



PUB TEMPERATURE MONITORING

Davide Rendina 830730
Andrei Gabriel Taraboi 829904

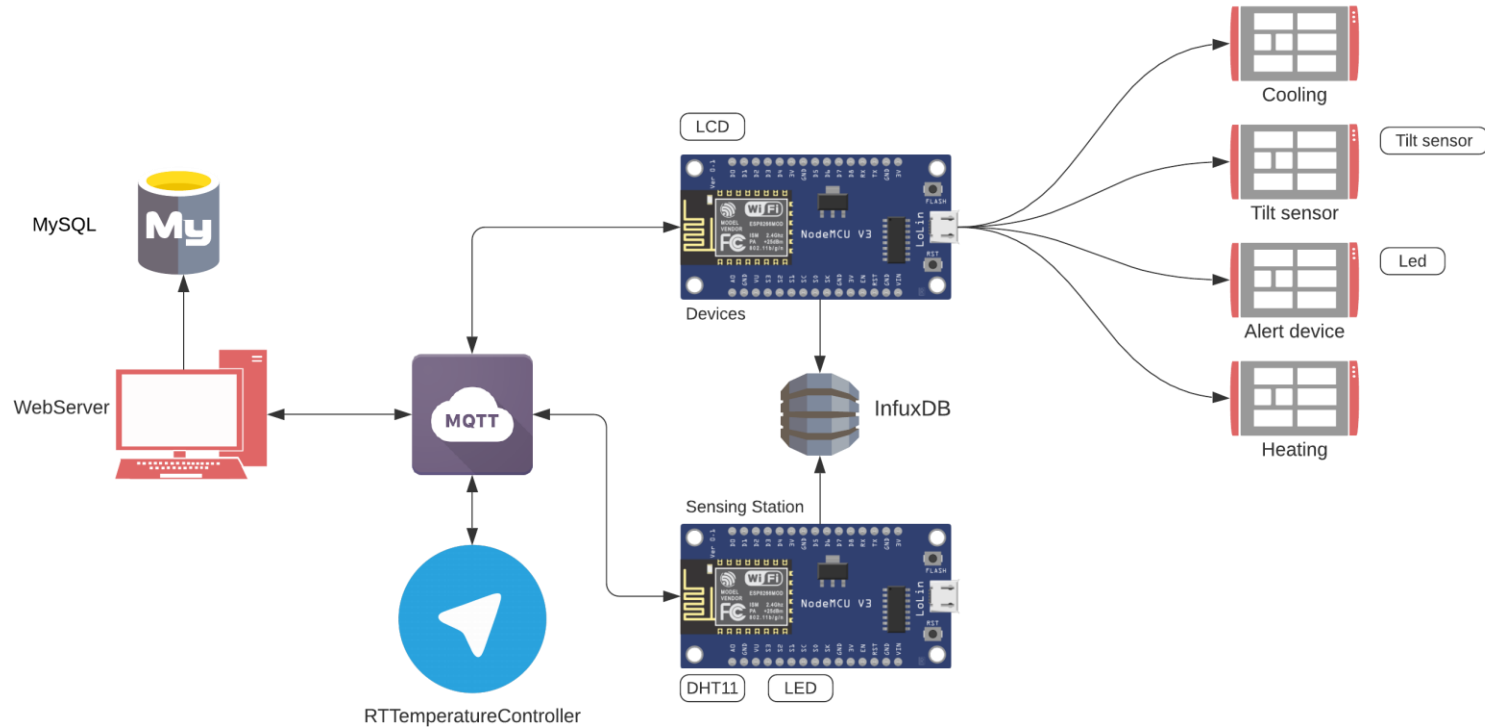


Obiettivi

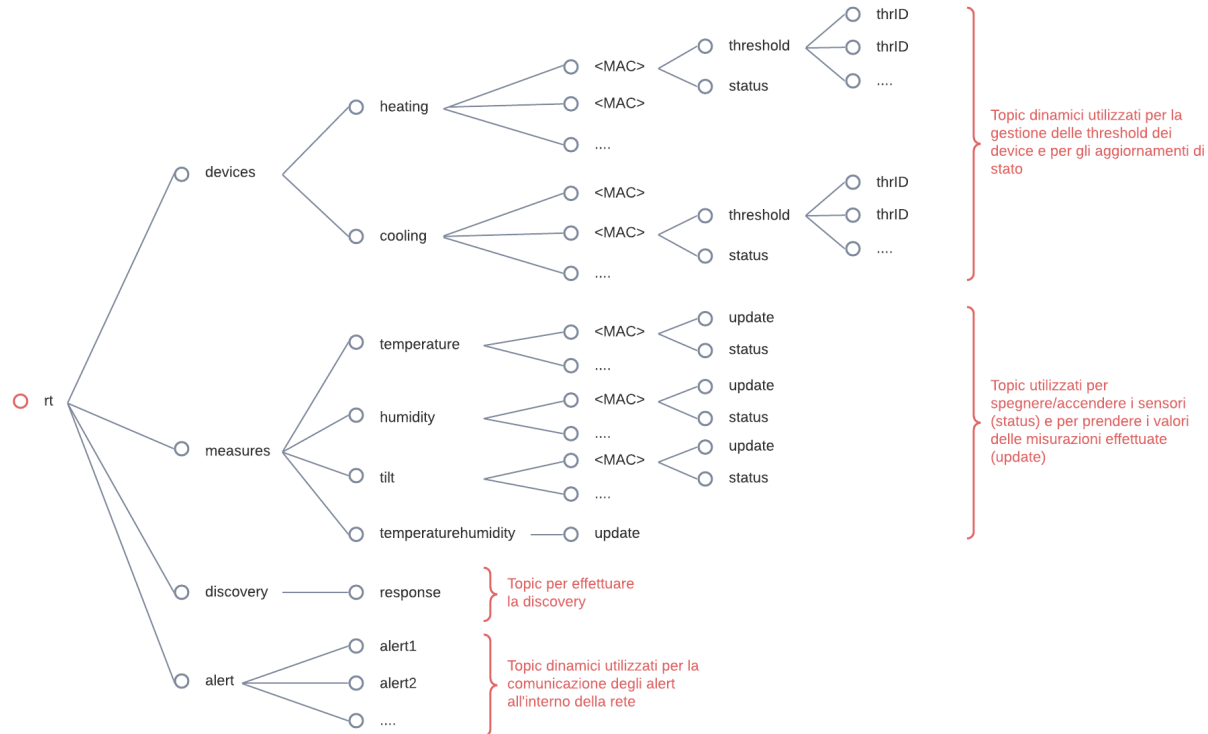


- Realizzare un sistema che permetta la gestione dei dispositivi di temperatura all'interno di un Bar.
- Eseguire un controllo sull'apertura, e chiusura, delle finestre dell'ambiente in cui ci si trova.
- Realizzare una smart network che permetta l'autoconfigurazione dei dispositivi che si collegano.
- Connettere i nodi della rete con MQTT.
- Utilizzare le Weather API per monitorare le previsioni meteo.
