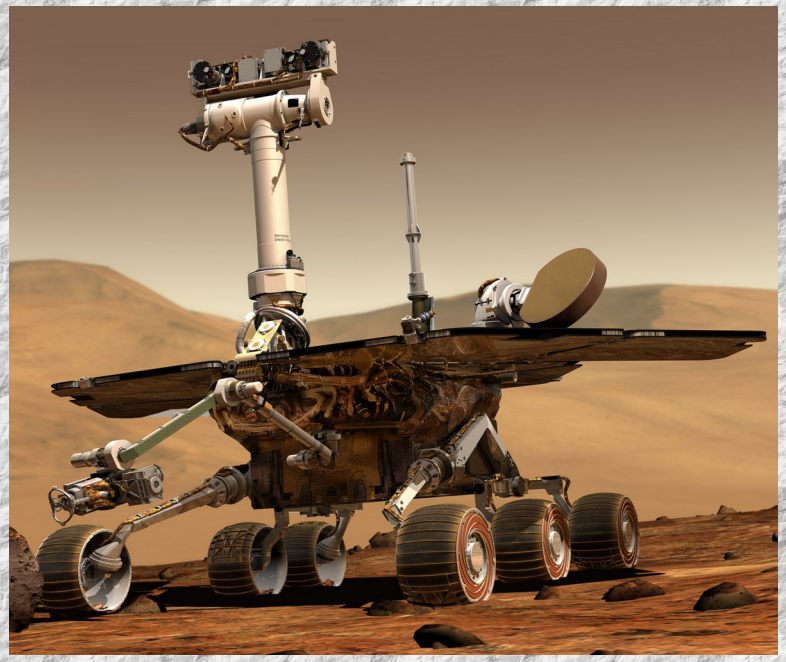


WiFi controlled Rover

Nikos Eleftheriou, Savvas Leventikidis

November 2022

Outline

- General comments
- Components
- Schematic diagram
- Rover operations
- Android app
- Future extensions

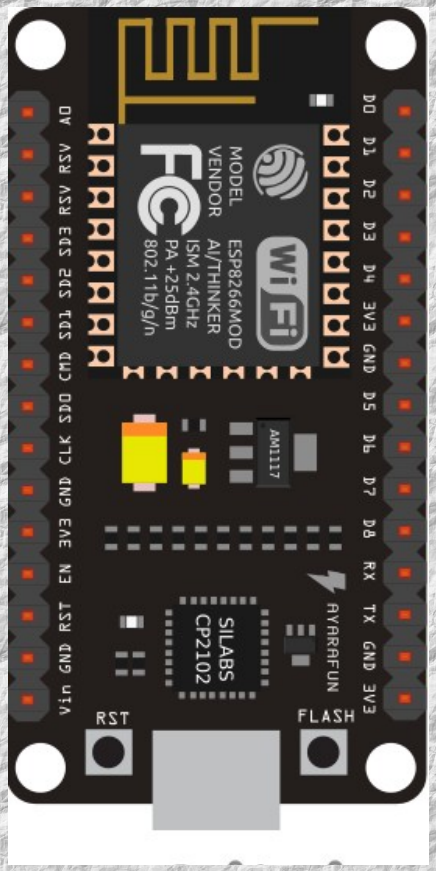
General comments

- Remote controlled (via Wi-Fi access point) vehicle (rover).
- The functions of the rover are controlled by the user from an cell phone app (only Android phones supported currently).
- Disadvantage: The operation area of the rover is limited to the Wi-Fi range.

Components

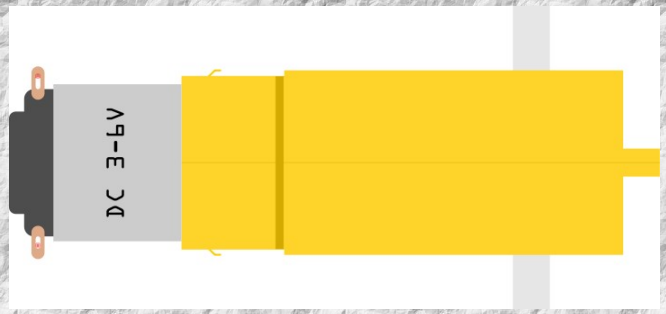
- Rover chassis kit
- NodeMCU – Lua based ESP8266
- 2 DC motors
- DC motor driver
- Dinstance & temperature sensors
- Buzzer
- 4 AA batteries, jumper wires, resistors, breadboard

