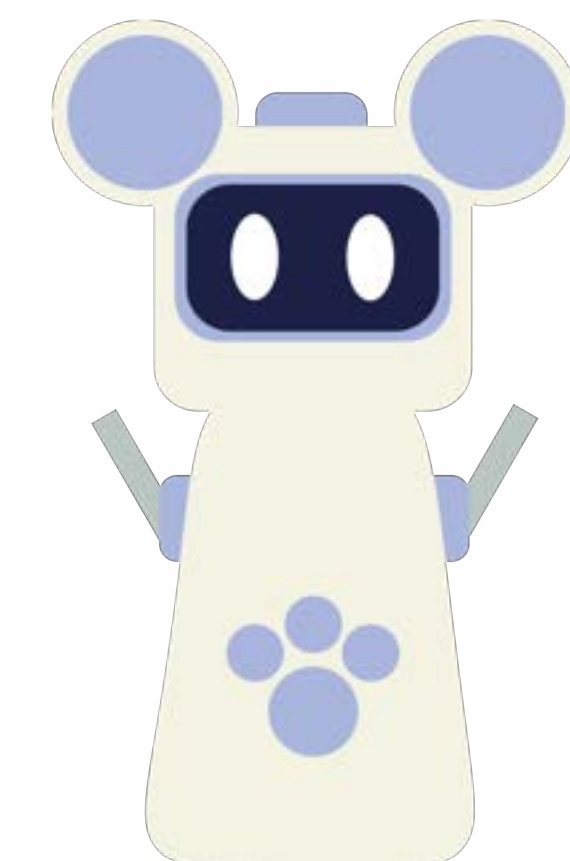


# Study Bearbot

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## Product Pitch

Studying is a stressful endeavor. Whether it's for a final exam at university or for a weekly quiz in middle school, everyone needs a short break every now and then. For those who get stressed out easily and have shorter attention spans, what better way to take your mind off of learning briefly than a friend waiting to comfort you?

Bearbot serves as an interactive desktop companion designed to alleviate stress while keeping users engaged in their study space. This study robot has

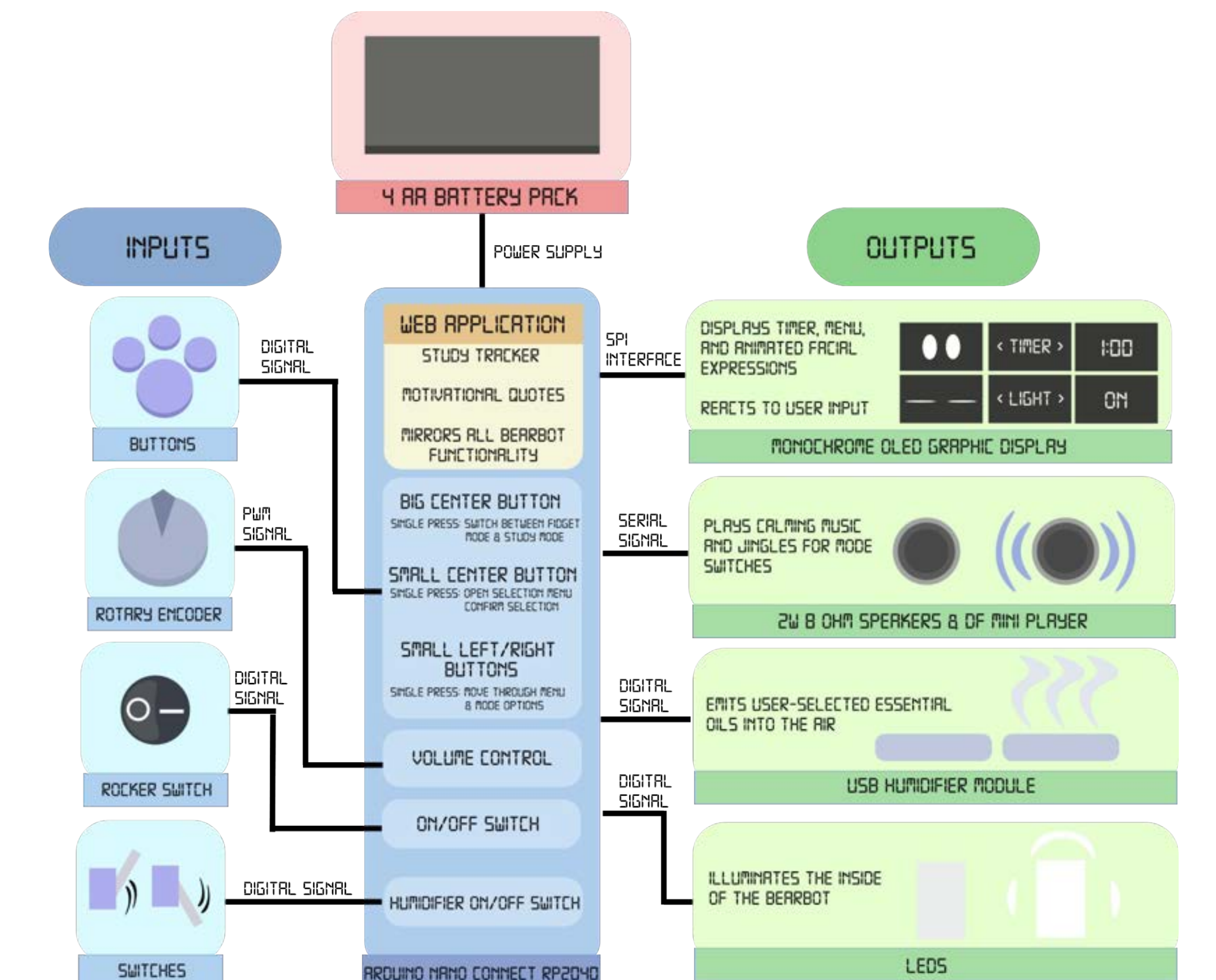
- fidget device components,
- a soft squeezable exterior,
- the option for soothing music, and a
- built-in scent diffuser for 45 minutes of light aromatherapy at a time