- Creare un'interfaccia web dinamica
- Costruire un sistema che offre grande dinamicità e resistenza ai fallimenti

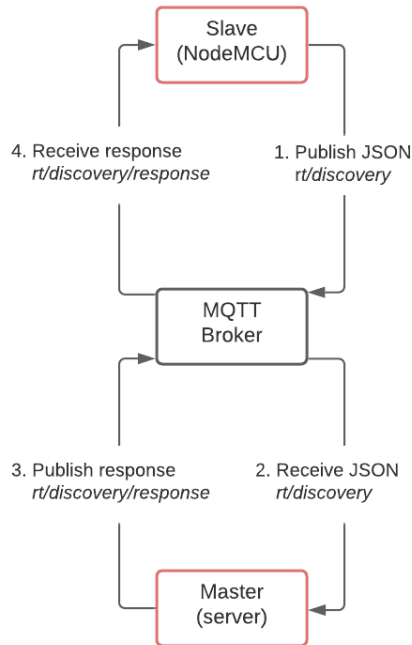
Struttura del sistema



MQTT



Fase di discovery



JSON discovery request structure

Device general info
(mac, name, description, type)

Threshold
(id, name, description, type, value)

Observes
(measureID)

Sensors
(id, name, status)

Alerts
(alertID)

JSON discovery response structure

General info
(mac, statusTopic)

Threshold topic
(lthresholdD : topic)

Observes topic
(measureID : topic)

Sensors topic
(sensorID : topic)

