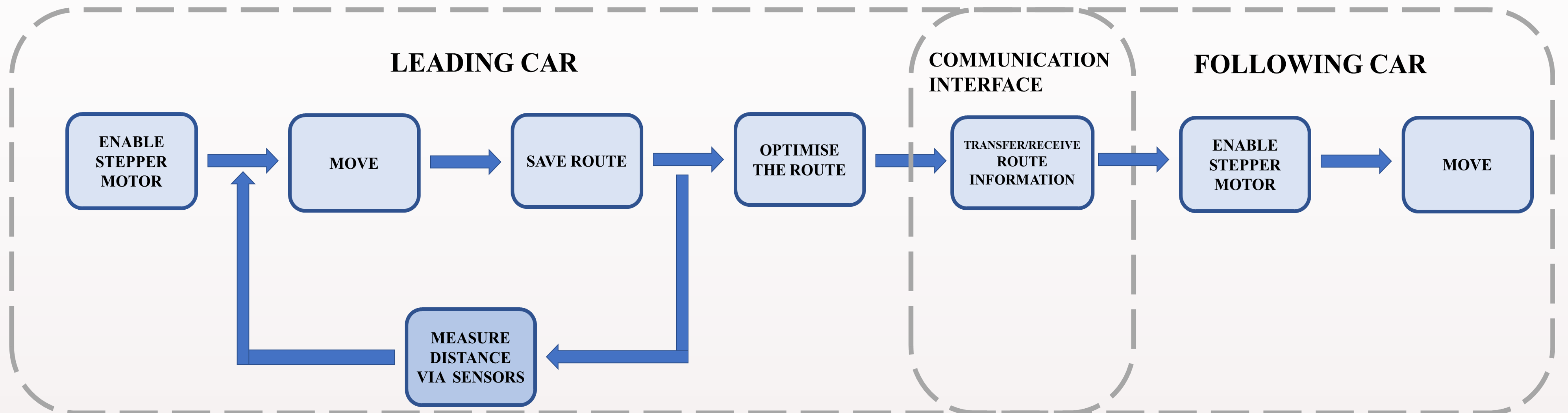# CONNECTED CARS

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This project is conducted in collaboration with [2]ROKETSAN A.Ş.