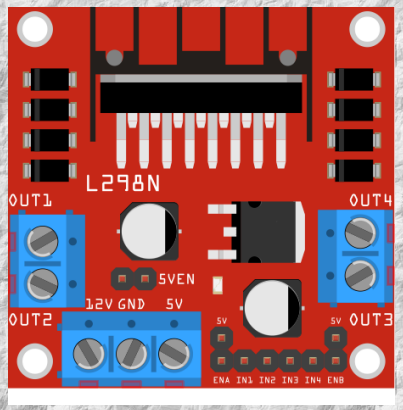
NodeMCU



- Simply programmable
- Low cost (<10€)
- Area efficient
- Built-in Wi-Fi module (ESP-8266)
- Processor: Tensilica 32-bit RISC CPU Xtensa LX106

Motors - Driver

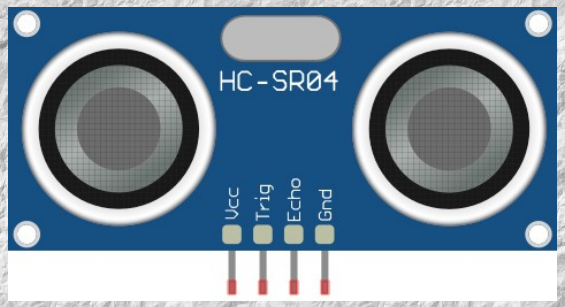




- Voltage: 3 V
- Speed: 125 rpm
- Torque: 0.8 kg·cm

- Motion direction and speed adjustment for (up to) 2 DC motors.

