

Our Detailed Design Review will be held on Tuesday 12/5 at 3:30 in GLE 1129.

General Review/Completion Updates:

- **Mechanical :**
 - Plans for new testing rig are in progress. Sketches can be found below
 - Football and Hockey helmets have been purchased

- **Electrical :** PCB Design for Battery Management is in progress

- **Software**
 - Threads setup to handle accepting UDP packets and do calculations on the data inside the packets.
 - Additionally threads are setup to handle bluetooth communication to multiple users.
 - Heartbeat Packet on Sensor setup is underway
 - Started working on implementing sqlite database on raspberry pi to be able to buffer data if there is no active bluetooth connection.
 - Started implementing sqlite database on raspberry pi that will check what sensors it has heard from while it was on and will determine if it has heard from them in the past 2 minutes.
 - Connection from smartphone to raspberry pi was successful and ready to begin testing
 - Communication from smartphone to Amazon database is behind.
 - Initial program flow for database connection does not work with android application, so alternatives are being looked into

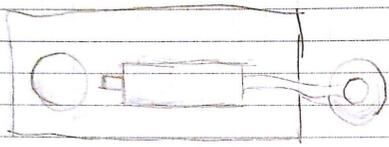
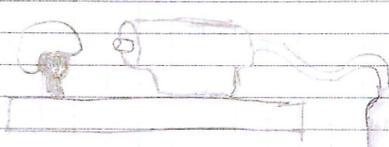
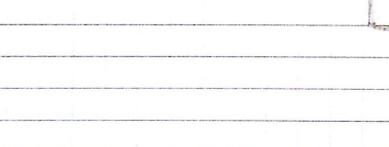
Latest Gantt Chart:

<https://www.wrike.com/timeline/index.html?id=Foiw0gNQpa0pJhP4Y3ZHyrPAmBniEUpxIIEYTOOJTHAYDELSTG4>

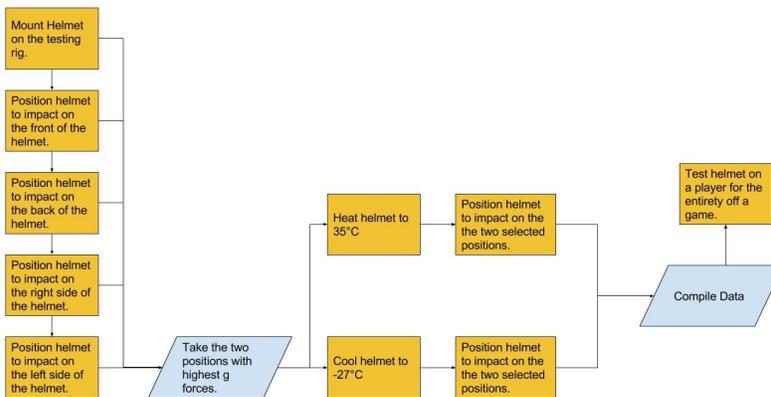
Details:

Mechanical

- Developed test plan to find the following:
 - Impact characteristics at each perspective sensor location
 - Effects of high heat, low heat, and high heat with high humidity.
- Design is a basic pneumatic system which will strike the helmet/sensor in different locations at known forces

	Parts	Cost
	1 stroke single stroke	20-100
	air tank	50-300
	air compressor	100-200
	Total Cost Estimate	400
	If school air used	200
	impact sensor	10-50

