Hawaii Pacific University

ENGR 3500

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Autonomous Food Delivery Robot

Overview

The world has been facing the toughest challenge ever in history which is the unexpected battle against COVID 19. It has changed the way our world operates. Social distancing has been strictly implemented. Direct human-human contact has been limited. More ways of contactless communication are encouraged to ensure safety, which is mainly to slow down the spread of this virus. Contactless delivery has emerged to fulfill human needs in many areas, including food, mail, grocery, and so on. This facilitates human access to essential goods and food during the circumstances involving a lot of restrictions from the government to fight the virus. For that reason, our team is building a robot for contact-free food delivery. Demand for it has surged massively due to the pandemic (Bernard Marr, 2020) and will keep increasing in the next coming years as per the report by Facts & Factors (2021). Big companies such as Grubhub and Doordash, are using robots for delivering food in some places (Hawkins, 2021).

Objectives

- Ability to automatically move from a starting point to the destination where food is going to be delivered and back to the starting point.
- Overcome the tough road while on the way to the destination
- Stop when there's a red light and Find a better route while there's a traffic
- Keep food warm

- Locatable and Securely deliver food to customers' hands.

Methodology

In order to achieve those objectives, we plan to break into the following stages:

- Build the first prototype which is able to move automatically within close distance first and follow the designated track.
    - Work on PID controller and adopt multiple sensors to our prototype, including IR sensor, Ultrasonic sensor and light sensor.
    - Work on software development
- The second prototype, which will basically be the upgraded version of the first prototype and have complete functionality.
    - Model 3D design, GPS equipment, and software development
    - Work on assembling all the components, compartments for food storing

Anticipated Outcome

Our final product will have these functions:

- Locate the initial location, receive the customer's location and automatically go to the destination safely. It will be equipped with multiple sensors to make sure it will not collide with any objects as well as not fall into holes or stairs.
- Ensure that food is given directly to the one ordering it
- Trackable by both sender and receiver.

We are targeting food delivery services and restaurants to own our delivery robots since we know traditional food delivery will mostly require direct contact between customers and delivery men, which should be avoided during the pandemic time. Our robot will also benefit them in terms of cutting costs for delivery men. Offering extra options for customers will reduce their hesitation to order food outside during the pandemic and enhance customers' loyalty.

References

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