IoT Project: Height / capacity monitor

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Overview

- design of a system to check level of fluid in a basket
- measure height using an ultrasonic sensor and send it to central computer
- show if certain thresholds (low/high) are surpassed at basket and central computer using LEDs and Node-Red
- thresholds can be dynamically set using the Node-Red interface and are sent to the ESP connected to the sensor

Circuit

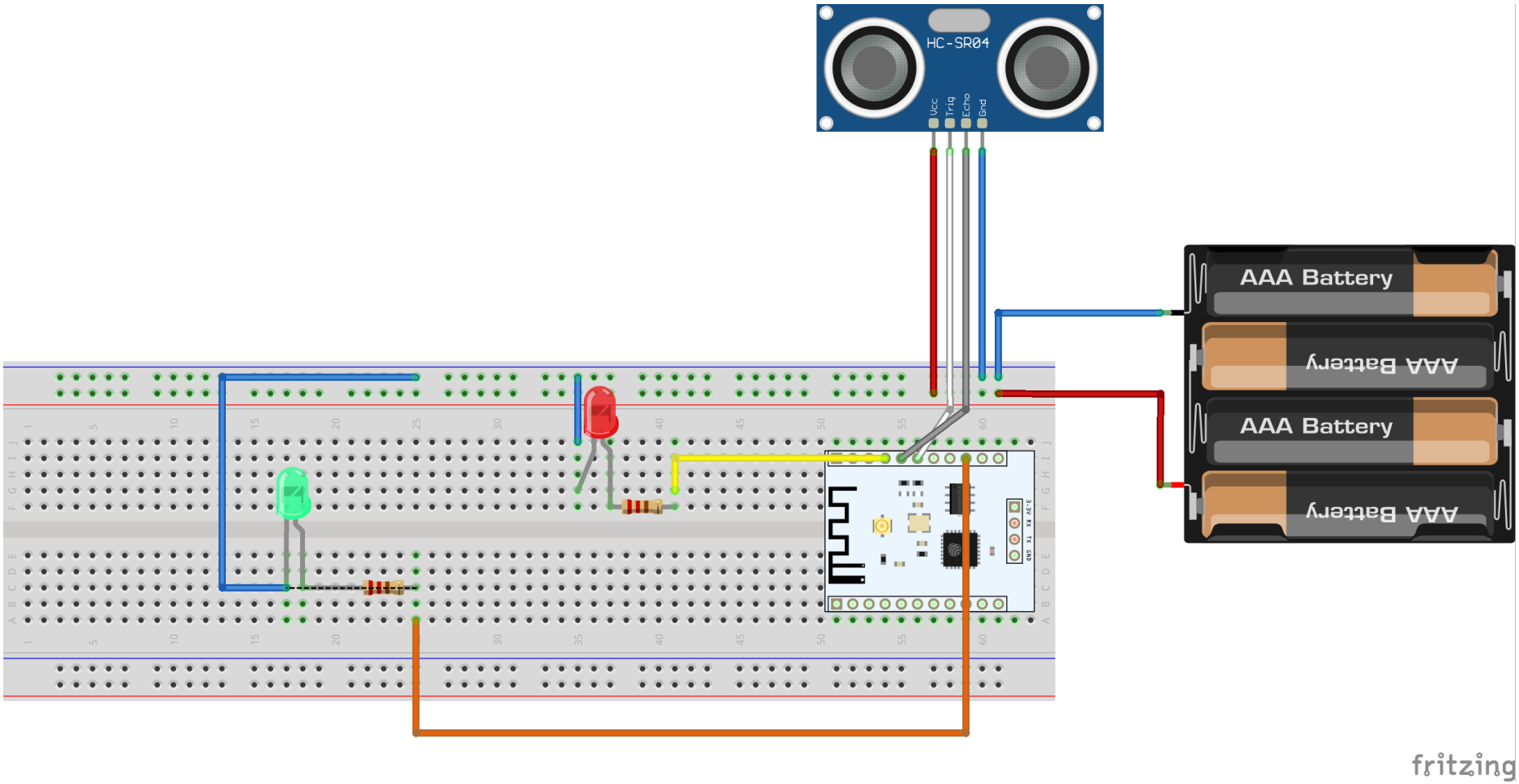

Figure: Circuit of the system

Micro controller program

Communication with the ultrasonic sensor

- implemented in the `loop()` function
- sensor is triggered with `digitalWrite(trigPin, LOW)` and `digitalWrite(trigPin, HIGH)`
- then the value is read with `pulseIn(echoPin, HIGH)` and the distance calculated basing on the time passed