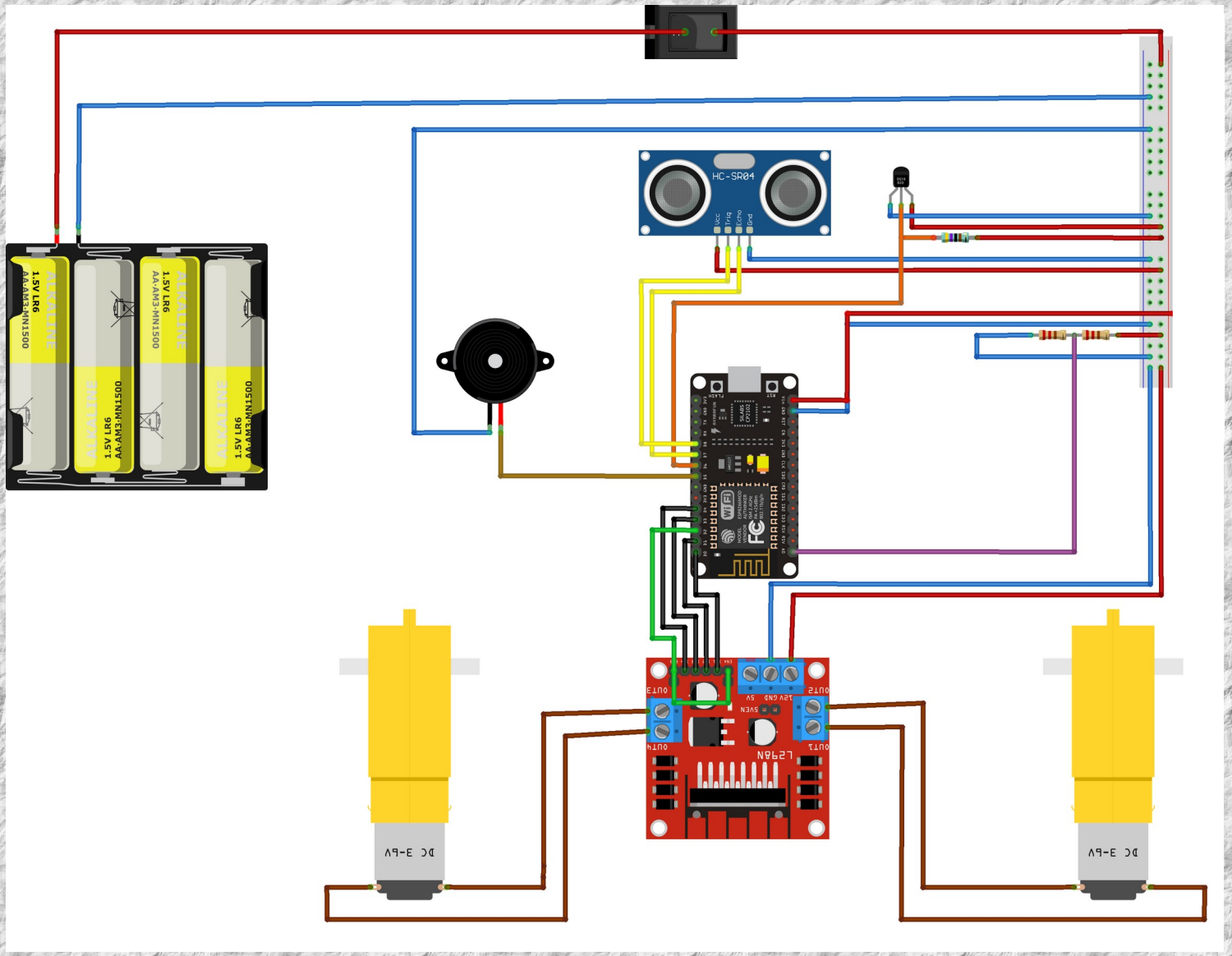
Sensors



- Ultrasonic distance calculation sensor
- 2cm to 400cm (1cm precision)

- Dallas 1-Wire protocol
- 64 bit serial number
- -55°C to 125°C (0.5°C precision)