LEADING CAR — **COMMUNICATION INTERFACE** — **FOLLOWING CAR**

ENABLE STEPPER MOTOR → MOVE → SAVE ROUTE → OPTIMISE THE ROUTE → TRANSFER/RECEIVE ROUTE INFORMATION → ENABLE STEPPER MOTOR → MOVE
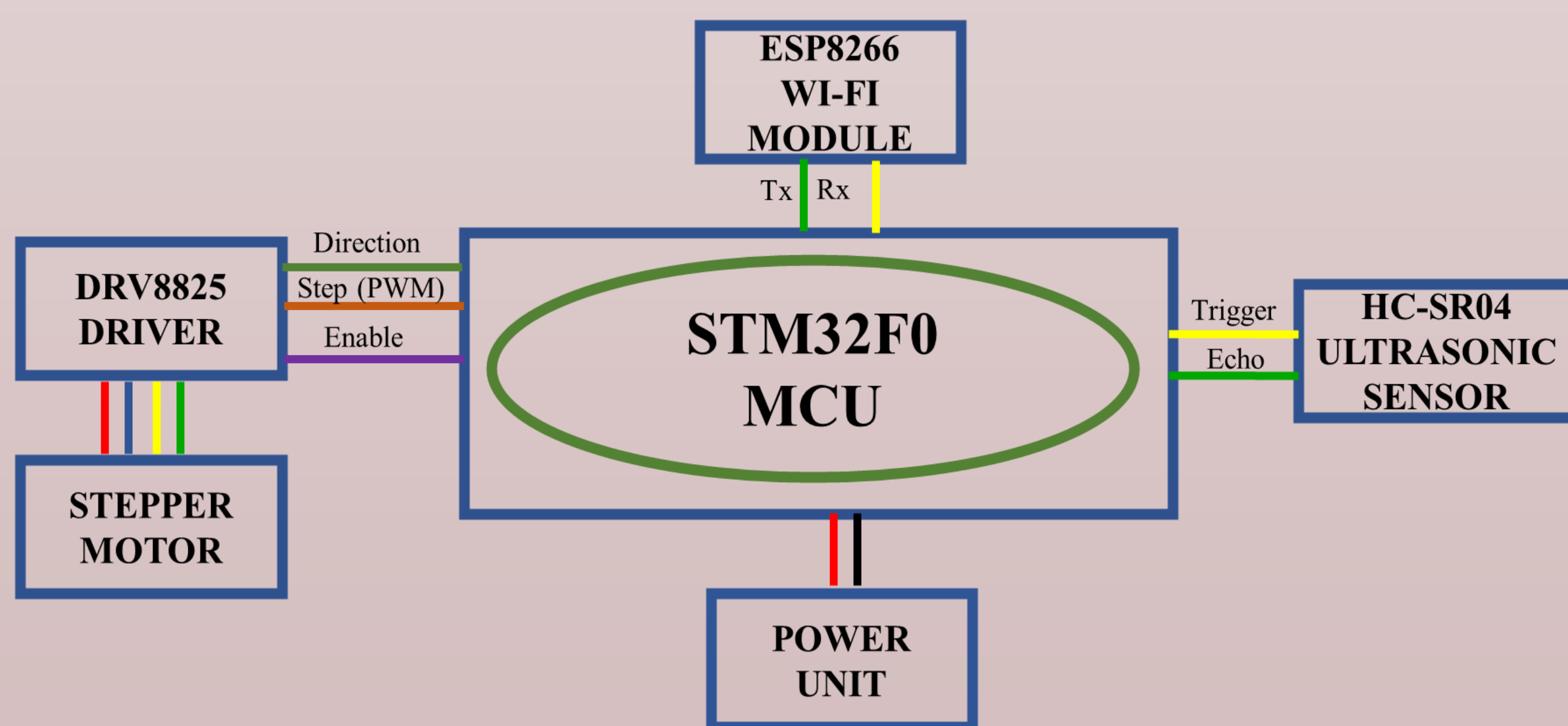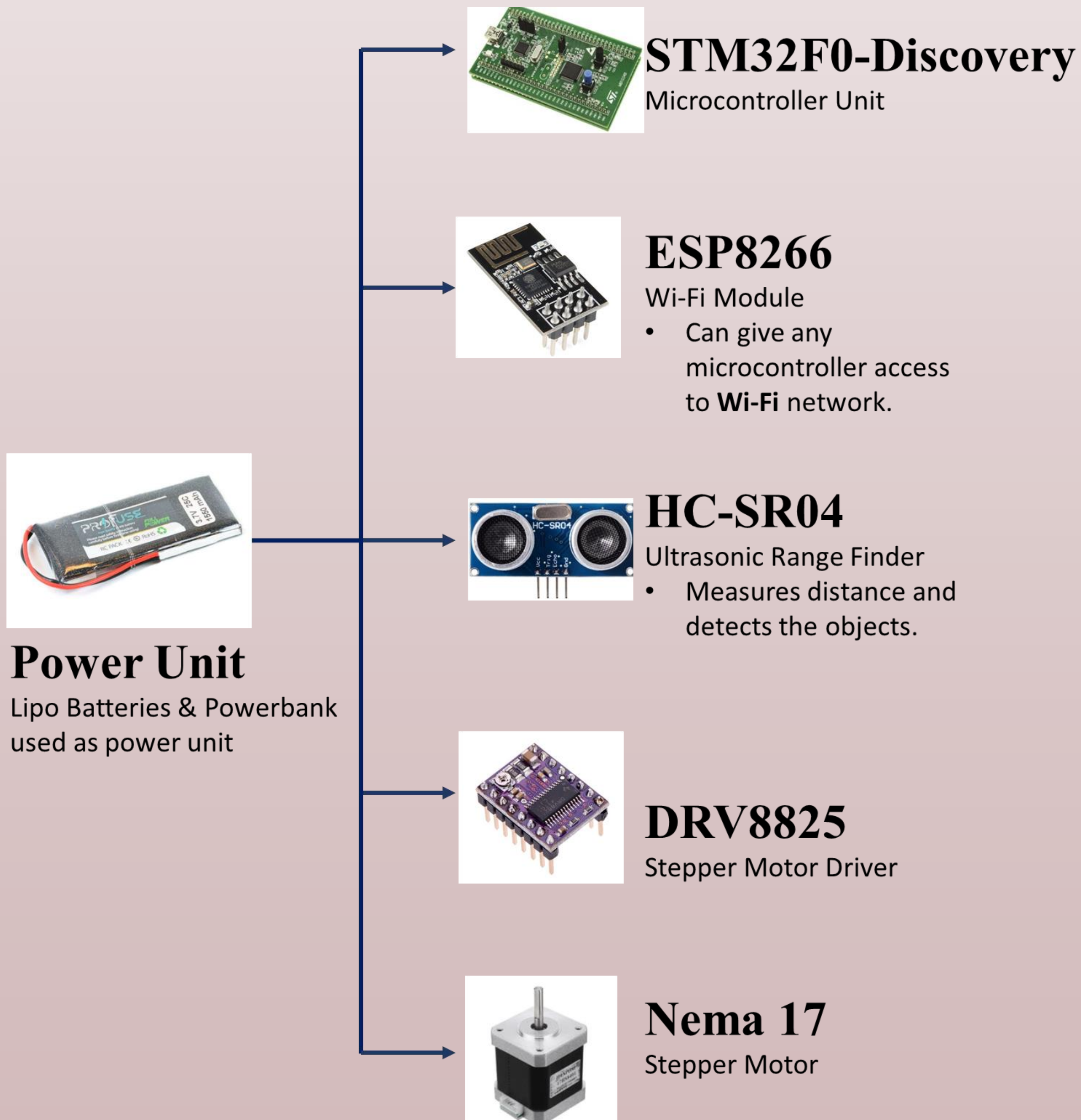
MEASURE DISTANCE VIA SENSORS

