

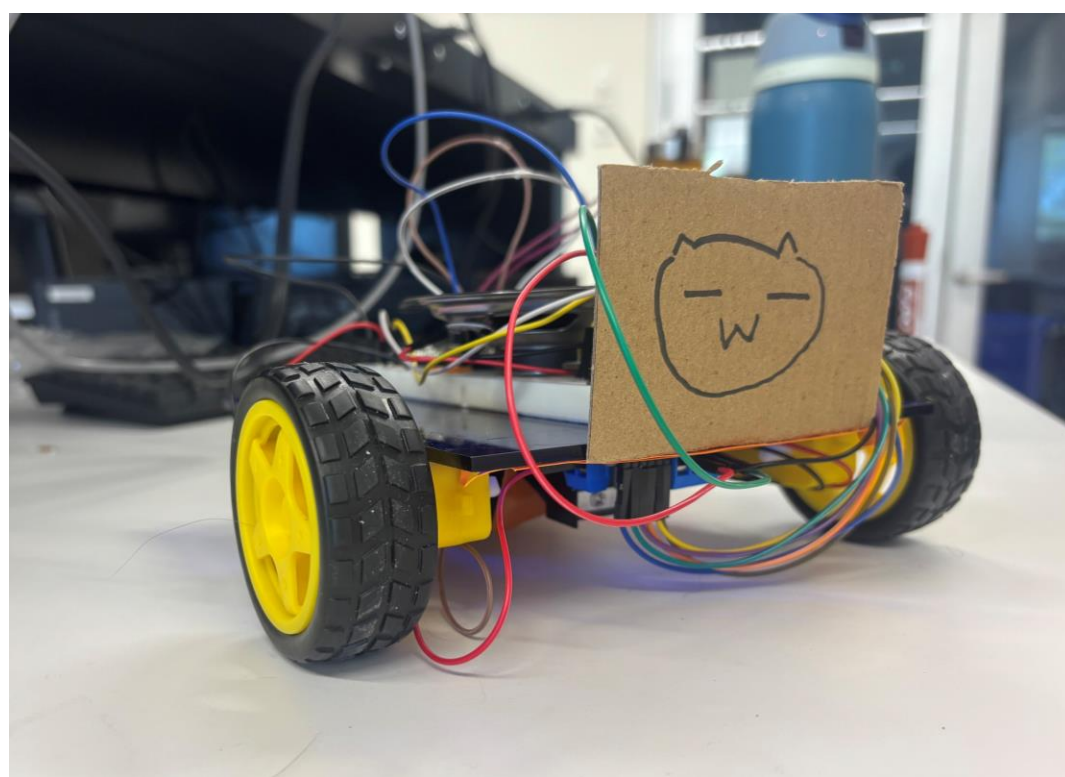
Wi-Fi Enabled Multi-MCU Toy Car