Alerts topic
(alertID : topic)

Database info
(connectInfo, pointDevice)

Risparmio energia



Sensing station

- Deep sleep ogni 10 minuti
- Log sulla rete ogni 30 minuti
- Utilizzo EEPROM



Tilt sensor

Deep sleep con risveglio tramite il sensore di tilt



Heating/cooling

Nessuna strategia di risparmio necessaria

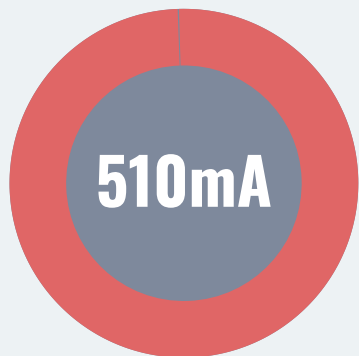


Alert Device

Deep sleep ad intervalli regolari di 5 minuti

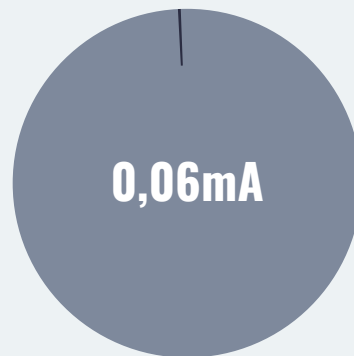


Consumo di corrente (teorico)



No sleep

Senza utilizzare strategie deep sleep, ogni dispositivo alimentato a batteria rimarrebbe attivo per 47 ore continue.



Deep sleep

Utilizzando strategie deep sleep, il sistema potrebbe in linea teorica rimanere attivo per 30 anni circa.