Schematic diagram



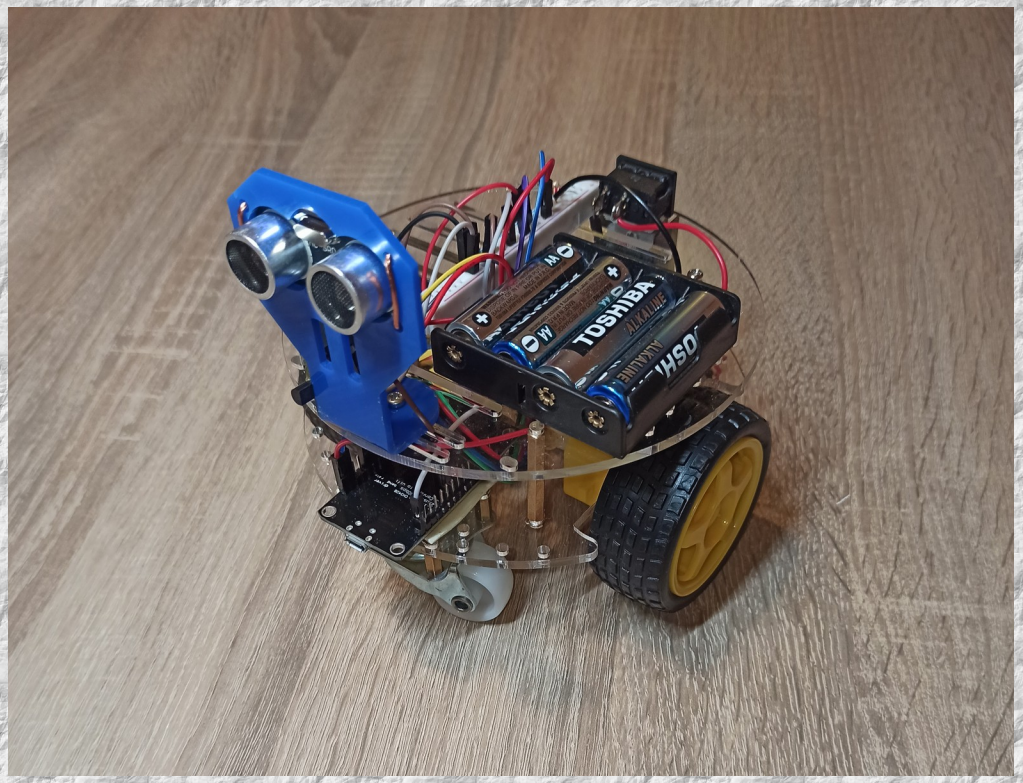
Rover operations

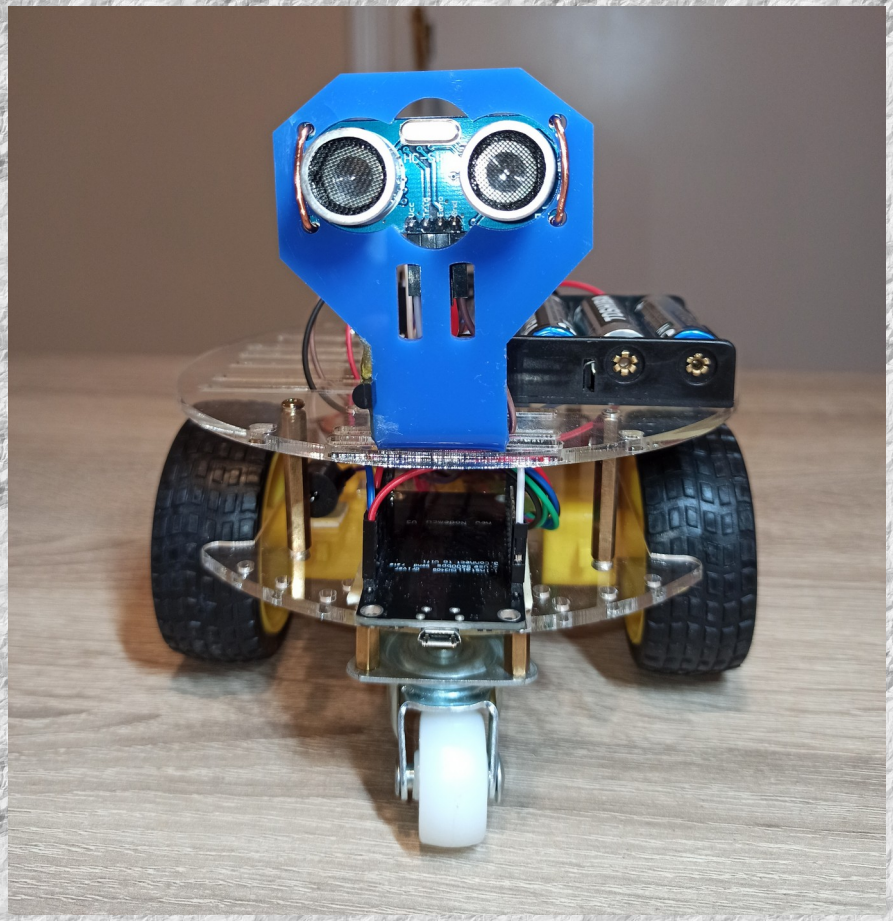
- Motions (forwards/backwards & rotational)
- Obstacle detection – immobilization
- User-adjusted safety distance
- Environment temperature measurement
- Power supply voltage measurement
- Buzzer notification (when obtacle detected but also as seperate function)

App functions

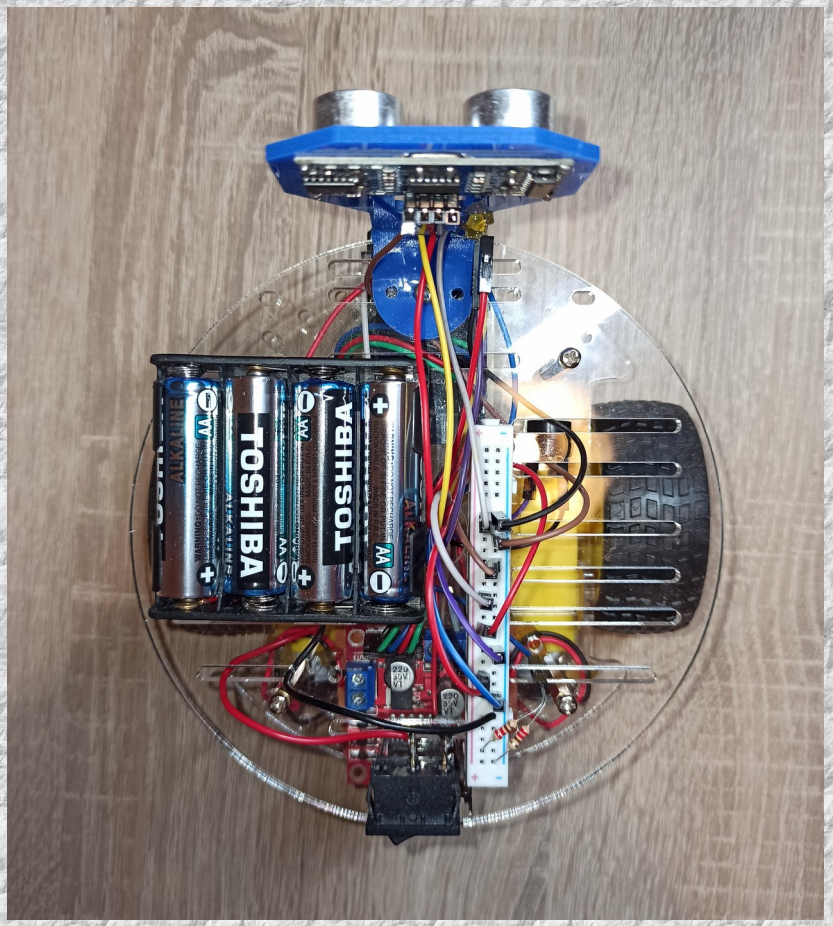
- Motion control
- Buzzer notification control
- Live streaming of temperature and voltage measurements
- Sensor values logging at a file permanently saved in the cell phone.