-Test Plans -General

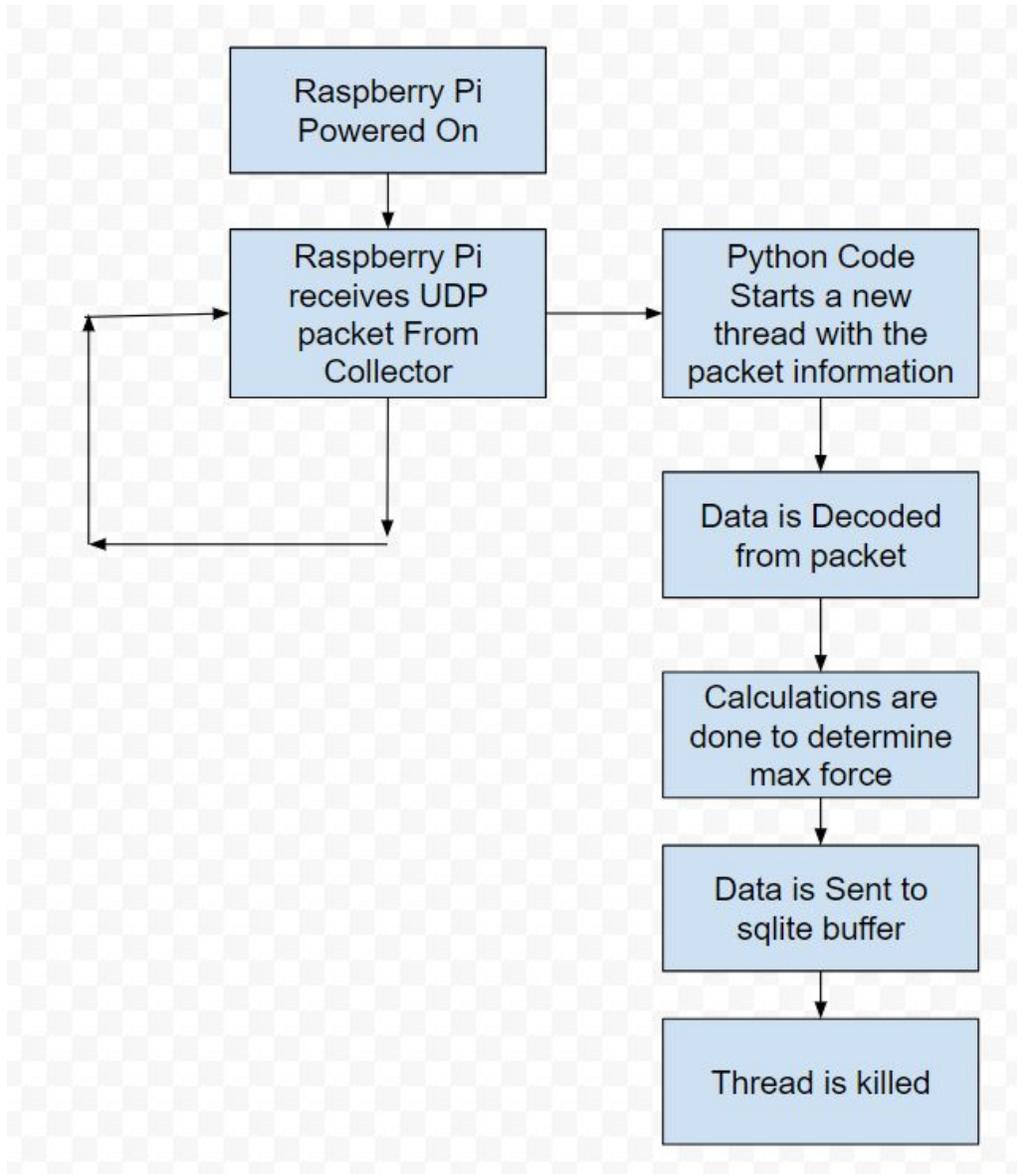


Electrical

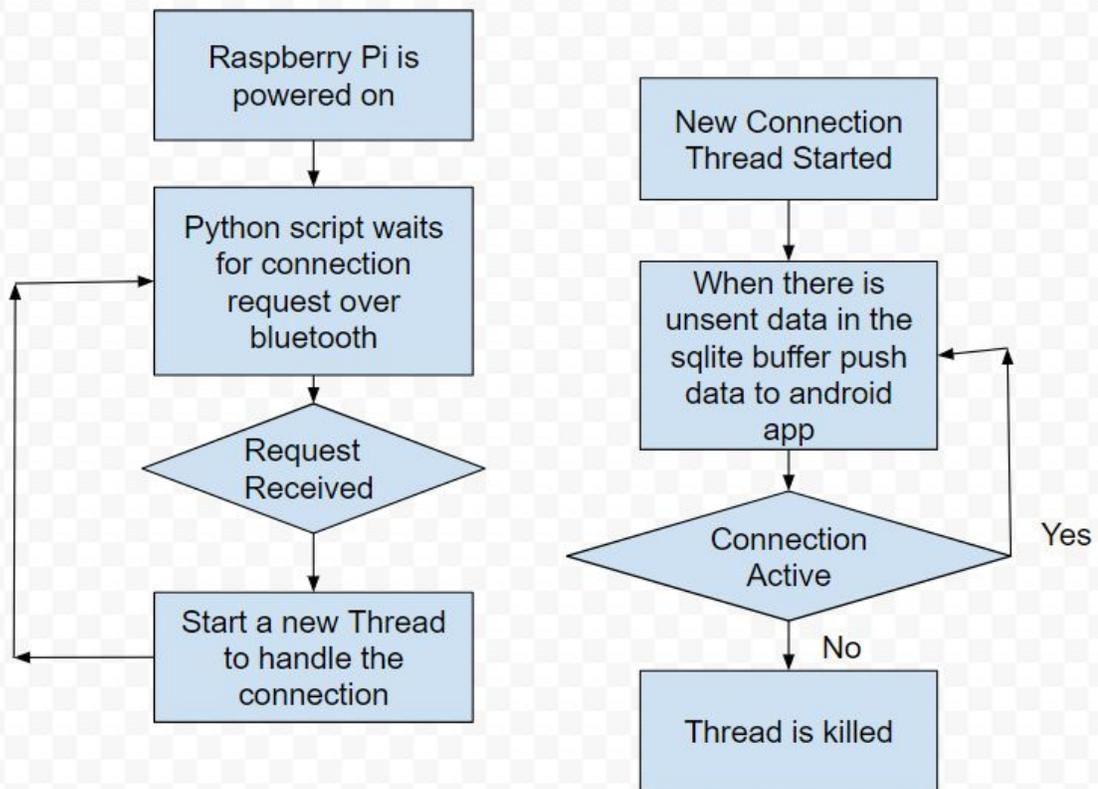
- Created a schematic showing ICs chosen for regulating voltage output to the device and controlling the charging of a lithium polymer cell. Charging can be done through a micro-usb with LEDs used to indicate the charge status..
- Batteries chosen to give a capacity of 3600mAh. Estimated to give a operating time of at least 654 hours. Batteries come with an integrated IC for covering discharge and charging cut-off limit concerns.