Interazione: Web APP



Home Temperature

Windows Count 0

Devices on 0

Alert

Alert window open: **off**

Heating

off

40:F5:20:04:3C:94-HT

Available sensors

Temperatura spegnimento

22

Cambia

Temperatura accensione

19.00

Cambia

Cooling

off

40:F5:20:04:3C:94-AC

Available sensors

Temperatura media

28.00

Cambia

Temperatura alta

32.00

Cambia

Umidità alta

80

Cambia

Alert device

40:F5:20:04:3C:94-AL

Available sensors

Tilt sensor

40:F5:20:04:3C:94-TL

Available sensors

tilt

Tilt sensor :
close

Acceso

Sensing station

40:F5:20:04:9E:DE

Available sensors

temperature

humidity

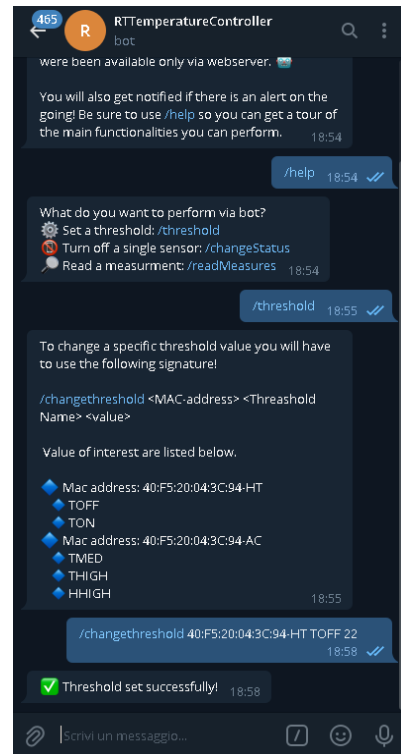
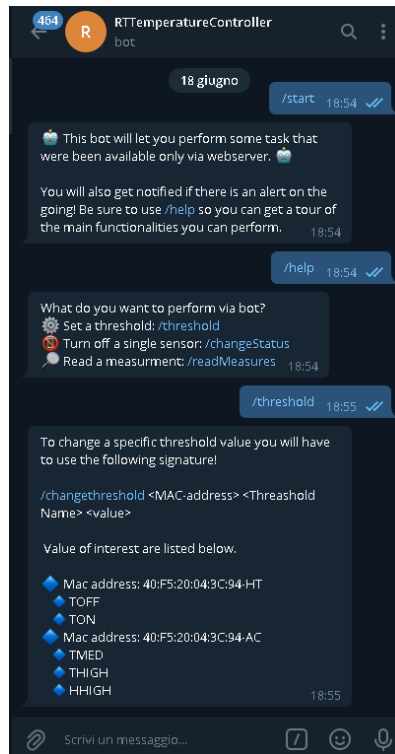
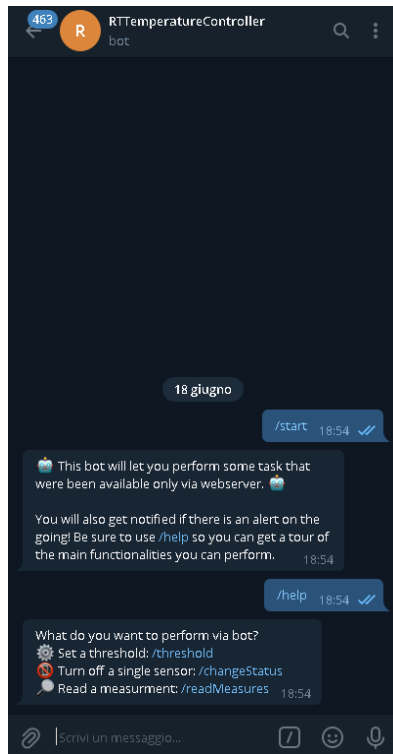
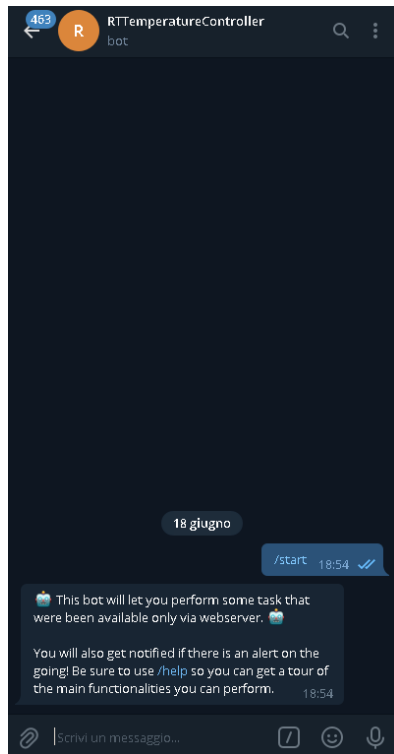
Temperature :
26

