EEE 187 Robotics

Laboratory 02

Freenove Hexapod Robot

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INTRODUCTION

For this project, we are assigned to build a Hexapod Robot from Freenove. This Hexapod robot kit is compatible with Arduino IDE and Processing IDE, that are both free and open source software. This kit use to assemble the robot and control it to move and act wirelessly. Additionally, it can also directly control the IO ports on control board. The Hexapod robot kit contains the V3.0 of the control board which needs to follow the correct battery.

ASSEMBLY

First step is that we need to install the softwares, Arduino IDE and Process IDE that we need to use for this robot and test the control board if its working. Starting with Arduino, I used the first example which is the “Blink” to show whether the controller is blinking indicating that it is communicating. I need to set the “Board” to “Arduino Mega or Mega 2560” and “Processor” to “ATmega2560 (Mega 2560”). After that I connected the control board with the USB cable and use the right port for the board, then “Verify” and “Upload”. With this, I was able to make the LED marked with “L” on the control board blinked which indicates that the code is running.

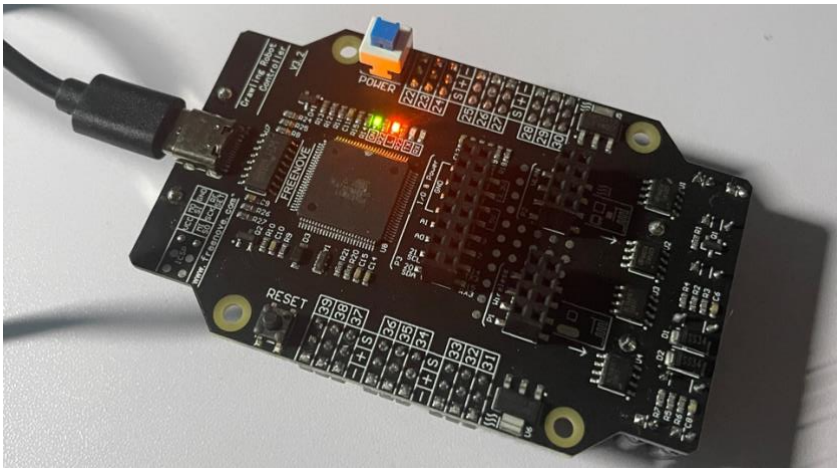

Figure 1. LED marked with “L” light up on the control board.

The next one is we need to download the Processing IDE which uses Java programming language by default. Then, I typed the line of code “ellipse(50, 50, 80, 80)” to test which means draw an ellipse, with the center 50 pixels over from the left and 50 pixels down from the top, with a width and height o 80 pixels. Going back to Adruino, I am required to include important libraries for the robot including the FNHR, FlexiTimer2, and RF24. On the other hand, I am required to download a library called “ControlP5” in the Processing IDE and open the ProcessingApp.pde included in the Hexapod Robot Kit instruction which runs an application window for the Hexapod. After, I connected the control board to the computer via a USB cable and selected “SERIAL” in Processing App and connect it. After that I need to test all the servos and connect to the control board. Using the Processing IDE, I was able to confirm that the servos are communicating and working.

The next step is to assemble the robot. Following the instruction, I was able to install the control board and servos to their respective acrylic plates.