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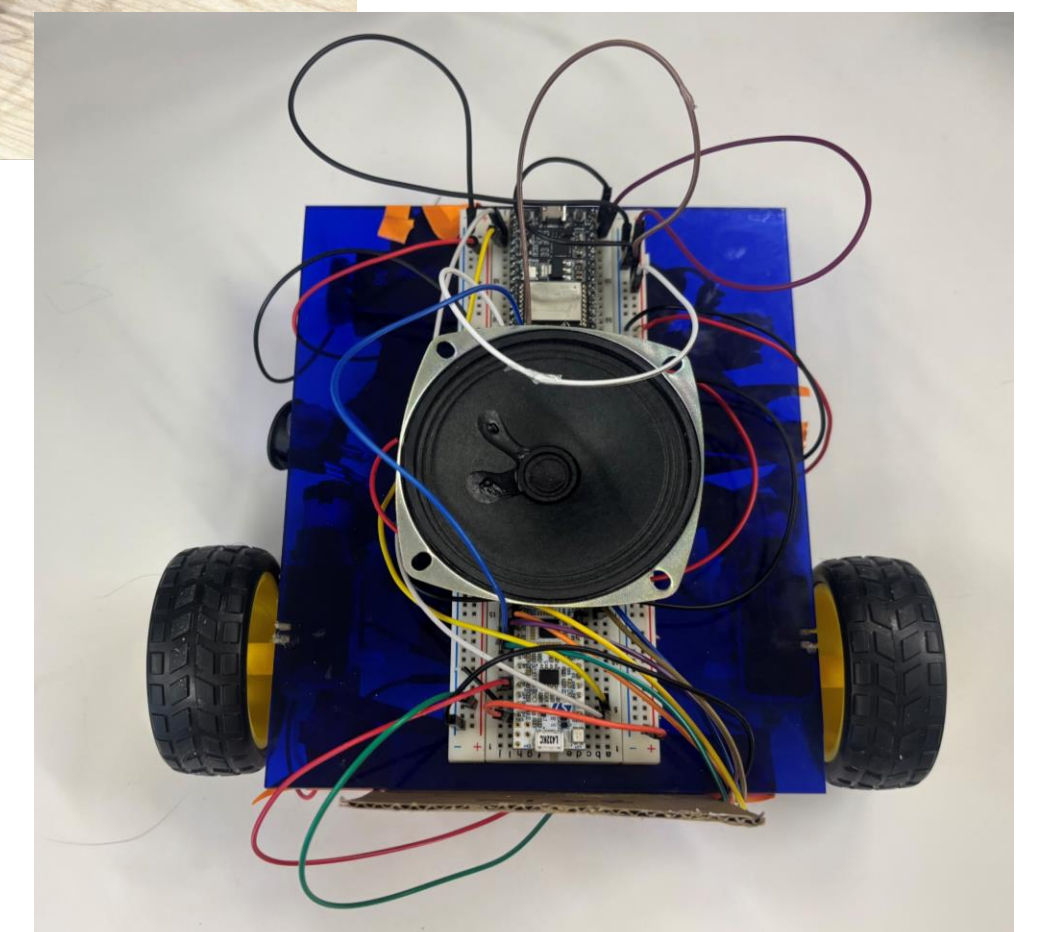
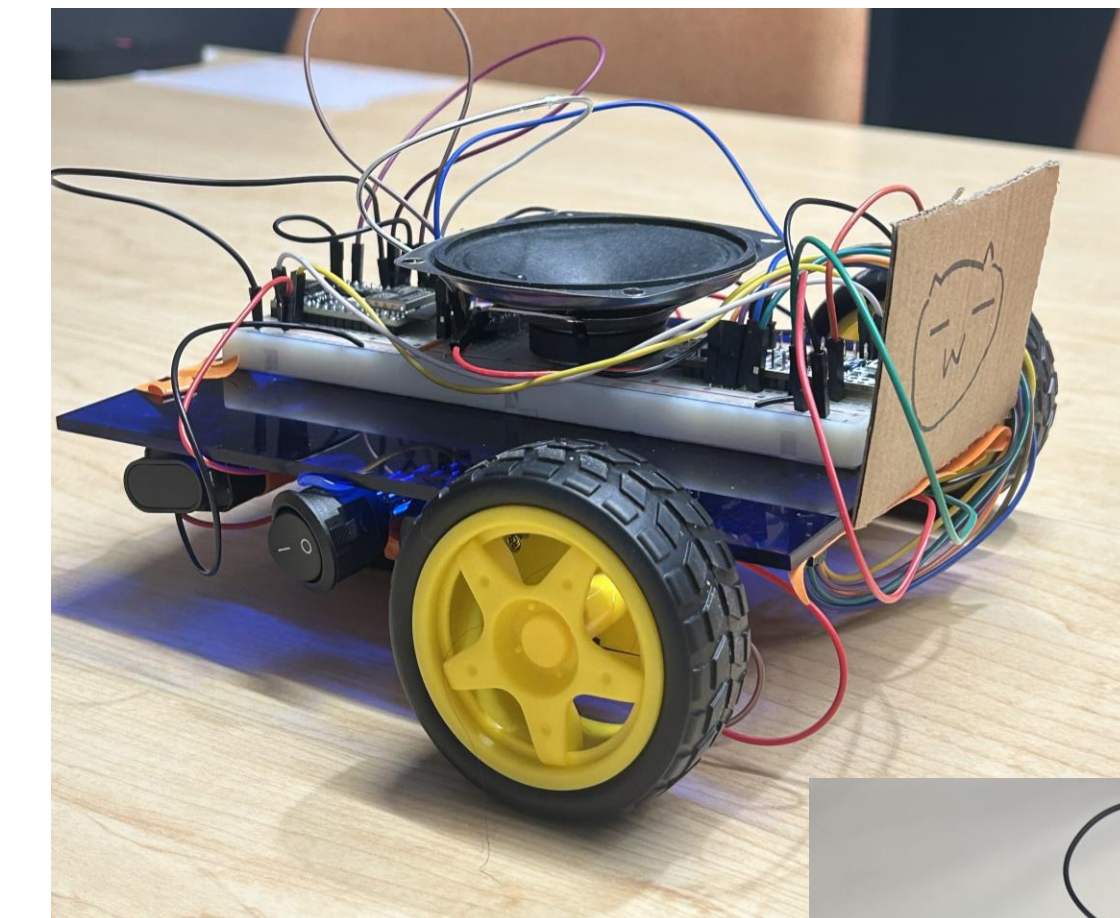