- Next step is to draft a PCB layout schematic and work towards building a prototype to test the power management design.

Software

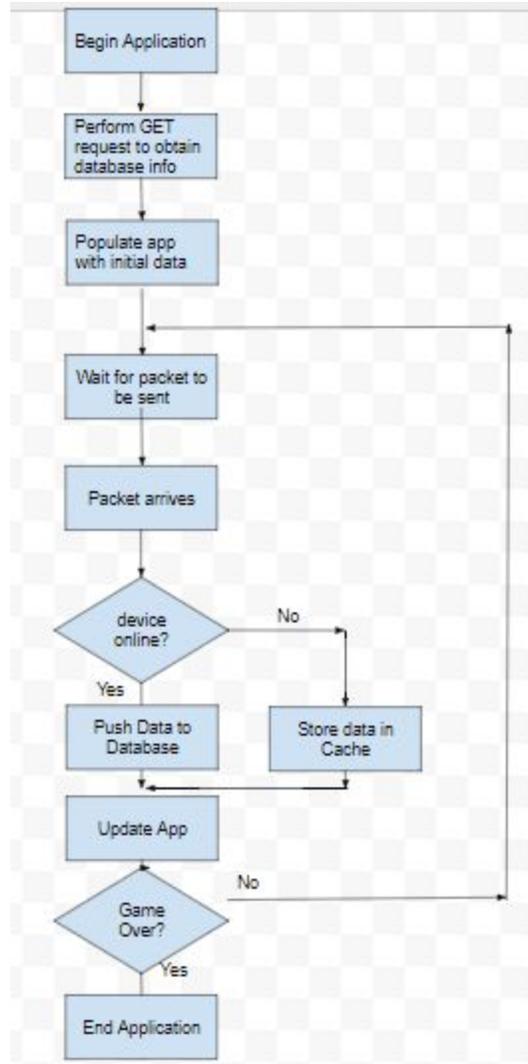
- Continue establishing connections and testing between nodes such as:
 - Raspberry pi to smartphone
 - Collector to raspberry pi
- Fix connection issues with smartphone to amazon database.
- Possibly look into solutions with less nodes



