Alex Rich and Aaron Rosen
Engineering 155
Final Project Proposal
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Final Project Proposal: A Robot Controlled Over The Internet

The team proposes to build a robotic vehicle that takes inputs from a website as commands and executes them. The website is to be hosted from an E155 Raspberry Pi2 Apache2 server, and will contain a visual grid interface. The user will click on different points on the grid to input commands into a list to be sent to the vehicle upon clicking a submission button. The Pi will parse the commands and send them using a BlueSMiRF to another BlueSMiRF on the vehicle. The vehicles controller (the E155 μMudd board) will read these commands and execute them. Below we will go over the deliverables for each part (website, Pi, FPGA, vehicle, new hardware) in detail.

Website

The website will contain a visual UI that contains instructions for use, a grid on which to input locations for the robot to maneuver to, a list of the locations currently buffered for sending, a clear buffer, and a submission button, which submits the commands to the Pi for communication.

Raspberry Pi 2

The Pi will be providing a server to host the website. It will connect to a BlueSMiRF with a Bluetooth dongle in order to transmit data to the vehicle. Upon receiving the list of locations from the website, the Pi will send one command at a time (waiting for ACK of successful execution from the vehicle).

FPGA

The FPGA will connect to a BlueSMiRF over UART. The UART will be implemented by the team. The FPGA will execute the command received by controlling the two motors via the H-Bridges on the μMudd board.
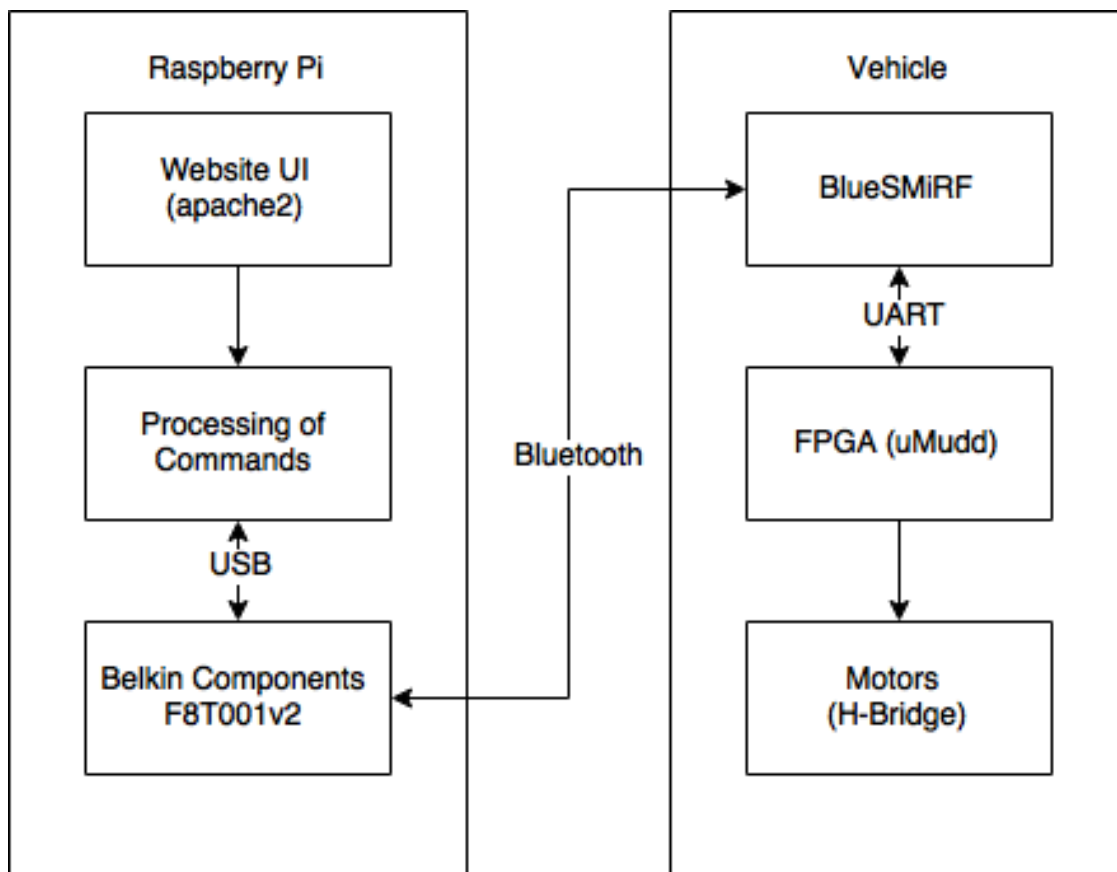
Vehicle

The vehicle will have two motors, one that controls each tank tread. The motors will be wired to the H-Bridges. The chassis will be purchased, and the motors will be sourced from the Engineering Department (E11 motor package) if possible.

New Hardware

The new hardware for the project is a BlueSMiRF that will allow for communication between the Pi and the FPGA. The device communicates with other devices using UART hardware and communicates with other BlueSMiRFs using Bluetooth.

Overview of System

A diagram of our system is shown below. The system is comprised of two major subsystems: the Raspberry Pi 2 controller and the vehicle, which is controlled by the μMudd board.

Bill of Materials

Item	Description	Source	Cost
Tracked Vehicle Chassis Kit	Chassis for the tank, includes treads and frame.	Amazon	15.39
Tamiya 70168 Double Gearbox	Gives tank flexibility to turn by controlling each tread independently.	Amazon	11.99
μMudd Board	Controls the vehicle	E155	0.00
Raspberry Pi 2	Provides website interface and sends commands to vehicle	E155	0.00
2X BlueSMiRF	Wirelessly communicate via Bluetooth between Pi and μMudd board.	E155	0.00
2X TrustFire 14500	Li Ion battery, 3.7 V	Aaron Rosen	0.00