

Internship at DeltaX Automotive ESA Evaluation

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Duration ; 29th November 2021 - 30th April 2022





About the Company



- Aim : Build the infrastructure of a smart commute eco-system
- Mission : Establish the first product : “ KIX ” scooter
- Target :
 - People who commute short distances daily
 - Inter campus shared mobility
- Include smart features that set the product apart from other competitors
 - Aesthetics
 - Fingerprint unlocking
 - Swappable batteries
 - Solar powered charging stations

Work Carried Out

Roles and Responsibilities:

- Designing program architecture based on project requirement and hardware specifications
- Writing software code, embedded programs and system protocols
- Ensuring proper integration between the various domains and the required considerations for mechanical and electronics domains

- ❖ Electronics Iterations
- ❖ Charging and Discharging Circuits
- ❖ Wire Harness
- ❖ Testing, tuning and E-brake Testing
- ❖ Motor Controller Communication
- ❖ Documentations



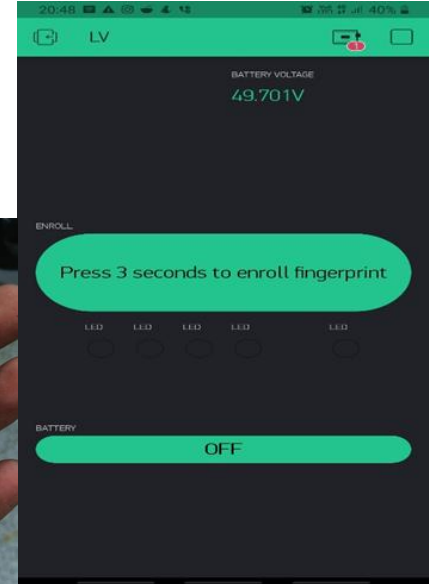
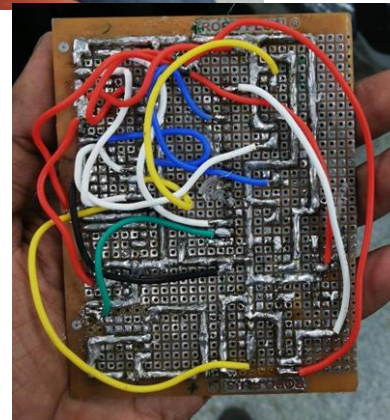
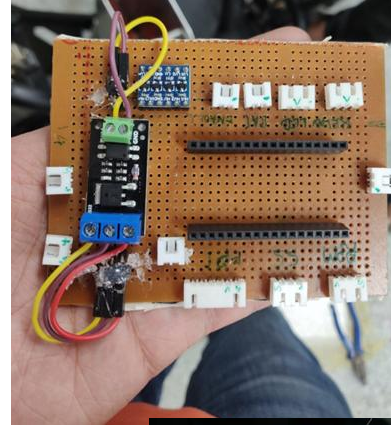
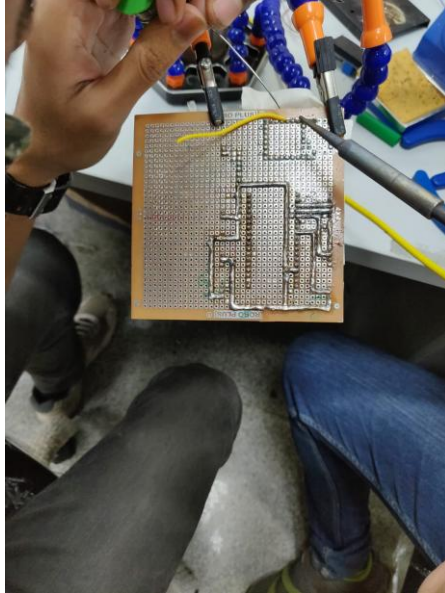


