Learning Module #7

Project: RC Car with App and Speaker

Group Members: Nathan B & Dominick R

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Final Write Up

Goals
Nathan and Dom's original goals were to refurbish an old RC-Car or make their own if necessary. Also it was to use ultrasonic sensors to prevent the car from crashing into anything so it could be the safest RC-Car.It wuld measure the distance of an object and depending on how close it was to something it would either stop or move in the opposite direction. Lastly, to create an app for the RC car to control it themselves using an arduino and code in both the app and the arduino.

Accomplishments & Problems
Something that Dominick accomplished was that he was able to make an app in App Inventor in order to control the app using multiple statements where if a button is held down the app will wirelessly send a letter to the bluetooth module hooked up to the RC car. Which will call different actions within the motors or speaker to occur. Once someone's finger is lifted off the button on the app it will send the letter "S" to the bluetooth module to stop all the motors from moving at all. Another thing that Dominick accomplished was that he was able to make a separate screen for the app in order to control the speaker by turning it on and off using a toggle button and global variables and is able to set the tone of the speaker to a different note and even play a little jingle with multiple tones together. Nathan Bach was able to program the RC car by recreating and improving on similar code used in a previous app when the car was

Accomplishments & Problems

last used by writing multiple characters and if statements to control the motors and speaker too.. Not only that but he was even able to get the speaker with the RC-Car working so they could have some sort of horn. Another thing he did was he was able to program a raspberry pi to connect a camera to show a live feed directly onto his laptop. Some issues that they encountered along the were that there was an issue with the ultrasonic sensor twice where it was reading the distance but was not moving the car back. To fix this issue it was pretty easy since it was just a misplacement of the closed bracket for the if statement which controlled the car based on the distance between the object and the car. Another problem that occurred was that the car was moving a lot more slowly than normal so Nathan and Dom installed another battery snap into the arduino to supply more power to the car. The next issue they had was that there were problems with the raspberry pi where it was not turning on, not reading the sd card, not connecting to the camera and could not upload or download anything on the schools wifi. So to fix this issue Nathan took the raspberry pi home and downloaded everything on his own wifi. The last big issue was that they could not figure out why the motors wouldn't stop running even after the button was released on the app, however after scouring the internet for answers Dom found out that he was using the wrong kind of function. Dom used a function which called an action when the button was clicked but it was supposed to be that when the button is pressed down its on but when it is lifted up the motors stop. Also there was an error such as lag where the two couldn't really do anything about.

Learned

Nathan and Dominick both learned a lot from this learning module such as how to solder once again. Another thing they learned is how to connect a bluetooth module and arduino and send messages between the two using if statements within the arduino code. They learned the basics of a raspberry pi and how to use it to stream a live video feed on a computer. They learned how to program a speaker using an arduino while also using if statements and being able to change the tone and notes that the speaker plays. The last thing they learned was how to make a toggle button in an app using global variables and also how to send signals to the bluetooth module using letters in order to control the motors and speaker themselves. With this learning module Nathan and Dominick both learned quite a lot and there isn't much that they would change about their project. However, some small things they could change is for one to figure out a way to attach the raspberry pi camera to the car without it getting in the way of the ultrasonic sensor. Also they would only make the app one screen because the bluetooth module disconnects with the app once you leave the screen and you need to restart the app to connect it once again. Also the two would figure out why the code used to play the birthday song was not working properly within the arduino which is the reason why the two made their own tune out of playing multiple different tones.

Future Learning Modules

Some advice that Dominick and Nathan would give to someone who was working on this exact learning module is not much but that they should make sure they are working somewhere with a good wifi connection. Also before you start trying to make the car and attach different components you should probably relearn the basics of arduino coding and also learn how each component works again so that way you aren't completely clueless when working on the project. Although some additional projects that Nathan and Dom could pursue with this activity is anything involving an ultrasonic sensor such as maybe a moving robot

Future Learning Modules
where it could move or run and stop when it is too close to something. Also they could take another app for maybe a club or something thanks to the knowledge they gained from learning how to use app inventors. The possibilities are pretty much endless because for this learning module Nathan and Dominick learned how to use many different components. With raspberry Pi's you could do a lot of different things and with a bluetooth module they could create any project that needs to utilize bluetooth to make it work.

A summary of your experience.
Nathan and Dominick both agree that this learning module was both highly educational and very insightful. This is because this learning module allowed the two of them to relearn some stuff that they have already learned such as how to use if statements in arduino code and how to make an app using drag and drop coding like how code.org works. However, there were some things that did get to learn how to do that he never used before such as how raspberry pi's work. Overall both of them really enjoyed this learning module because it was fun, it kept them busy, and they were able to relearn some past stuff and both learn something new as well.

Resource Page

1. https://appinventor.mit.edu/ - App Inventor website which was used to create the app for controlling the

RC car.
2. https://www.youtube.com/watch?v=QC6TDIduhfg - Youtube video to show how one can make an RC car app using app Inventor.
3. https://www.youtube.com/watch?v=nVIdGs_c12s - Youtube video that shows how one can create a toggle button
4. https://howtomechatronics.com/tutorials/arduino/ultrasonic-sensor-hc-sr04/ - Web page that shows you how to use an ultrasonic sensor. what ‘s the code for it and how to attach it to a circuit.
5. https://www.instructables.com/Happy-Birthday-Song-Using-Arduino-Uno/ - Web page where code to play happy birthday song is for the speaker and arduino.
6. https://www.arduino.cc/en/Tutorial/BuiltInExamples/toneMelody - Web page that explains how to change the sound the speaker plays and provides code for it as well.
7. https://www.pcmag.com/how-to/beginners-guide-how-to-get-started-with-raspberry-pi - Website that explains the basics of how to use a raspberry pi component.
8. https://thepihut.com/blogs/raspberry-pi-tutorials/16021420-how-to-install-use-the-raspberry-pi-camera - Website that explains how to connect the camera module to a raspberry pi and how it works.