

Final Project Description

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Goal:

This is a project for office people using. I want to build a vehicle that can transport some food or snacks to people when they are working. When they feel hungry or want to eat something, they can just press a button or something else, the vehicle will bring some food to them. I just want people to enjoy a better office life in a convenient way.

Parts List:

Arduino board x 1
Arduino shield x 1
Infrared ray transmit ball x 1
Infrared ray locator x 1
Servo motor x 1
DC motor x 2
Battery connection x 1
AA battery x 4

Process:

Originally, I wanted to use Bluetooth to control it. Michael gave me some suggestion that Bluetooth can't know the right direction, but infrared ray might be a good way to achieve it. Then I refined my proposal and tried to use infrared ray to control my vehicle.

The major parts of my vehicle are an infrared ray locator and an infrared ray transmit ball. The ball will transmit 1200Hz infrared ray. The locator will know the direction and the distance of this ball.

The most difficult part is converting the locator's number to a servo motor degree. The locator will acquire the signal from 360 degrees, however, the servo motor can only rotate 180 degrees. When the ball is behind the vehicle, the servo motor can't change the direction toward this ball. I also tried a lot of different things to achieve this goal such as stepper motor and H-bridge module, but it wasn't a good way for this product because they would make this product too complex. Finally, I used a simple way to achieve this goal. When the ball is behind the vehicle, it will turn around and the servo motor will find the right direction.

Another problem was that the number from the infrared ray locator would be influenced by the place I set it and the moving of the vehicle. The most useful way to solve it was to test it many times. Finally, I put the locator in the front of the vehicle where the electronic components has few

distractions, so the number is stable. I also divided the number of directions into 13 different groups and each of them corresponding to a specific direction of the servo motor, so it moves precisely.

After that, I added two DC motors on the vehicle and wrote the code. At first, they didn't move at the same speed, so the vehicle turned around and couldn't find the right way toward the ball. Then I tested the speed of the motors many times and tried to figure out the right speed that can make them move synchronously. I also made them move a little bit slower than before, so the servo motor has enough time to find the direction of the ball.

I also built a shield to simplify my circuit and used different colors of heat shrink tubing to separate different types of wires. In this way, it looks clear and will be easy to check in the future.

Finally, I achieved my goal! When the ball is in front of the vehicle, it will move forward to the ball. When the ball is behind the vehicle, the vehicle will turn around then move forward to the ball. When the ball is closed to the vehicle, the vehicle will stop, so users are able to take some snacks out of it. This vehicle achieved my original goal and it works well.





