ECE 3220 Final Project
Initial Proposal
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During the engineering process, data acquisition and interpretation is the most essential aspect for design verification. Proper interpretation of accurate data allows engineers to make informed decisions about their systems. Each year Mizzou Racing's Formula SAE team (a team we are both a part of) designs, manufactures and races a ¼ scale Formula style racecar. Throughout this extremely involved display of engineering, a multitude of sensors allows student-engineers to acquire data and fine-tune designs. One of these sensors is the MLX90614 infrared temperature sensor. Three of these sensors are placed over each tire to obtain tire temperature readings of the inner, middle, and outer portions of the tire while the car drives. This data is extremely useful for our engineers as it allows them to make appropriate modifications to the racecar's suspension. Though useful, this data can be hard to interpret. Our proposed project is to design data-visualization software for these tire temperature sensors. This visualization software would give a side-by-side look at the car driving and the temperatures of the tires at any given moment in time.

The project will consist of three main sections: importing the data, preparing it for display, and the graphical implementation. Importing the temperature data from a csv or text file is something we have done in labs and should be straightforward. Once imported, the data will then be sorted into an appropriate object oriented structure. After the temperatures are placed into an appropriate object oriented structure, certain processing will take place to prepare it for the graphical display; the temperatures of each tire segment must be translated into some sort of color – based scale (blue for cold tires, and red as they get hotter). We will need to derive an algorithm to process this data, as the tire temperatures can vary based on ambient temperatures or how long they are being used for. After this, it will be a matter of calling the GUI libraries. Research into GUIs and their respective APIs will need to take place, but right now we are thinking of using VLC player for its simple video playback features and Nana for the rest of the graphics (a top down view of the car with temperature overlays). Video will be obtained by a GoPro mounted on the car.

Use case diagram: