# VO2 Max mask

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Group and project presentation

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Describe problem and solution

03. **Technical Approach**

Technical aspects

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User experience

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Visualize solutions and prototype

06. **Project Methodology**

Summarize and reflect on the project methodology

# Introduction

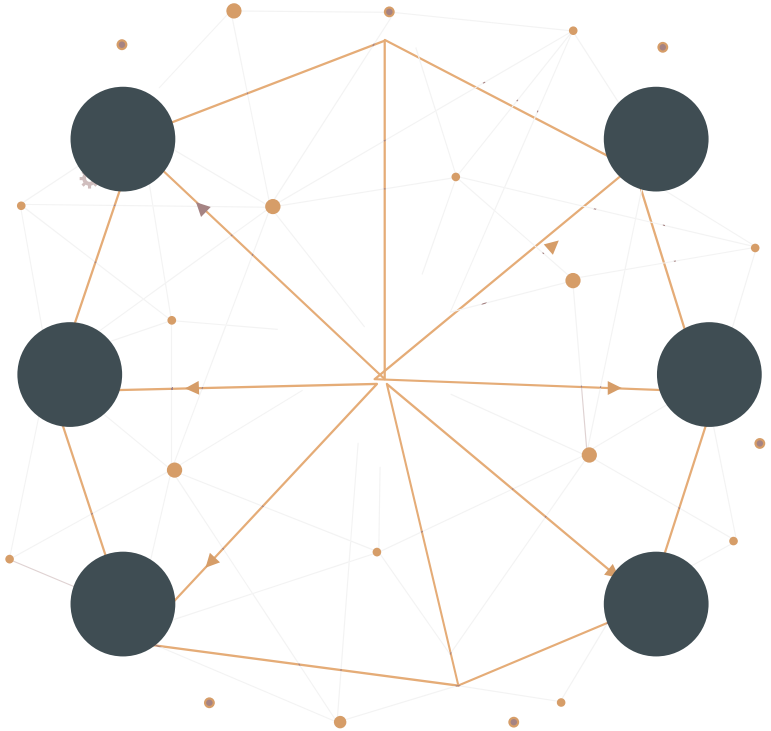
- Developing and validating existing GitHub project on $VO_2$ Max mask
- KTH wanted an adaptable $VO_2$ and $CO_2$ measurement tool
- Intended user: Researchers, sports scientists, athletes

# Problem Statement

Expensive

Bulky

Inflexible



Limited to labs

Not portable

Lacks adaptability

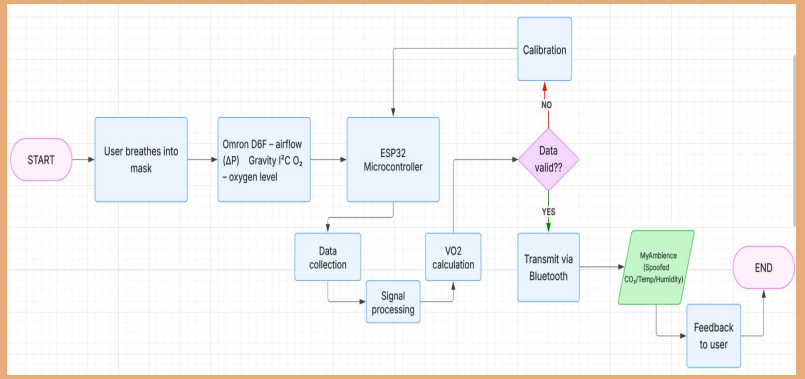
# Technical Approach

Exhaled air → pressure sensor, CO2 sensor, O2 sensor

Data collected and processed by ESP32 TTGO T-Display

Calibration and VO2 calculation

Bluetooth - MyAmbience app (real time)





# User Interaction

**My Ambiance app**

Input basic details (e.g. weight, ID )

- System automatically measures airflow, $O_2$ uptake, and $CO_2$ output through sensors
- Data is processed by the mask system and sent wirelessly to the app
- Subject gradually increases workload
- Real time feedback is shown in the app


# Results


1

2

3

4

## Clear $VO_2$ curves

Oxygen output and $CO_2$ output rise steadily with workload.

## Peak $VO_2$ detection

Reveals the limit of a person's aerobic capacity.

## Reliable metabolic insights

From $VO_2$ and $CO_2$ values, RER can be calculated.

## Consistent and usable

Data remains stable across repeated tests.

## Project Methodology

Focus:
Hardware assembly
Software integration

### What went well:

- Physical assembly

### Challenges:

- Integrating new sensors

### Future improvements:

- Battery
- On/Off switch
- Different mask sizes
- Larger test group

# Thanks!

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