Acceso

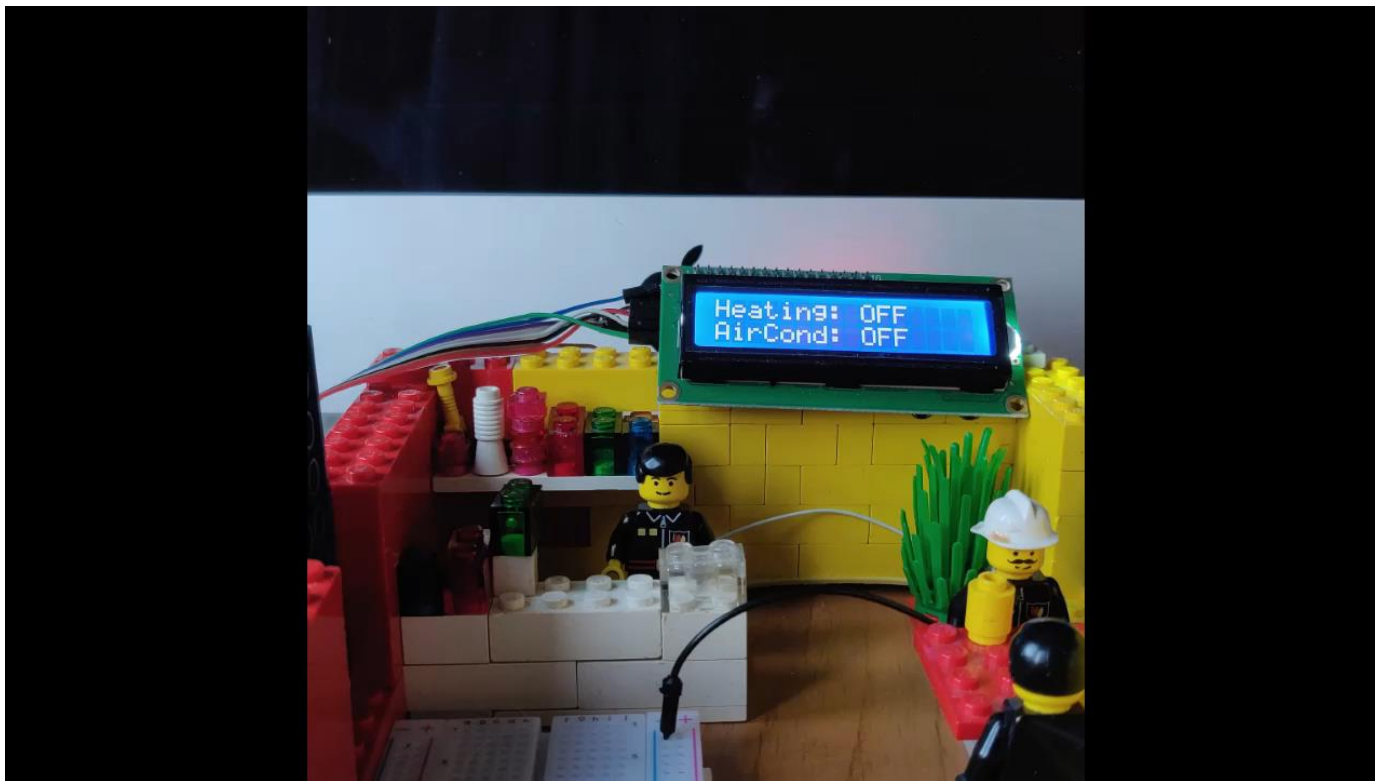
Humidity : 72

Acceso

Interazione: Telegram



Dimostrazione



Dimostrazione



The screenshot displays a web application interface for temperature control. On the left is a chat interface titled "RTTemperatureController bot". The chat history shows several messages, including a request to set a threshold and a successful response. The current message shows the bot's response to a "/getMeasure" command, listing available sensors and their values: Tilt sensor: close, Temperature: 26.00, and Humidity: 72.00. On the right is the main control panel, titled "Home Temperature". It features an "Alert" section with a status indicator "Alert window open: off". Below this are four sensor control panels: "Heating", "Cooling", "Alert device", and "Tilt sensor". Each panel shows the sensor's MAC address, available sensors, and current values. The "Heating" panel shows "Temperatura spegnimento" at 22 and "Temperatura accensione" at 19.00. The "Cooling" panel shows "Temperatura media" at 28.00, "Temperatura alta" at 32.00, and "Umidità alta" at 80. The "Alert device" panel shows the MAC address 40:F5:20:04:3C:94-AL. The "Tilt sensor" panel shows the MAC address 40:F5:20:04:3C:94-TL and an "Accesso" button. At the bottom right, a "Sensing station" panel shows the MAC address 40:F5:20:04:9E:DE and "Accesso" buttons for "Temperature: 26" and "Humidity: 72".

Chat Interface (RTTemperatureController bot):

- What do you want to perform via bot?
 - Set a threshold: /threshold
 - Turn off a single sensor: /changeStatus
 - Read a measurement: /readMeasures
- /threshold 18:54 ✓
- To change a specific threshold value you will have to use the following signature:
/changeThreshold <MAC address> <Threshold Name> <value>
Value of interest are listed below.
 - Mac address: 40:F5:20:04:3C:94-HT
 - TOFF
 - TON
 - Mac address: 40:F5:20:04:3C:94-AC
 - TMED
 - THIGH
 - HHIGH
- /changeThreshold 40:F5:20:04:3C:94-HT TOFF 22 18:58 ✓
- Threshold set successfully! 18:58 ✓
- /readMeasures 19:26 ✓
- From here you can perform two different task.
Either you just ask all the measures now available via /getMeasure, or you could use the following signature:
/getMeasure <MAC address> <Name>
Value of interest are listed below.
 - Mac address: 40:F5:20:04:3C:94-TL
 - Tilt sensor
 - Mac address: 40:F5:20:04:9E:DE
 - Temperature
 - Humidity
- /getMeasure 19:26 ✓
- Tilt sensor: close
- Temperature: 26.00
- Humidity: 72.00 19:26

Home Temperature Control Panel:

- Alert**
Alert window open: off
- Heating** (off)
40:F5:20:04:3C:94-HT
Available sensors
Temperatura spegnimento: 22 (Cambia)
Temperatura accensione: 19.00 (Cambia)
- Cooling** (off)
40:F5:20:04:3C:94-AC
Available sensors
Temperatura media: 28.00 (Cambia)
Temperatura alta: 32.00 (Cambia)
Umidità alta: 80 (Cambia)
- Alert device**
40:F5:20:04:3C:94-AL
Available sensors
- Tilt sensor**
40:F5:20:04:3C:94-TL
Available sensors
Tilt sensor: close (Accesso)
- Sensing station**
40:F5:20:04:9E:DE
Available sensors
temperature
humidity
Temperature: 26 (Accesso)
Humidity: 72 (Accesso)

Dimostrazione



The screenshot displays a web application interface for temperature control. On the left, a chat window titled "RTTemperatureController bot" shows a conversation. The chat history includes a message about changing a threshold value, a successful confirmation, and a request to read measures. The latest message, highlighted with a red box, shows the results of a "getMeasure" command: "Tilt sensor: open", "Temperature: 26.00", and "Humidity: 72.00".

The main dashboard, titled "Home Temperature", features several sections:

- Alert:** A section with a red "off" indicator and the text "Alert window open: off".
- Heating:** A section with a red "off" indicator, showing "40:F5:20:04:3C:94-HT" and "Available sensors" with values for "Temperatura spegnimento" (22) and "Temperatura accensione" (19.00).
- Cooling:** A section with a red "off" indicator, showing "40:F5:20:04:3C:94-AC" and "Available sensors" with values for "Temperatura media" (28.00), "Temperatura alta" (32.00), and "Umidità alta" (80).
- Alert device:** A section showing "40:F5:20:04:3C:94-AL" and "Available sensors".
- Tilt sensor:** A section showing "40:F5:20:04:3C:94-TL" and "Available sensors" with a "Tilt sensor: open" status and an "Acceso" button.
- Sensing station:** A section showing "40:F5:20:04:9E:DE" and "Available sensors" with "temperature" (26.00) and "humidity" (72.00) values, each with an "Acceso" button.

The top right of the dashboard shows "Windows Count 1" and "Devices on 0".

Dimostrazione



The screenshot displays a web application interface for a temperature control system, divided into two main sections: a chat window on the left and a control panel on the right.

Chat Window (Left):

- Header: RTTemperatureController bot
- Content: A series of messages and commands. Key messages include:
 - Value of interest are listed below.
 - Mac address: 40:F5:20:04:3C:94-HT
 - Mac address: 40:F5:20:04:3C:94-AC
 - Mac address: 40:F5:20:04:3C:94-TL
 - Mac address: 40:F5:20:04:9E:DE
 - Value of interest are listed below.
 - Mac address: 40:F5:20:04:3C:94-TL
 - Tilt sensor
 - Mac address: 40:F5:20:04:9E:DE
 - Temperature
 - Humidity
 - Tilt sensor: close
 - Temperature: 26.00
 - Humidity: 72.00
 - Tilt sensor: open
 - Temperature: 26.00
 - Humidity: 72.00
 - Will start raining at 00:00, be sure to close your windows.
 - ⚠ We caught an alert for you! ⚠
 - Alert window open: Is now on

Control Panel (Right):

- Header: Home Temperature
- Alert: Alert window open: on
- Heating: off
- Cooling: on
- Tilt sensor: 40:F5:20:04:3C:94-TL
- Alert device: 40:F5:20:04:3C:94-AL
- Sensing station: 40:F5:20:04:9E:DE

Red boxes highlight the following elements:

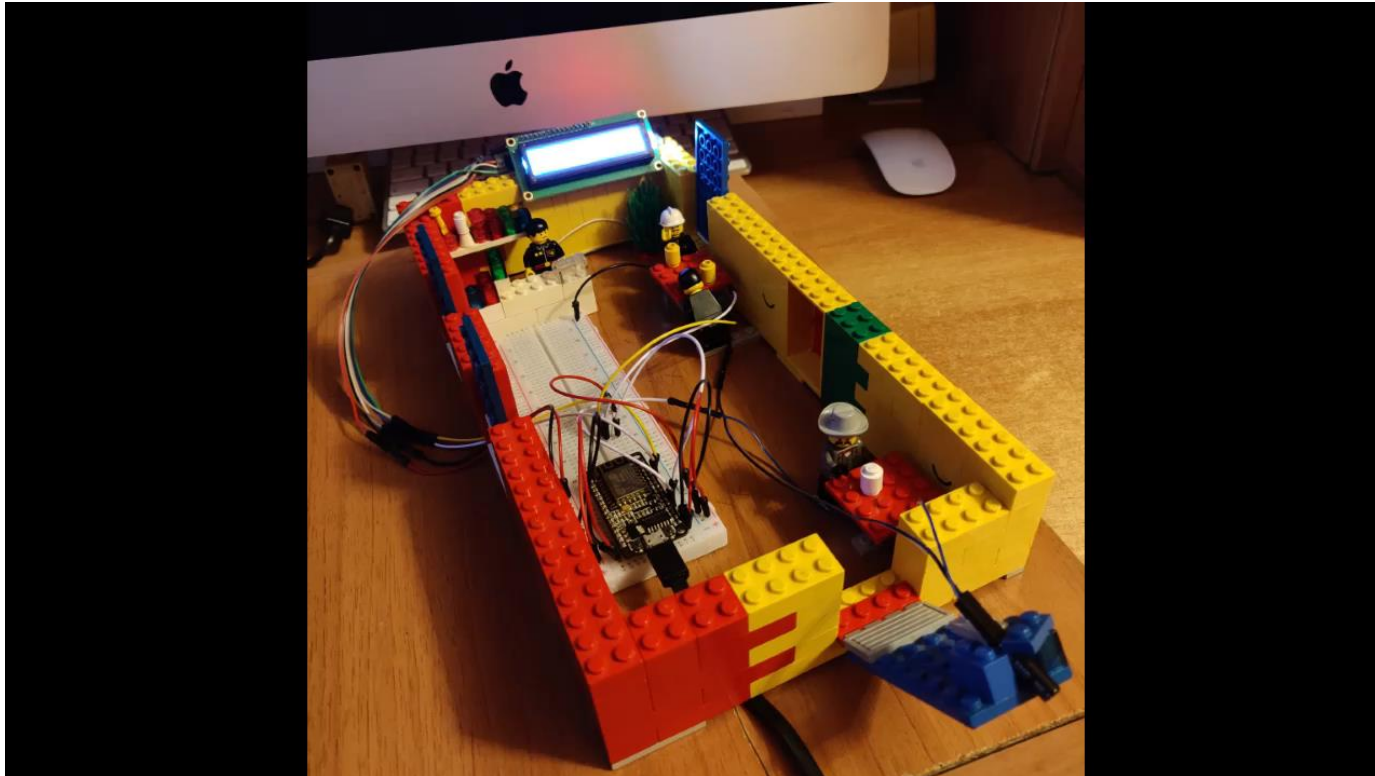
- The 'Alert' section.
- The 'Cooling' section.
- The 'Alert device' section.
- The warning message in the chat window.

Dimostrazione



The screenshot displays a web application interface for temperature control. On the left is a chat window titled "RTTemperatureController bot" with a dark theme. It shows a list of commands like "/changeThreshold" and "/readMeasures", and a series of messages including sensor readings (Tilt sensor, Temperature, Humidity) and alerts (e.g., "Alert window open: is now on", "Alert window open: is now off"). The right side of the interface is a light-colored dashboard titled "Home Temperature". It features a top bar with "Windows Count 0" and "Devices on 1". Below this is an "Alert" section with a red box around the text "Alert window open: off". The dashboard is divided into four main sections: "Heating" (with a red "off" indicator), "Cooling" (with a green "on" indicator), "Tilt sensor", and "Alert device". Each section displays available sensors and their current values, along with "Cambia" (Change) buttons. The "Sensing station" section at the bottom shows temperature and humidity readings with "Acceso" (Access) buttons. A red box highlights the "Alert" section in the top right of the dashboard.

Dimostrazione



Conclusioni

01

Devices

Utilizzo di un NodeMCU per ogni device, in modo da togliere la simulazione degli stessi.

02

Risparmio energetico

Adottare tecniche di deep sleep anche per i due dispositivi per cui non è stato possibile farlo (*alert device* e *tilt sensor*).





Grazie dell'attenzione

Davide Rendina 830730
Andrei Gabriel Taraboi 829904