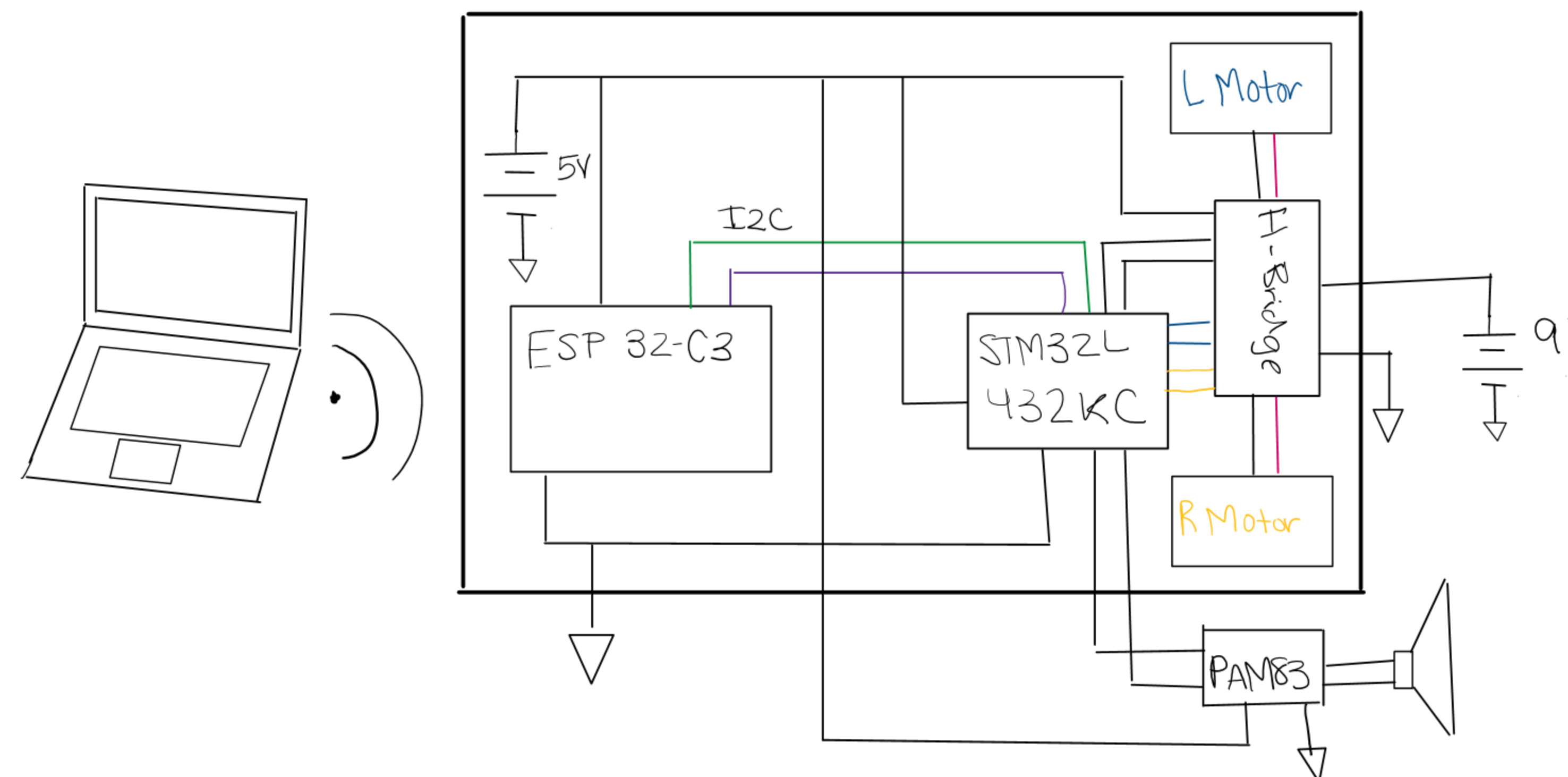
Dept. of Electrical and Computer Engineering