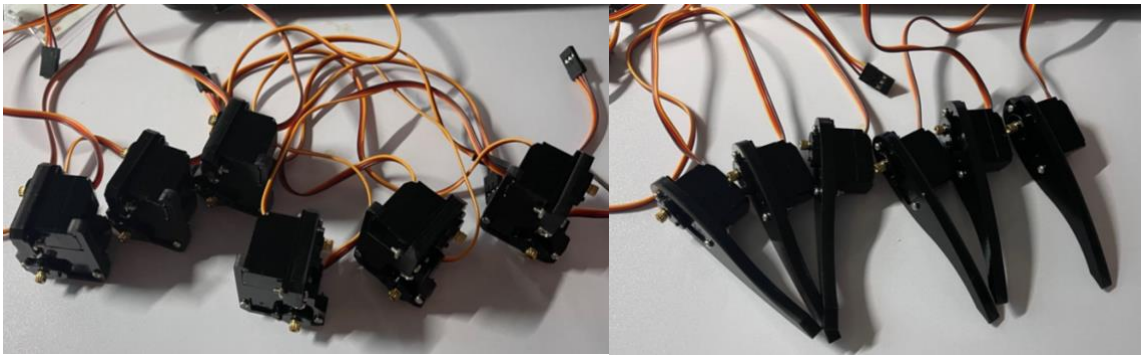

Figure 2. Servos assembled with the acrylic plate use for the Hexapod legs.

After the parts, I was able to assemble and connect them to the Processing IDE to calibrate the Hexapod Robot. Below is the fully assembled Hexapod.

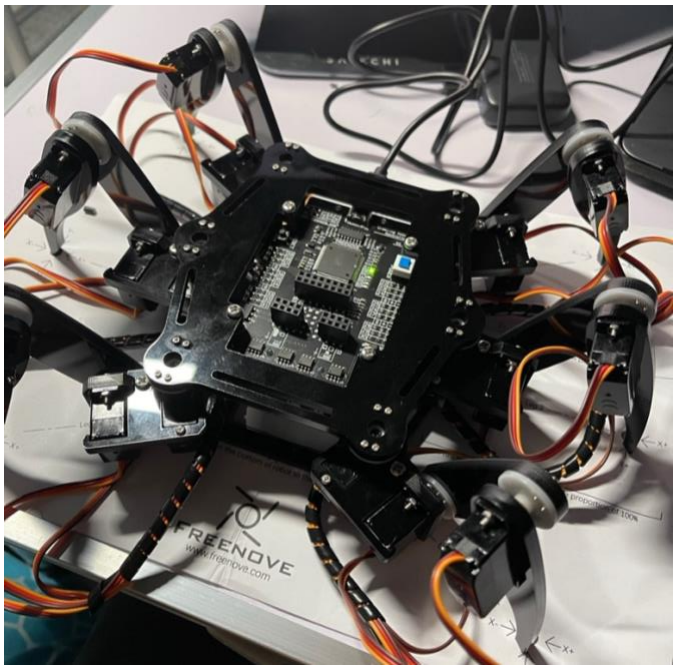

Figure 3. Fully assembled Hexapod ready for calibration

After the assembly and calibration, I then tried to control the robot by installing the WLAN to the Hexapod. It created a Wi-Fi hotspot named “Freenove Hexapod Robot” with the given password in the instruction that I needed to connect. Using the Processing IDE, I switched from SERIAL to WI-FI and clicked the “CONNECT” button. After that, I was able to control and execute the operations such as forward, backward, left, right, turn left, turn right and change body’s height. On the other hand, I was able to download the mobile application for the hexapod and built the remote control for it. Below is the fully assembled remote control for the hexapod.

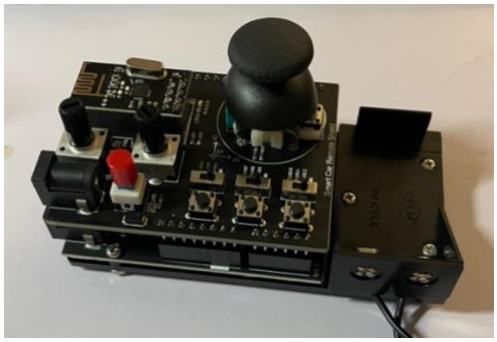

Figure 4. Fully assembled remote control for Hexapod

FINAL DEMONSTRATION

With the instructions given and programmed for the hexapod, I was able to successfully control the robot with different devices including the laptop or desktop, mobile application, and remote control. During the demonstration, I was tasked and able to control and move the hexapod within 4 tiles going back at the same spot. Below is the final assembled hexapod as well the approved demonstration from the instructor.

Figure 5. Final hexapod demonstration and the approval of the instructor