Electronics Iteration

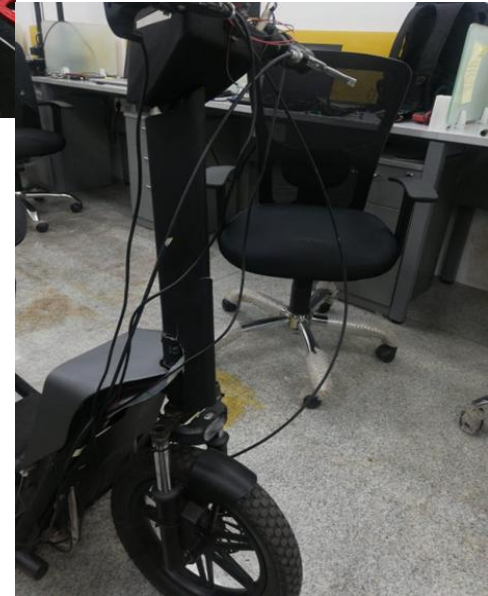
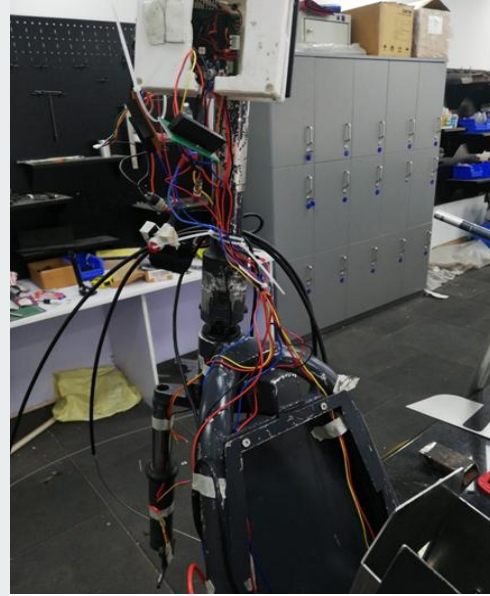
Features of the Electronics Iteration:

- Fingerprint authorizations
- Enrollment of new fingerprint
- Opening of battery door through authorization
- Electronic locking of motors
- Communication with the motor controller
- Side stand sensor
- RPM sensor
- App based control
- Charging Circuits
- Human Machine Interface

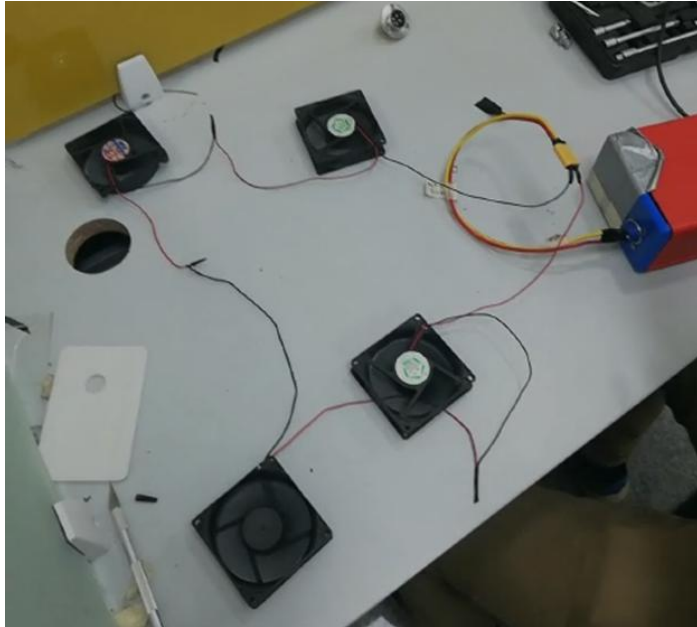
Electronics Iteration:



Wire Harness



Charging and Discharging circuits



Charging Circuit

Testing, tuning and E- Brake

General			Current	Voltage	RPM	Wattage	Temperature	BMS	Advanced
Minimum Input Voltage	8.00 V								
Maximum Input Voltage	57.00 V								
Minimum Duty Cycle	0.5 %								
Maximum Duty Cycle	95.0 %								
Minimum Current	0.05 A								
Fault Stop Time	500 ms								
Auxiliary Output Mode	Off								
Motor Temperature Sensor Type	NTC 10K at 25°C								
Beta Value for Motor Thermistor	3380.0 K								
Coefficient for PTC Motor Thermistor	0.610 %/K								
Duty Cycle Current Limit Start	100 %								
Hall Sensor Extra Samples	1								

