Stress detector for light biofeedback

A wearable device prototype project

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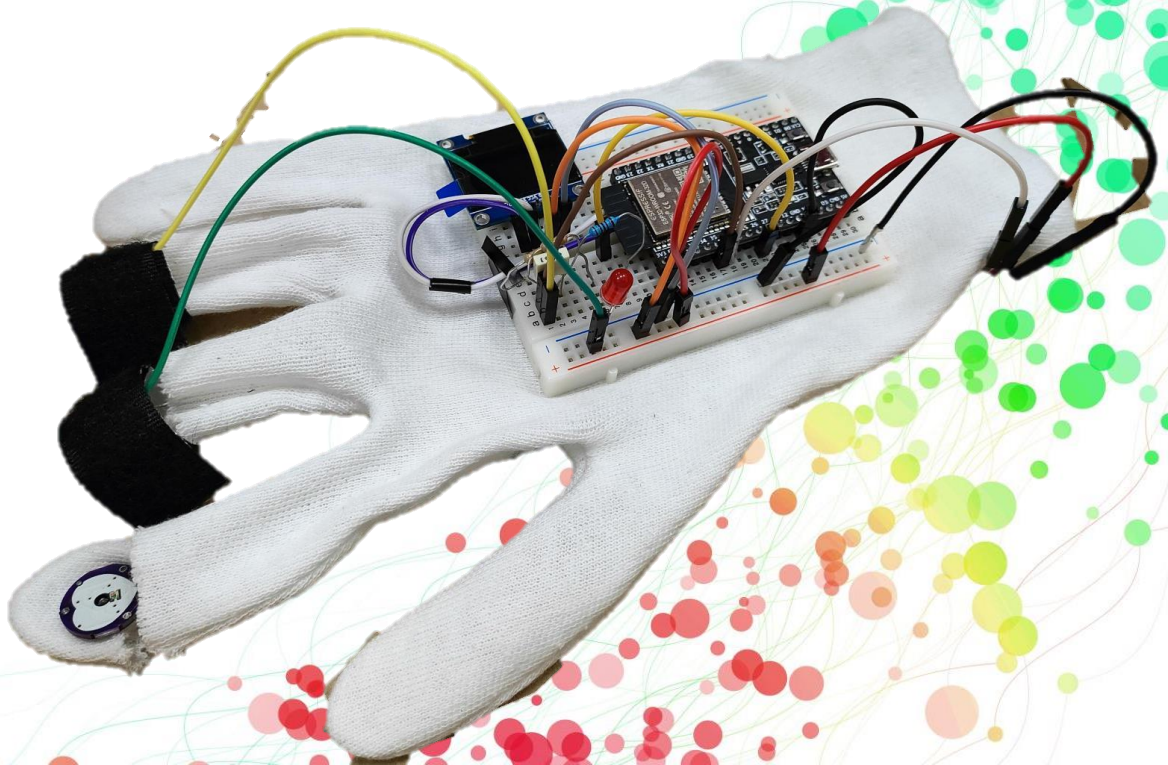
The behind idea is:
Use **Stress biofeedback** to control **environmental parameter** of a house (ex. Light) in **Autistic person**

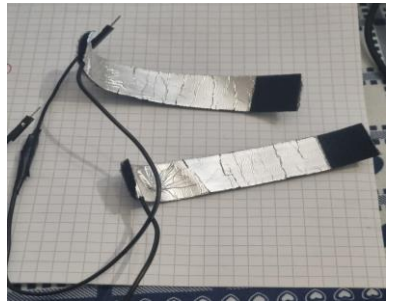


How measure stress?

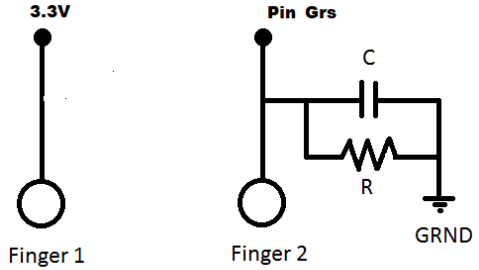
- Galvanic skin response (**GSR**) sensor (the gold standard parameter for stress detection) **[3]-[4]**
- Hearth rate (**HR**) sensor (a possible improvement can be **HRV**, more correlated to stress than HR)

The acquisition and elaboration of data is made through a **Esp32 microcontroller**

[1]



[2]



R_dito

Calibration

Stress threshold
Relax threshold

V_bpm

Peack detection

BPM

stressor → physiological activation → Skin resistance ↓ / Earth rate ↑

How do feed-back?