Introduction

This project implements Wi-Fi communication and interfaces multiple microcontrollers to build a remote-controlled car with a horn.

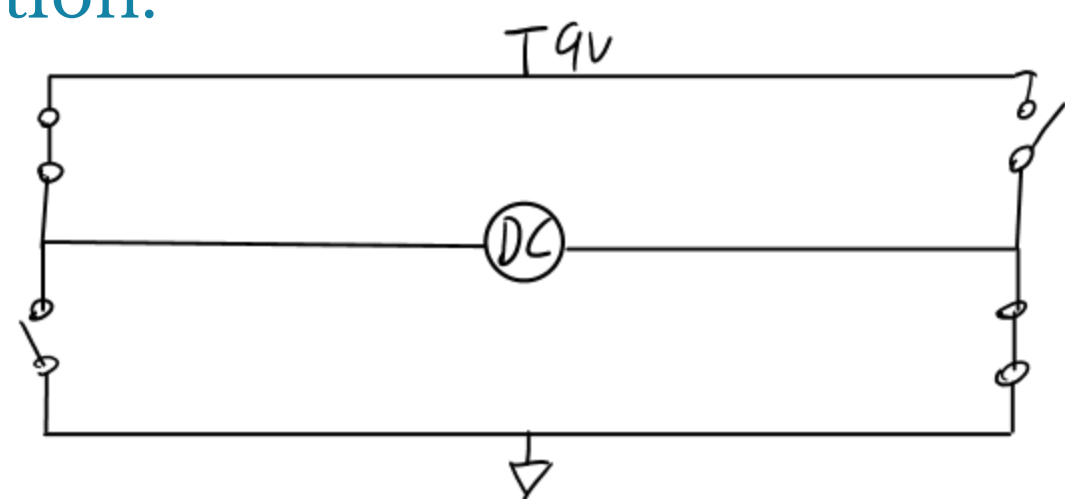


Hardware Overview:

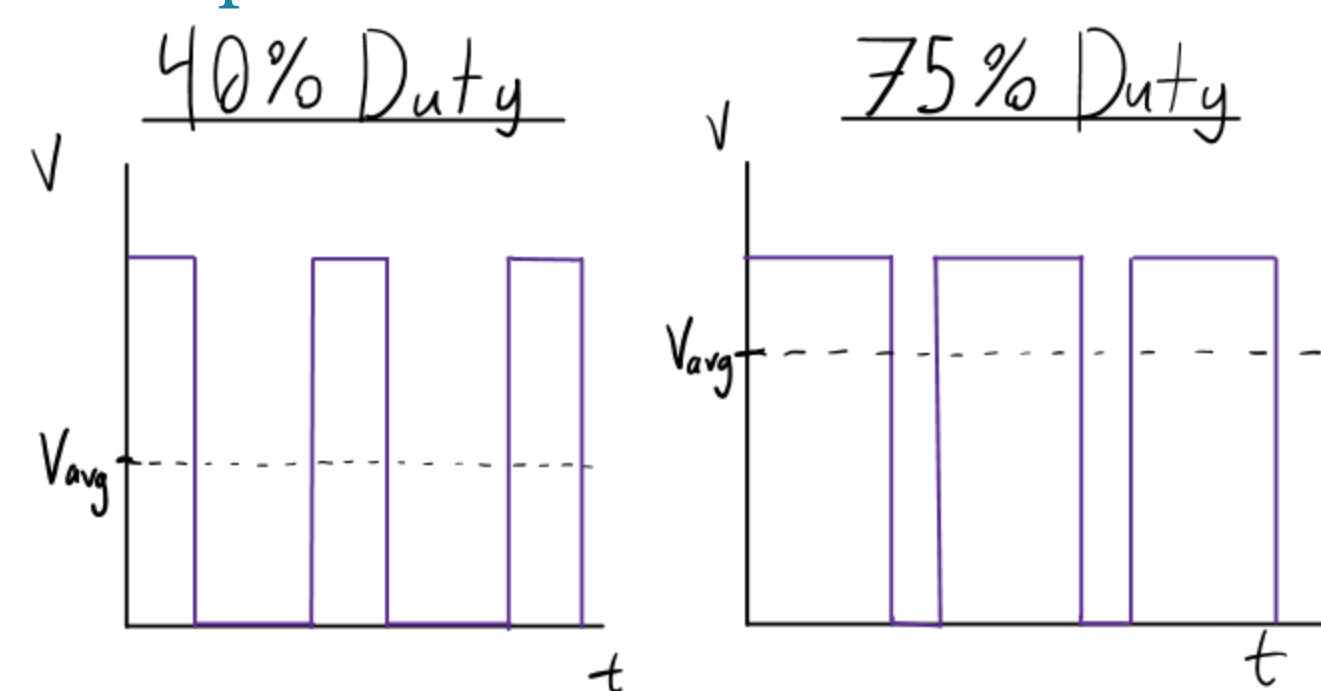


Motors/PWM

The H-Bridge controls the motor direction.

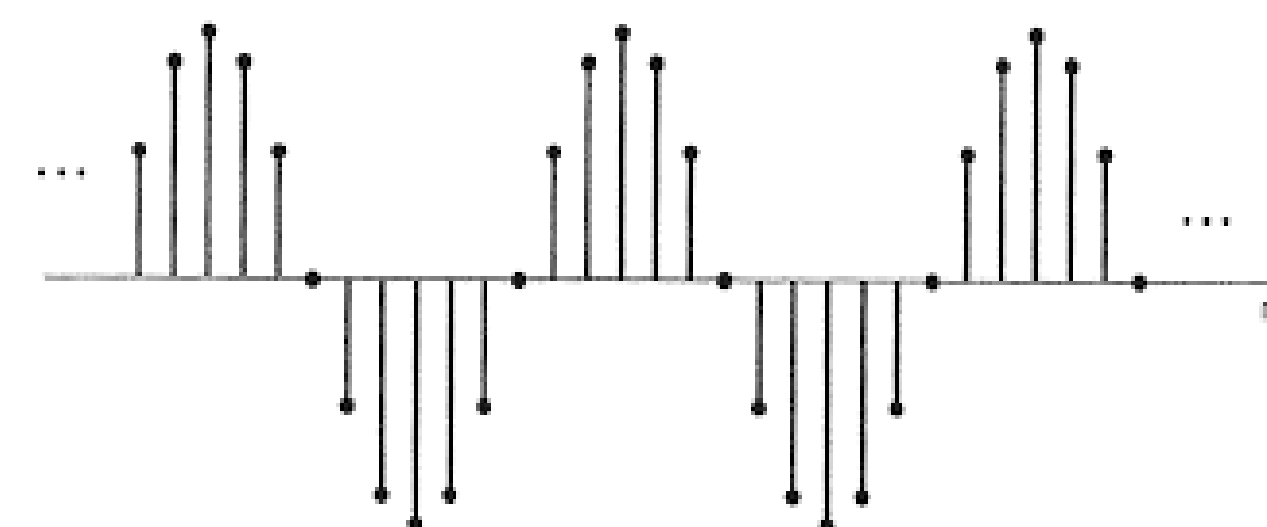


The motors are most efficient when they are fully on or off, making the duty cycle of the PWM the best way to control the motor speed.



DAC/Speaker Controller using DMA

A discrete sine wave is stored in memory and output by the DAC (accessed through DMA). Its frequency is decided by the DAC's timer. On the clock's update, a value is sent from the DAC to an amplifier and speaker, which causes the horn to sound.



Wireless Connection

The ESP generates a Wi-Fi signal which allows a laptop to control the board remotely.

The laptop transmits commands using a Python script.



I2C

The laptop can only communicate with the ESP, so the ESP is the controller and the STM is the peripheral.

I2C interrupts are configured for the STM, allowing the processor to handle the commands in real time. This is more efficient than polling for a message.