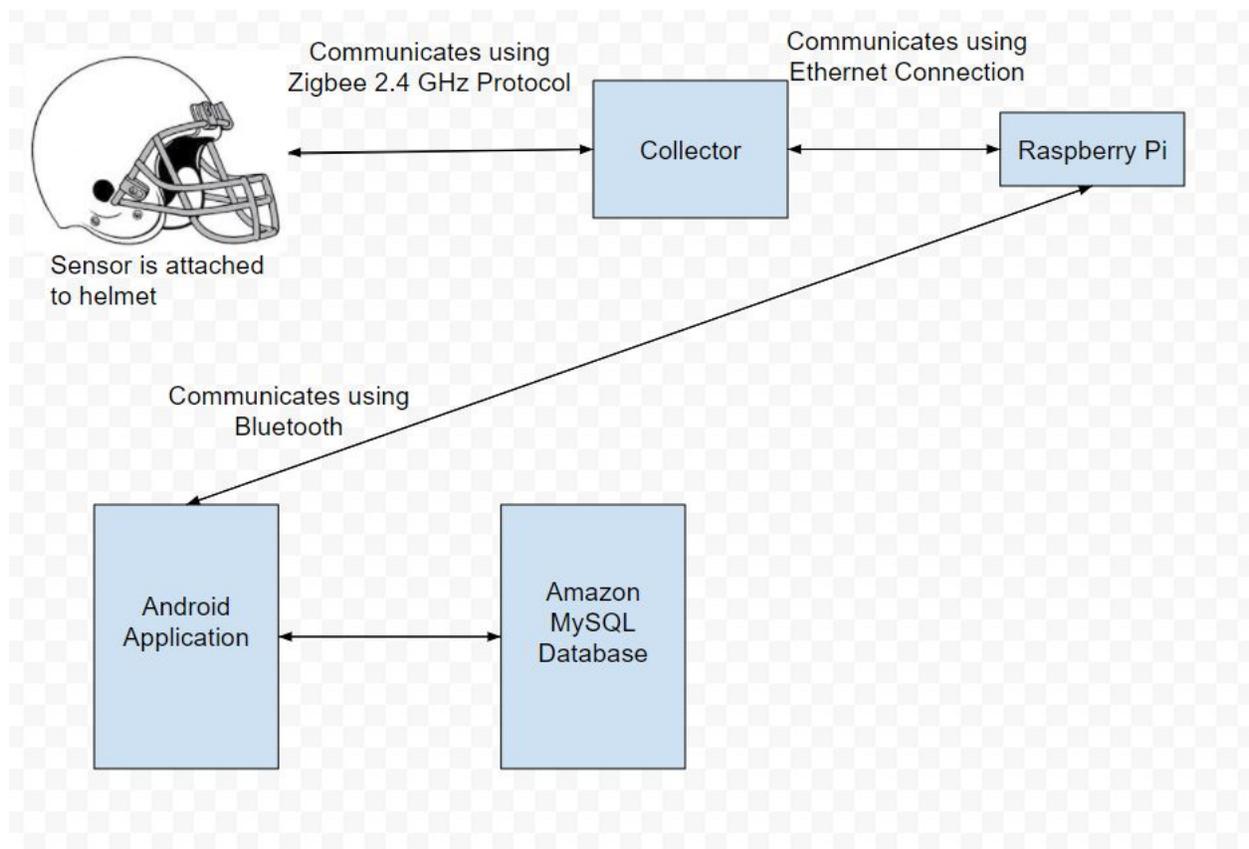
This flowchart shows the UDP connection side of the raspberry pi code. The raspberry pi once powered on, will wait for a UDP packet from the collector. Once one is received, the raspberry pi will run a thread for said packet to calculate the g force from the packet information, and send the info out to the smartphone.



This flowchart shows the other side of the raspberry pi code, the bluetooth connection to the smartphone. The raspberry pi will run a thread for each bluetooth request sent. The pi will then wait for calculated data to be complete from the UDP flow chart, and send said data to the proper smartphone.



This flowchart displays the reconfigured flow chart for the new program flow of the android smartphone. The original idea of using Java's built in SQL class was not going to work for an android studio, and therefore alternatives were to be researched. The new current idea is for the application to perform a GET request to the server side, to run a PHP script which will establish the connection, and other said PHP scripts will be run to perform database calls such as updating tables, pushing data to the database etc.



This Flowchart describes how the information from the sensor is able to communicate the information it has felt back to the amazon database in order to save the data. Additionally as the data is being passed to the database, it will

Risks - Any additions or removals?

- Test rig cost - At about \$400 right now

Plans for after break

- ME
 - Continue testing designs and backups
 - Find Sensor mounting location
 - CAD Model
- Electrical
 - Continue PCB Design
- SW
 - Focus on new database management system