Photos





Photos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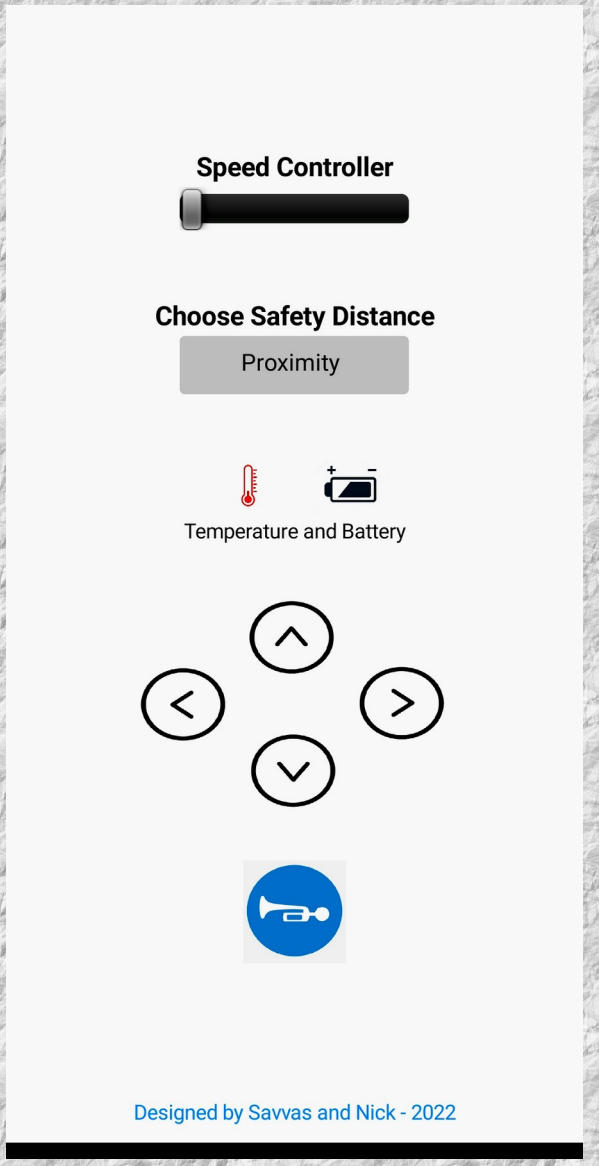
Speed Controller
Choose Safety Distance
Proximity
Temperature and Battery
Designed by Savvas and Nick - 2022

Future extensions

- Supply switching ability (4x1.5 V / 9 V).
- Add more sensors – functions (e.g. CO and humidity sensor to evaluate the climate - atmosphere quality).
- Embed camera for live-streaming the environment of the rover to the app in real time.

Future extensions

- Add robotic limbs so as the rover can interact with the environment.
- Auto “explorer” mode (self-driving, obstacle avoidance, measurement sending etc.)
- Mapping and record keeping of the rover’ s environment (mapping by dead reckoning).

Thank you