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Software requirements

wii-car

# Android Application

The project requires two android applications running on separate phones. One phone is in the user’s hand and the application running on it is used to control the car by sending signals over Wi-Fi network to the other phone, which is placed inside the car. The phone inside the car is running the other application. This application is responsible for receiving the data from the user’s phone and sending them to the microcontroller over Bluetooth.

## Control Application

The control application requires the following components for its functioning:

* Buttons for gas and brakes.
* Accelerometer used to calculate the turning direction of the car.
* TCP/IP socket for sending data over Wi-Fi.

## Car application

The application running on the car’s phone has the following requirements:

* TCP/IP socket for communication over Wi-Fi.
* Bluetooth communication to send data to the microcontroller.
* Camera control and GPS.

# Microcontroller Program

The firmware running on the ARM microcontroller has the following requirements:

* General Purpose Input Output peripheral configuration to output signals from the controller.
* UART serial peripheral configuration to communicate with the Bluetooth module.
* Bluetooth module driver development, which allows sending appropriate commands to the module over the serial communication line and receiving the data.

# Hardware Requirements

The following hardware components are required for the project:

## DC Motor

Two 9 V DC motors are used to drive the car. One motor is used for movement and the other is used for turning.

## Bluetooth Module

An HC-05 Bluetooth module is used to establish Bluetooth serial communication between the car’s smart phone and the ARM microcontroller. The Bluetooth module uses the Bluetooth serial protocol.

## ARM Microcontroller

An STM32F407 based microcontroller board is used to control the car. The module receives signals over Bluetooth from the smart phone and controls the DC motors.

## Motor Control IC

An L298 integrated circuit chip is used to control the direction and voltage of DC motors. The control signals come from the microcontroller.