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Abstract

Across the nation, many children are born with mobility conditions that limit his or her ability to interact with the environment around them. The Go-Baby-Go program provides a solution to this common issue by modifying toy cars to allow children the freedom to travel wherever they please and socialize with other children without any hassle of their condition.

Team 22C joined the nationwide program to aid the children by improving the mobility vehicle with developing their own device while addressing common reoccurring issues from previous vehicles.

The proposed vehicle utilized an Arduino kit to connect a joy-stick for steering and a variable speed control for acceleration. There is also a 5-point safety harness and PVC piping with foam to support the safety of the child while riding in the vehicle. Along with making the vehicle cost effective to purchase, the team also considered the ease of assembly for any family was able to build the vehicle for their children.

System Diagram

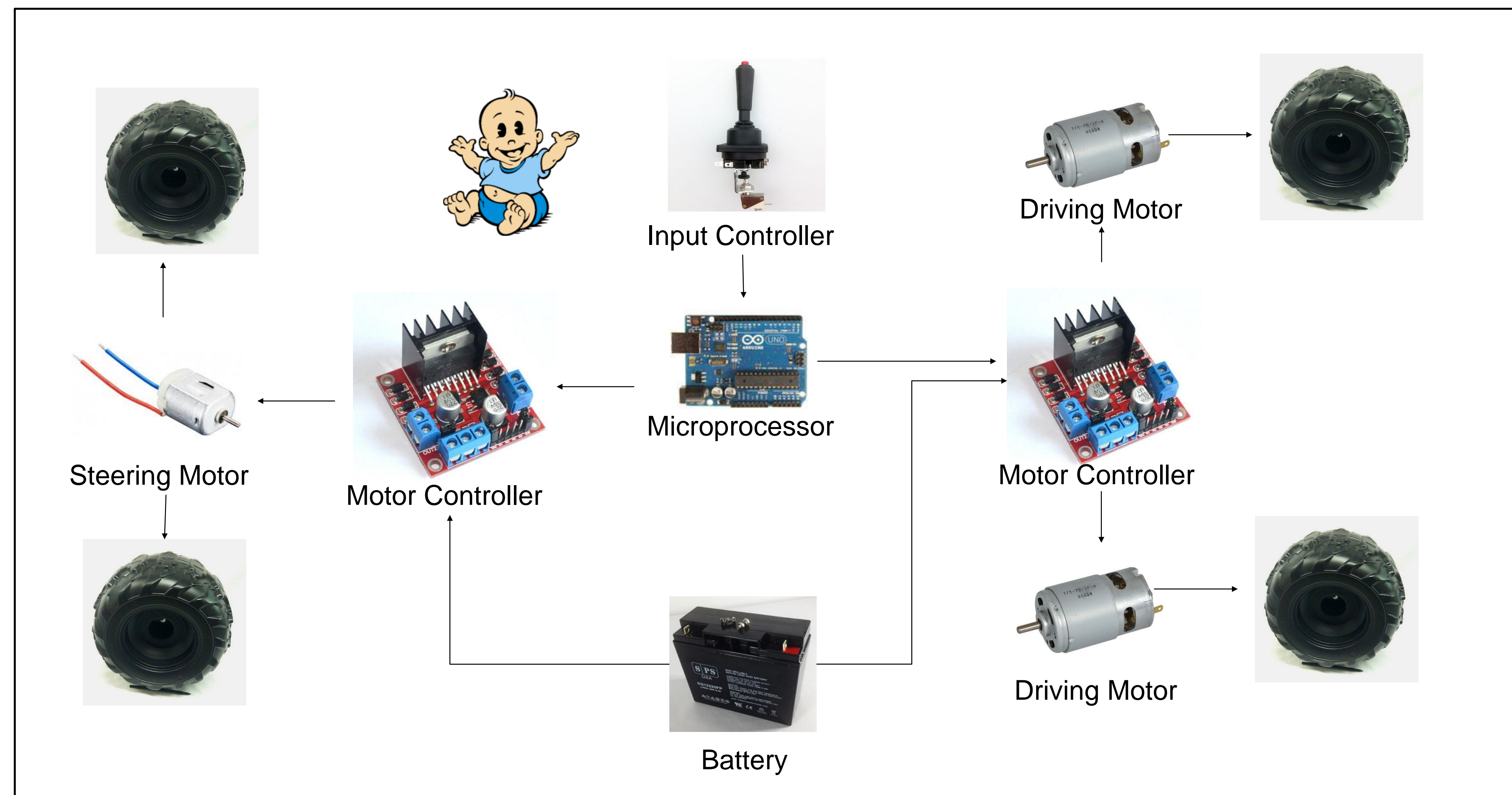


Figure 1: System Flow Diagram

Final Design



Figure 2: Final Design

Design Requirements

The team met with our client in the beginning of the year to understand what the client required in our project, which are seen below:

Customer Requirements

- Low cost
- Ease of Assembly
- Durable
- Safety
- Lightweight
- Aesthetically pleasing

Engineering Requirements

- Weight <130 lbs
- No Sharp Corners/edges
- Max Battery Voltage 12V
- Speed 0<2.5<5 MPH