Introduction

- An autonomous connected car is a car that can create a map of its surroundings using various sensors and mapping algorithms as well as communicating with the systems around it.
- Today's autonomous cars do not know what to do if there is a GPS or data outage such as, in parking garages, urban cities, and tunnels.
- For these reasons, this project aims to achieve build an autonomous connected vehicle system via sensors and mapping algorithms without using GPS.

STM32F0-Discovery
Microcontroller Unit

ESP8266
Wi-Fi Module
- Can give any microcontroller access to **Wi-Fi** network.

HC-SR04
Ultrasonic Range Finder
- Measures distance and detects the objects.

DRV8825
Stepper Motor Driver

Nema 17
Stepper Motor

Power Unit
Lipo Batteries & Powerbank used as power unit

Specifications and Design Requirements

The system requirements specifications state that the system is autonomous, can perform a maze solving algorithm and transfer data. The system has sensors, stepper motors, a microcontroller, and a Wi-Fi module for this purpose.

The use case of the first car is discovering the path and transferring that information to another car while the use case of the second car is receiving the data from another car and following the given path.

Solution Methodology

The leading car has a purpose to complete a maze rather than merely avoiding obstacles. It performs the mapping operation with a maze-solving algorithm, which has the priority for the left-hand side. With this algorithm, any maze can be solved.

After the vehicle has successfully completed the maze, it optimizes the route and records the shortest ideal path. Subsequently, transmit the final map to the following car.

ESP8266 WI-FI MODULE — Tx Rx

DRV8825 DRIVER — Direction / Step (PWM) / Enable — STM32F0 MCU — Trigger / Echo — HC-SR04 ULTRASONIC SENSOR

STEPPER MOTOR

POWER UNIT

Conclusion

All in all, the autonomous movement of two vehicles, optimizing the route and communication with each other was accompanied by the afore-mentioned methods.

It is possible to progress to an IoT smart city project consisting of houses, traffic lights, and autonomous vehicles that are in contact with each other, inspired by these methods.

Acknowledgements