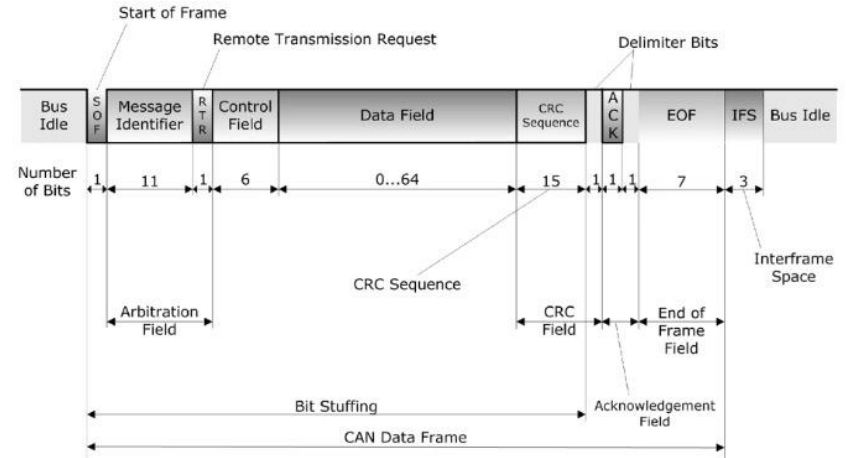
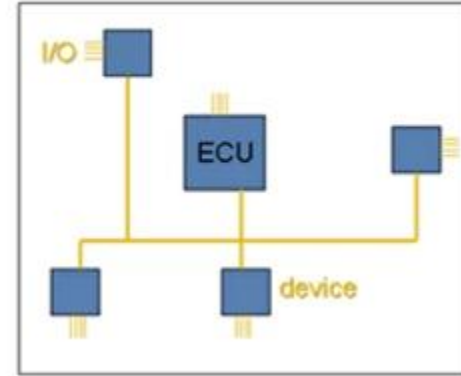
Data Collected:

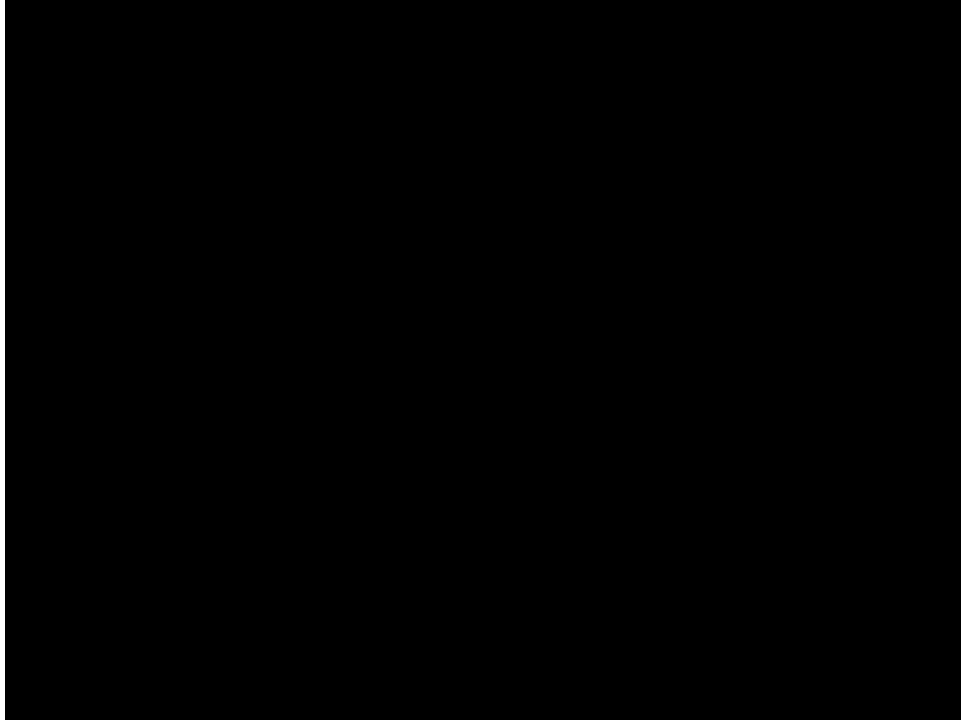
- Input Voltage
- Mosfet Temperature
- Duty Cycle
- Tachometer Readings
- Motor Temperature
- Motor Current
- Amp usage per hour
- Battery discharge and charging rates

Motor Controller Communication

The UART Communication Protocol
The CAN Protocol.

With CAN





Thank You !!

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Capstone Project Guide:

Prof. Sachhidananda M H

Internship Guide:

Mr.Kithir Kareeb Navaz Ahmed Zackariya

Mr. Harit Trivedi



References

- <https://github.com/dsoto/CAN-bus-MWE/tree/master/Arduino-CANbus-prototyping>
- https://vescproject.com/sites/default/files/imce/u15301/VESC6_CAN_CommandsTelemetry.pdf
- <https://github.com/dsoto/CAN-bus-MWE/blob/master/Arduino-CANbusprototyping/Arduino-CANbus-prototyping.ino>
- https://eurlex.europa.eu/search.html?SUBDOM_INIT=ALL_ALL&DTS_SUBDOM=ALL_ALL&textScope0=tite&DTS_DOM=ALL&lang=en&type=advanced&qid=1650284077205&andText0=EV+regulations
- <https://eur-lex.europa.eu/advanced-search-form.html?action=update&qid=1608211064595>