Featured Modifications

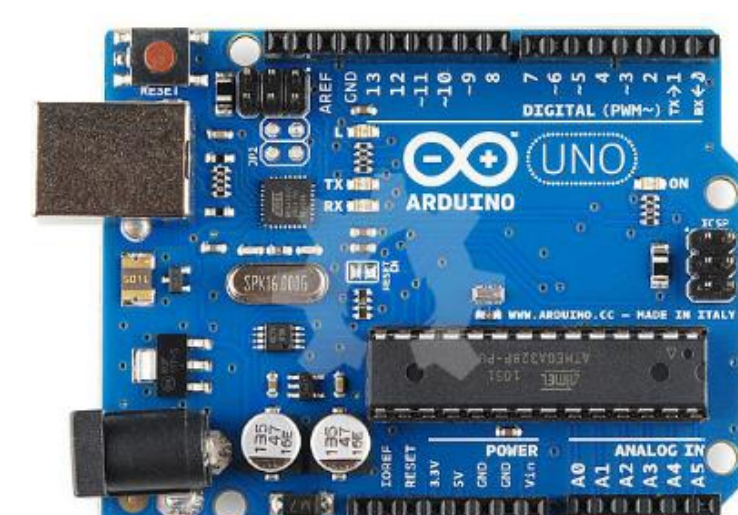
Steering Joystick



5-Point Cushioned Safety Harness



Arduino Microprocessor



Padded PVC Safety Frame



Cost Analysis

The team was awarded an initial budget of \$1,500, which was used for various design prototypes. Below is the bill of materials of the final product design budget. Items ordered for previous designs were donated to the EE department or returned back to manufacturer for a refund. The total remaining budget the team has is \$1,159.17

Table 1: Budget Breakdown

Budget		
Part Categories	Pricing	Source
Safety	\$ 61.24	Home Depot
Electronics	\$ 66.97	Amazon
Steering	\$ 24.95	Amazon
Vehicle	\$ 187.67	Amazon
Total Vehicle Cost:	\$ 340.83	

Conclusion

The team was able to successfully design, develop code and manufacture a retro-fitted children's vehicle with a joystick to help aid a child with mobility issues interact with friends in a new perspective. This was accomplished through benchmarking pre-existing vehicles in the Go-Baby-Go program, prototyping various design ideas, guidance from faculty and open communication with the client.

References

- [1] Raja, Dilip, Circuit Digest, "DC Motor Control using Arduino," <https://circuitdigest.com/microcontroller-projects/dc-motor-control-with-arduino-uno-pwm>
- [2] Tronixlabs, instructables, "Control DC and Stepper Motors with L298N Dual Motor Controller Modules and Arduino," <http://www.instructables.com/id/Control-DC-and-stepper-motors-with-L298N-Dual-Moto/>

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