Canteen on the Go: Express checkout system

Patryk Milkiewicz

BEng. (Hons) in Software & Electronic Engineering

Ollscoil Teicneolaíochta an Atlantaigh

Atlantic Technological University

What is it?

Canteen on the Go is an express checkout system for the college canteen. The aim of this project is to limit queues in the canteen and improve the overall canteen experience. It takes advantage of a long-distance RFID reader to scan tags attached to products and the student payment card for ultra-fast checkout. This information is then sent to the server, where it is processed in the database.

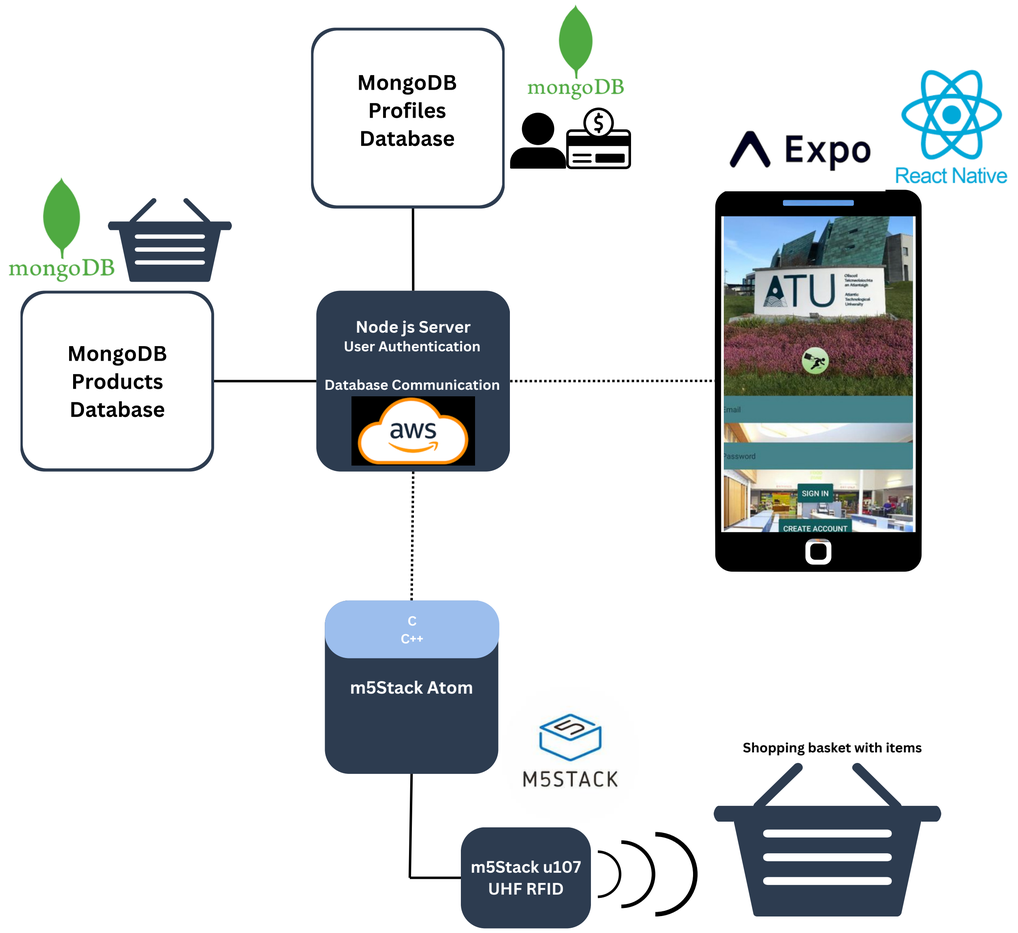
The mobile app allows students to top up their account and see their past purchases.

The intended use was for the college canteen, but it can have many more applications in various shops like clothes shops, grocery stores, and many more.

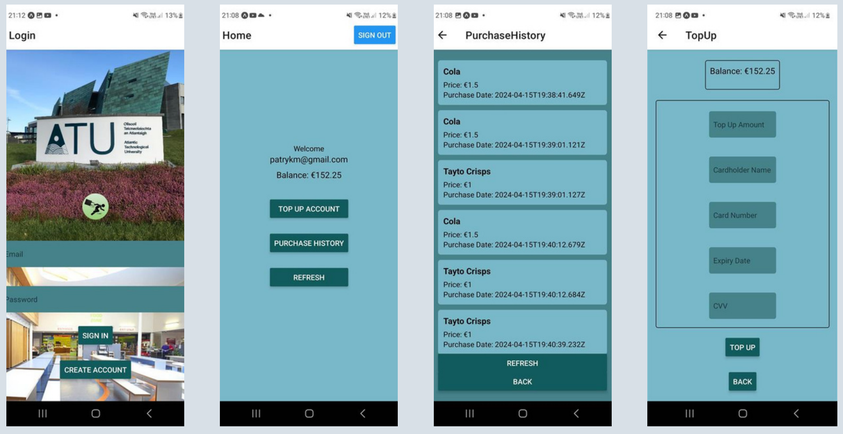
How it works?

When a student sets up their account on the mobile app a request is sent from the expo app, to the Node js server. The server check the database to see if the user already exists, if not, it will create the user and their payment card will be added afterwards. When the user tops up their account a request is sent to the server with a JWT token, the token is authenticated, the users account is updated and a response with the updated user is sent back.

The RFID tags have a unique Electronic Product Code (EPC) these are stored in the products database along with the corresponding product to each one. When a students wants t make a purchase they simply approach the RFID reader with their products and payment card and scan them over the reader, the reader picks up the tags, then sends a request to the server, finds the user purchasing the items, updates their account balance and purchase history, then finally updates the products database



Results



Software & Hardware

Software

Technologies:

- **Languages:** C, C++, JavaScript + React Native
- **AWS:** For hosting a secure backend server
- **Mobile App:** Uses secure, token-based authentication for accessing restricted endpoints
- **MongoDB:** Stores User information and Products in stock
- **Expo-Secure-Store:** Securely stores the token and user information on the App

Frontend:

- Expo & React Native for the mobile app

Backend:

- Node.js server for storing User information and Products available in stock

Hardware

m5Stack:

- **m5Stack Atom** - featuring an esp32 pico and an led display with an integrated button
- **m5Stack u107** - Ultra High-Frequency RFID Reader

Conclusion

This project is only a simple application of a more complex idea, but it does demonstrate the possibility of implementing something similar in many businesses. The hardware correctly picks up the tags and communicates with the database, updating the stock level along with the user's balance and shopping history. The app and server communication is secured via JWT tokens, and the logged-in user is securely stored in the application, meaning they can completely close the app and be automatically logged in when opening the app again.