EE/ CprE / SE 491 - sddec20-25

Supercapacitor Based Motor Regeneration(maybe)

Week 2 Report

2/3/20 - 2/15/20
Client: Solar Car
Faculty Advisor: Nathan Neihart

Team Member Roles

- **Kyle Czubak:** Scribe
- **Ben Kenkel:** Meeting Facilitator
- **Joe DeFrancisco:** Chief Engineer & Team Lead
- **Ryan Willman:** Safety Manager
- **Bryan Kalkhoff:** Report Manager
- **Connor Luedtke:** Test Engineer

Weekly Summary

Over the last two weeks, we came to the realization that this project is likely not feasible for a solar car application. We came to this conclusion after spending a fair amount of time looking at previous car CAN data. However, we cannot be sure that this data is totally accurate, making the project much more difficult to scope. Since that decision, we have assessed the needs of the customer and created a couple of project alternatives that we will be proposing to our project adviser this coming week.

Plan A, is to create a modular battery characterizer that will allow us to have accurate data on the state of charge of every cell. By having this information we will be able to build a more balanced battery pack.

Plan B, would be to fix various systems in the car to prevent the driver from creating a fault state. An example would be refining the software systems so that a hard acceleration will not pull too much current from the battery pack. This project will software refinement of Motorboard and possible hardware reworks, but likely has very little hardware work to do.

For now, we are planning on moving forward with Plan A.

Past Week Team Accomplishments:

- Narrowed down possible projects that would have more focus and more achievable goals.

Pending Issues:

- None until a new plan is approved

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Bryan Kalkhoff	Looked into motors and how they work. Also helped interpret CAN data	22	30
Kyle Czubak	Parsed CAN data from old race to get a better understanding of motor controllers.	21	30
Ben Kenkel	CAN log work	16	24
Ryan Willman	Researched feasibility of supercapacitor use and SOC	18	26
Joe DeFrancisco	Visualizing CAN data using MATLAB code. Defining requirements for a new project.	22	29
Connor Luedtke	Looked into capacitors and solar car system diagrams. Researched boost circuit architecture.	20	29

Upcoming Plans

Joe DeFrancisco

- Set a definitive plan to move forward on a technical path.
- Spec state of charge measurements, discharge process and circuit to implement.

Connor Luedtke

- Spec battery charging circuit. Look for potential charging IC.

Ryan Willman

- Research information about thermal sensors and fault sensors

Ben Kenkel

- Work on specing out components such as LCD displays and wifi modules that the software people can use effectively.

Bryan Kalkhoff

- Look into templates for Bi Weekly Status reports and other documentation.
- Look into Latex for report formatting
- Start specing out processors for potential new design

Kyle Czubak

- Start specing processors to do what we want based on the requirements that we need.

Summary of Weekly Advisor Meeting

Dr. Neihart expressed concerns about the direction and progress of our project due to the need for valid data that would help us to determine the size of a capacitor bank. Initial numbers that we had seen were suggesting that a capacitor bank would need to be larger than what would be feasible for the client's use. We agreed that we need to set a course for the direction and goals of the project by our next meeting. Which led us to come up with the different plans that we outlined above.