Anthony Tedja

Mr. Motyliwski

TEJ 201-02

9 June 2017

Report - Robotics Culminating Assignment

**Summary**

Overview Construction of Robot - Page 2

Specifics and Special Adjustments of Robot - Page 3

Testing Results, Problems Encountered and Adjustments - Page 4 + 5

Comparison of Robot to Real World Robot - Page 5

Timeline of Work - Page 6

Pictures - Page 7



**Overview Construction of Robot**

Once I learned that we had to build a moving robot, I knew I wanted to make the bat mobile from the dark knight trilogy. I started collecting aluminum sheets from other students’ breadboard casing for the body and then went through my old things at home to find spare parts I can use for the robot. I found a wood board about 5 x 8 inches, a Lego hinge piece, and 10 small plastic wheels with nails. Once we stated the culminating project, I soldered the wires and capacitors to the motor and then taped it all up with electric tape. After, I cut up the aluminum to shape the body of the bat mobile. I used many references for what to cut out and it was difficult because it was hard to cut out and many of the aluminum pieces weren’t bent or cut properly so I had to restart some of the process with limited amount of aluminum sheets. I started with 7 aluminum sheets and I used every little piece of it. Once the outer shell was done, I took the wood and with a few tools from home, I cut the wood to shape around the aluminum body and the wheels. I hammered the nails for the front wheels to the front of the wood board and one of the front wood pieces broke off because I hammered one of the nails in too hard. I pieced every part together and all I needed was to stick them together. I wired everything up to the breadboard and then hot glued everything together to the wood board. I was able to fix the broken wood piece by hot gluing it back on and I hot glued the hinge on the front of the outer shell so it can open up for the programming and battery. I put the reset switch at the top of the outer shell and taped up the front wheels.

**Specifics and Special Adjustments of Robot**

Wood Base Board - I used this piece to hold every part together like the wheels, breadboard, and motors.

Wire connecting power supply to motor chip - I used this to speed up the motors so my robot would go faster than at regular speed.

Switch - I switched out the reset button with a switch because it was a hassle opening up the bat mobile to reset it every time so now the switch is at the top of the robot and acts like a power button so I don’t have to open it up every single time.

Front Wheels - I used 6 wheels (3 on each side) for the front of the robot so it would look more like the bat mobile and so the robot won’t push or drag the side where there are no wheels.

Aluminum Outer Shell - I used this piece to cover the breadboard and all the wires and so it would look more like the bat mobile.

Lego Hinge - I used this piece to stick the front outer shell to the base but it is also used to make the shell able to open up for easy accessibility and adjustments.

**Problems Encountered and Adjustments**

Limited aluminum sheets - I only had 7 pieces of aluminum sheets and it was hard to get an idea of what every piece will become. Some of the pieces broke in half after excessive bending so I had to restart that area and had to use the broken pieces for other parts. It was hard to cut out and bend because of the small amount of handheld tools I had access to. I used kitchen scissors to cut the aluminum and had to make the middle of the body smaller than it should be because of the limited amount of aluminum sheets.

Broken wood base - I used a handheld saw to cut to wood to accommodate the wheels and motors and many of the lines were not straight or symmetrical to the other side. The hard part was hammering the nails into the wood sides because there is a wood knob in the middle and the nail is being hammered in from the middle to I couldn’t hit it at the right angle. This accounted to one of the sides to break off. I had to move to two hammering points to the near front so I could hit it properly and I glued the broken wood piece back on with the hot glue gun in class.

**Problems Encountered and Adjustments** + **Testing Results**

Wheels and floor - This was a big problem because whenever the robot tried to make a turn, not only did it slip on the floor but it also had to drag the front wheels to move. When I tested the delay times on a regular floor, it turned smoother sometimes but it changed during the testing at the track. I had to put a higher delay time for it to turn the same amount as the regular floor to the track floor.

Curving - This problem is with the placement of the wheels and motors. It isn’t even and parallel to each other so most of the time, only 3 of the wheels are on the ground. When I program it to go straight, after a few feet a noticeable drift occurs a little to the left.

**Comparison of Robot to Real World Robot**

An industrial robot is an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes. Industrial Robots are robots that are designed to move or make things in manufacturing and production settings using programming. It is similar to the robot because they usually do one or a few tasks depending on the programming and will continue to do that task forever unless it breaks. They are replacing many of the factory workers because it is a lot cheaper and efficient over time for the owner. They can also be very precise and accurate compared to a human and can perform dangerous jobs that humans cannot. Common examples of industrial robot tasks include welding, assembly, and testing. In a few decades, it is estimated that 47 percent of U.S. jobs will be automated; so many workers will need to find another job.

Though they are reprogrammable, in many applications they are programmed once and then repeat that exact same task for years.

**Timeline of Work**

Monday May 15 - Started solder the wires to the motor and wired them up to the board

Tuesday May 16 - Finished the wiring for the robot and started the schematics

Wednesday May 17 - Wellness day at school

Thursday May 18 - Worked on the board schematics

Friday May 19 - Finished the board schematics

Monday May 22 - Victoria Day

Tuesday May 23 - Started the Programming for the robot

Wednesday May 24 - Missed the school bus

Thursday May 25 - Worked on the programming for the robot

Friday May 26 - Started cutting out the aluminum sheets for the robot body

Monday May 29 - Handed in parts 1 & 2 of requirements

Tuesday May 30 - Worked on the body of the robot

Wednesday May 31 - Worked on the body of the robot

Thursday June 1 - Started the overview for the report

Friday June 2 - Worked on the overview and drawing of the robot

Sunday June 4 - Carved the wood base and finished cutting out aluminum sheets

Monday June 5 - Hot glued all the pieces on the wood board

Tuesday June 6 - Finished Physical component of robot

Wednesday June 7 - Tested program on the track and worked on report at home

Thursday June 8 - Finished Program for robot and finished report

**Pictures**

May 26 - Picture 1 May 30 - Picture 2 June 4 - Picture 3 June 6 - Picture 4

