

BabiEV3

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Purpose

The purpose of the project is to have the robot move randomly within a confined space, and to have it interact and learn from its environment. There will be a series of instances where the robot will have an initial reaction to engaging with its surroundings, and then will adapt and have a different reaction the second time it experiences the same thing. We've named these interactions eating, sleeping, touching and listening. Eating: The robot will get increasingly hungry over time and will eat when it rests on a green tile. The second time its hungry the robot will ask for food using the screen. Sleeping: The robot will get increasingly tired over time and will rest on red tiles, if the robot reaches zero fatigue then it will temporarily shut down for 2 seconds to replenish its energy. Touching: When the robot comes into contact with an object for the first time it will go backwards and turn rapidly to escape. Once this happens, it will turn on the ultrasonic sensor and will avoid obstacles. Listening: The robot will continuously record the decibel level of the room, and when it exceeds 40 dB it will escape again, the second time it will display "Shhhhhh".

Method

Movement: It will move randomly based off of six pre-programmed movements, backwards, turn right, turn left, and three forward with varying speeds. The robot will then execute a for loop that returns a random number between 1 and 6, which will indicate the movement path of the robot. This was created by Rueban Rasaselvan.

Eating: The robot is programmed to have a decreasing bar on the screen that indicates its hunger. This was done by assigning a pixel length to be decreasing by 1/50 every 2 seconds until it reaches zero. When the bar reaches zero, it will begin to eat when it passes over a green tile, using the light sensor. The robot will rest on the tile as it fills the bar up by 1 every second. Once the robot has eaten once it will initiate an if statement that states if the robots hunger is below half, and it has eaten once, then

indicate on the screen “I’m hungry”. The code for increasing hunger was created by Rueban Rasaselvan, and the if statement was created by Cooper Leong.

Sleeping: Sleeping works like eating, as it uses the same bar decreasing technique, although once the bar reaches zero it will temporarily shut down for 3 seconds to regain energy. This was achieved by making an if statement with the conditions of fatigue less than or below zero and the robot is on a red tile, it will replenish its fatigue bar. This was completed by Rueban Rasaselvan.

Touching: The robot will indicate touch by using the bumpers of the robot, and when it hits something it will receive the signal as a 1 and will then initiate an if statement that will run the escape function, a random assignment of movements (like the random movement part). After the robot collides with an obstacle once, it will then initiate the ultrasonic sensor, which will check the distance between the robot and whatever is in front of it. The minimum desired distance between the robot and an object was set to 20, and if the value between distances drops below 20, the robot will escape, if its above 20, then it will begin to approach the object with a speed of 3 times the error (distance – 20).

Listening: To listen to its surroundings, the robot used the sound sensor. We set the maximum tolerated decibel level to be 40 dB, and when it is exceeded for the first time, the robot will initiate the escape function. Once that has happened, the robot will set the listening boolean to true, which will have the robot ask for people to be quieter by displaying “Shhhhhh” the next time the decibel level exceeds 40 dB. This was completed by Cooper Leong.

Conclusions

The project was a success, the robot achieved all the desired tasks it was designed too. For each portion of the project, the robot had an initial encounter with its environment, which led to an understanding of its surroundings and applying that to its second encounter. The purpose of the project was to have the robot interact with different forms of eating, touching, sleeping and listening, where it learned how to properly perform each task.