Automated food delivery system

A picture containing indoor, table, person, people

Description automatically generated

I was recently inspired by a fully automated robotic restaurant developed by Alibaba in Shanghai. Robots navigate autonomously around the restaurant to serve the customers their food. This seemed like a perfect opportunity for us to utilise the knowledge taught during Product Design Studio by Prof Wei Lek to interact with a cloud software such as firebase. An automated food delivery system allows the tracking of orders, and also provides an opportunity for users to get their food in a more accurate and timely manner.

In this project, a proof of concept will be built utilising RFID technology, Firebase as the cloud service, and a buzzer to buzz to alert the user that the food has been received

Build of Materials

1 x L298N

1 x Arduino MKR Wifi

1 x RC522 RFID module

1 x RFID Tag

2 x Yellow Motor

1 x Car Chassis

2 x Motor Mounts

1 x LED Screen

1 x Breadboard

1 x set of jumper wires

Workflow:

Diagram

Description automatically generated

Step 1: Create the Robot Chassis

Any DC motor and motor driver and chassis can be used, but in this project, I created a dxf file and laser cut the chassis, the file can be found in my github here. The cad files used to create the bracket can also be found in the github (credits to SOAR for creating the bracket design)

Attach the Motors, RFID module and L298N driver as seen in the exploded diagram below

Step 2: Wire up the electronics

**Motor and Motor Driver**

* Connect the Left Motor to OUT1 and OUT2 on the L298N Motor Driver and connect the Right Motor to OUT3 and OUT4 on the L298N Motor Driver
* Connect the Motor Driver pins, IN1, IN2, IN3, IN4 to pins 6,7,8,9 respectively, Connect ENA and ENB to pins 2 and 3 respectively

**Buzzer**

* Connect the buzzer to pin 4

**RC522 RFID Module**

* Connect the RFID module as shown in the diagram below

Step 3: Write up the programme logic

**Navigation Code**

* Creating Move function for a simulated navigation code

**Connecting to firebase to read the robotState**

* **Picture of reading robotState from Firebase**

**Once state changes to delivery, start navigation code**

* **Show conditional statement to start navigation code**
* **Saved UID of table to variable**

**RFID detection code**

* **Once detected RFID, stop for 10 second and sound buzzer**

**Updating firebase**

* **After ten seconds call return home navigation stack**
* **Once reach home, update firebase to home again**