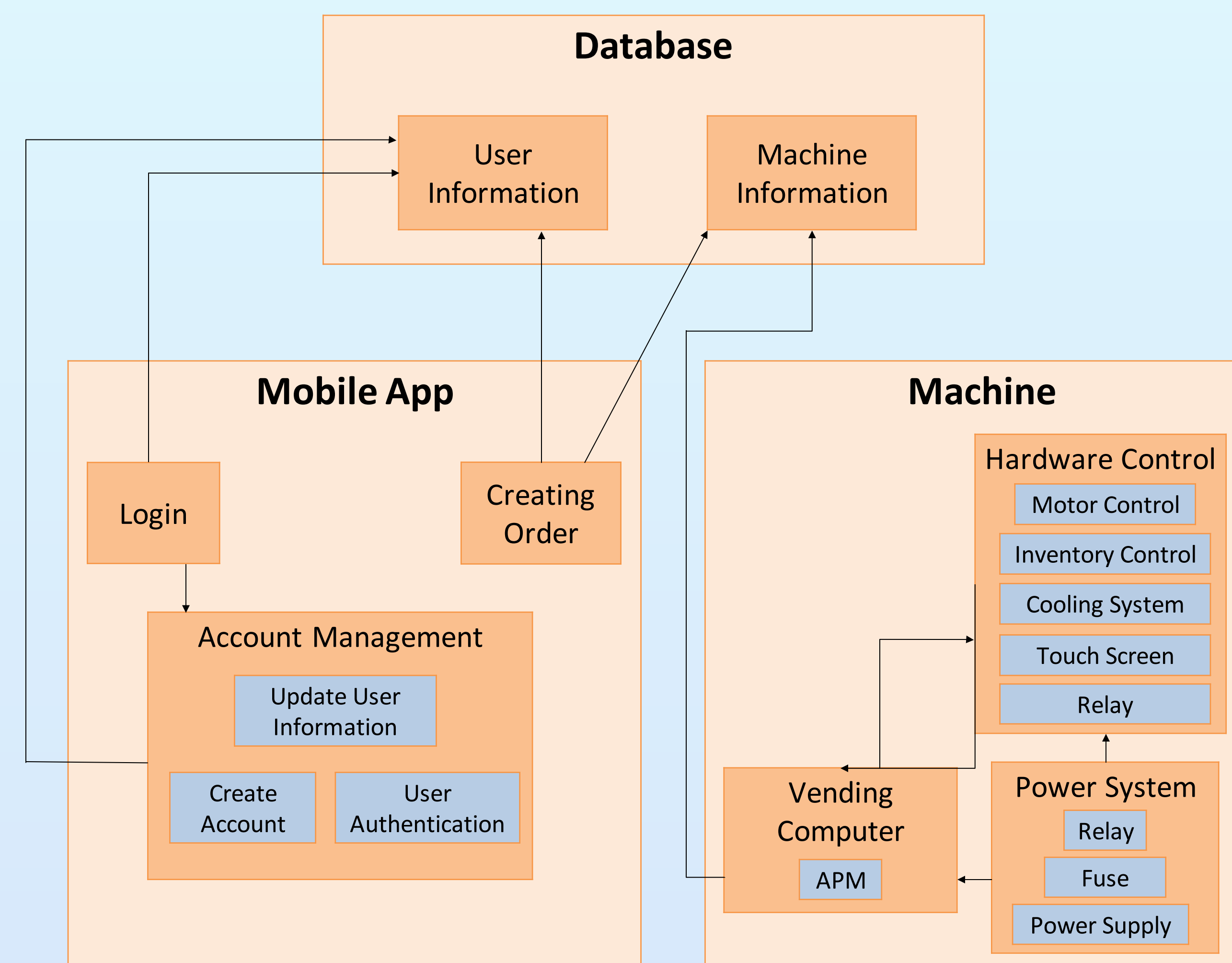
Executive Summary

The Automated Vending and Reservation System (AVRS) behaves similarly to a standard vending machine, but with additional features; such as allowing users to reserve snacks in advance. The user will do this through an app which will display the available inventory of the selected machine and handle transactions. It will then give the user a numeric code which they will input into the machine to retrieve their reserved snacks.

Background

The original plans were to purchase a second-hand vending machine and retrofit its control system to allow for the reservation system to be added on. However, even smaller vending machines were prohibitively expensive for a Senior Design project. It was then decided a custom, purpose-built vending machine would be created instead; at a greatly reduced cost.

Conceptual Design Phase



Prototype & Test

To prototype the vending machine, we assembled the electronics on the bench with a 3D printed stand. We were able to maximize our development time on the Vending Computer. The Vending Computer took time to configure and calibrate. For the mobile app development, we used Xcode and Android Studio to emulate iOS and Android. We then deployed it on physical devices.

Detailed Design Phase

• **Database Layer**

The Database stores all user and machine information from the system and communicates with the Machine and App. User information is the cloud-based system concerned with handling data for the mobile customers. Machine information contains the unique identification of each machine. They are implemented in NoSQL.

• **App Layer**

This layer is the main UI of the system. It allows the users to place orders at a particular machine. It includes login to the app, create or pay for orders, view orders history, and manage the account. It requires iOS 12.0 or later, or Android 8.0 or later. It is implemented in JavaScript and NoSQL.

• **Machine Layer**

This layer is responsible for turning on/off the Vending Machine, powering devices in the machine, and protecting the appliance. It allows all devices to work properly.

Conclusions

The Automated Vending and Reservation System was a success. We slightly went over our budget due to ongoing supply chain problems and complications regarding the steel used for the construction of the Physical Machine. We went the route of having two apps which are developed on different platforms. We had to drop a few features due to time constraints. However; we still achieved the original feature-set that was envisioned.