Ambient light control simulated by a **RGB led**

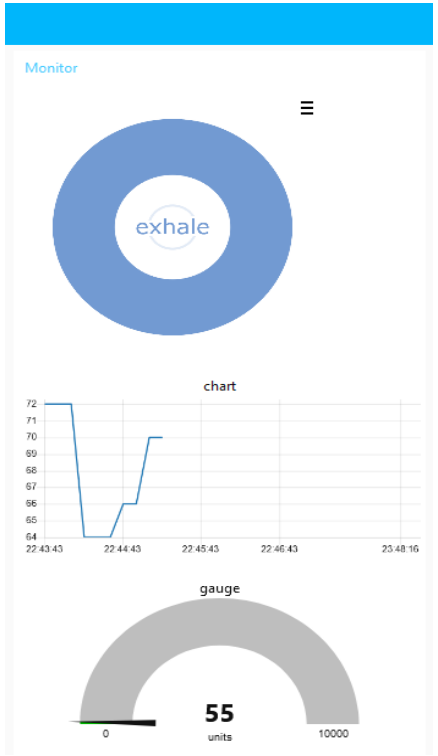
[5]

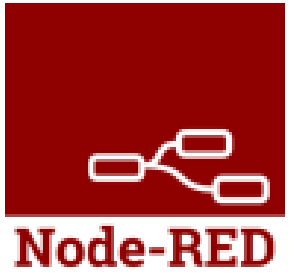
Feed-back

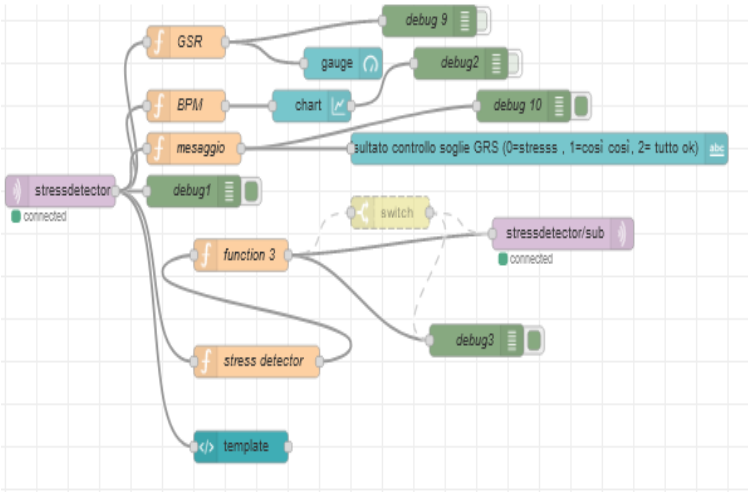
STRESS zone

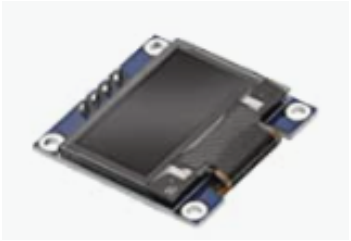
How to visualize data, interact with device and implement IoT part?

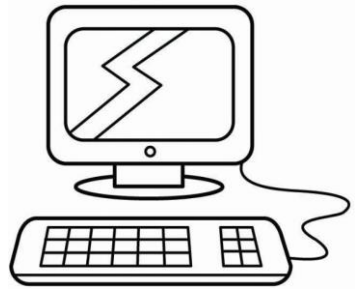
- **Mqtt communication protocol** in order to send and receive message to a **Mosquitto server** (IoT part implemented through **node-red programming tool**)
- **Dashboard** in order to visualize data and **remote monitoring**
- **Wi-fi connection**
- **Oled display** and **button** for instruction and interaction with device
- Possible extension: light control through a second **esp-32 device**











Bibliography

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- [3]https://www.researchgate.net/publication/312246486_A_Brief_Introduction_and_Review_on_Galvanic_Skin_Response
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- [5] Yu, B., Hu, J., Funk, M. *et al. DeLight*: biofeedback through ambient light for stress intervention and relaxation assistance.