Communication with the base station

- implemented in the `callback()` function, which overrides the one in Arduino libraries
- the `JSON` with thresholds information is received and parsed
- `LEDs` are switched on/off accordingly

Node-Red Flow

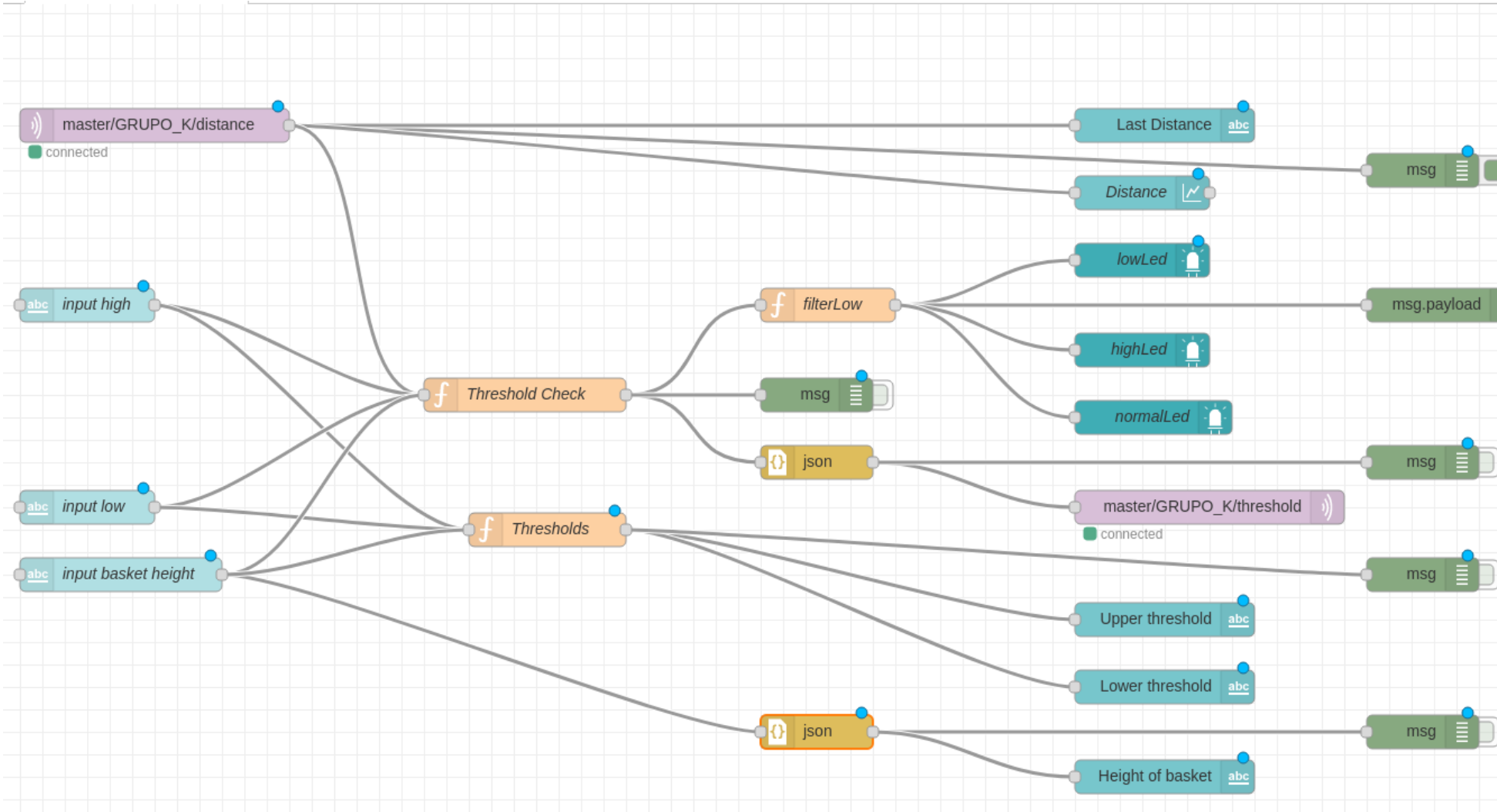

Figure: Node-Red flow

Limitations

- measurement fluctuations of the sensor $\rightarrow$ not reasonable values have to be filtered
- needs constant Wifi connection between central computer and ESP to recognize thresholds
- energy consumption scales with frequency of measurements
- Battery should be changed/charged periodically

Thanks for your attention!