to calm the users nerves without removing them from the studying headspace.

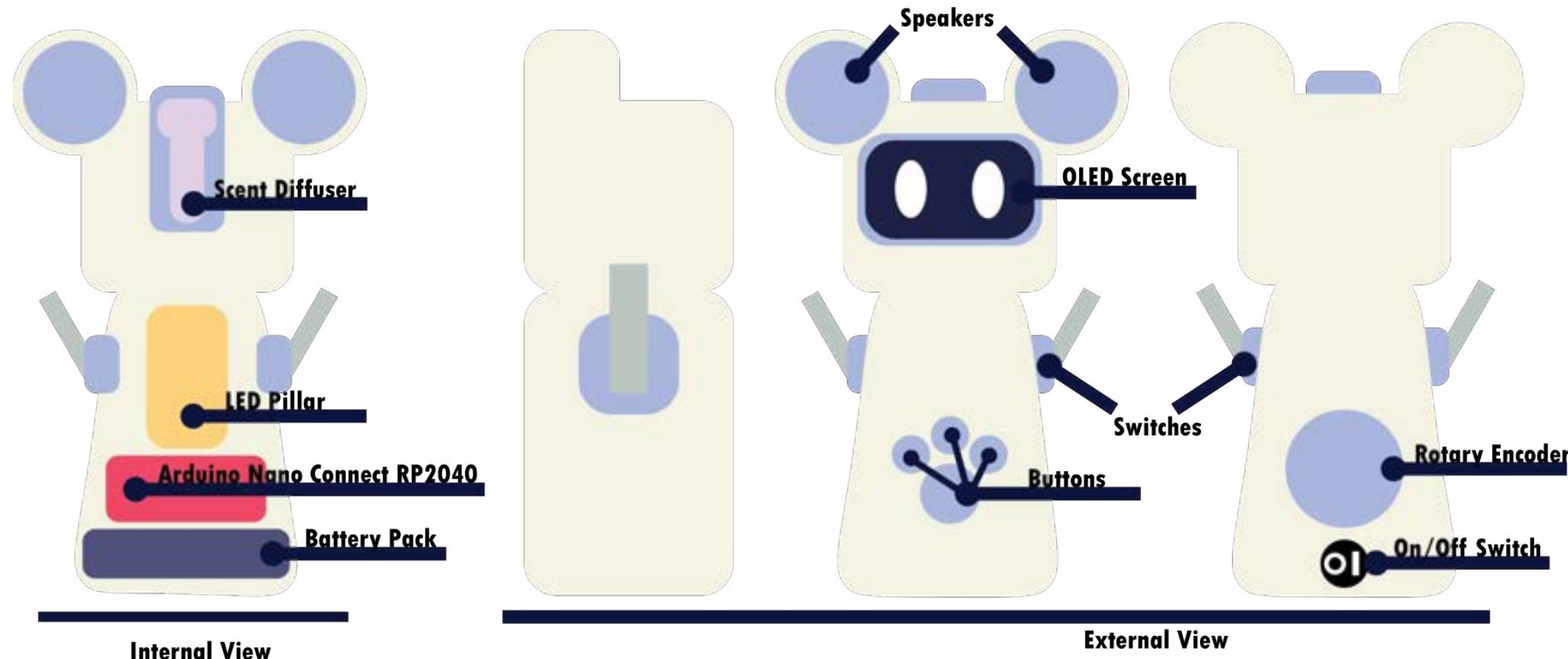
A web application is also available for the user to remotely control functionalities of the Bearbot, track their study sessions, and read motivational quotes as they work.

Bearbot is completely powered by a battery pack that lasts for **7.8 hours on average**, allowing him to be portable and utilized at any workspace you may be at. Participants that have studied with Bearbot on average feel **less stressed and more focused** on the task at hand, and **would study with Bearbot again if given the opportunity**.

## System Architecture

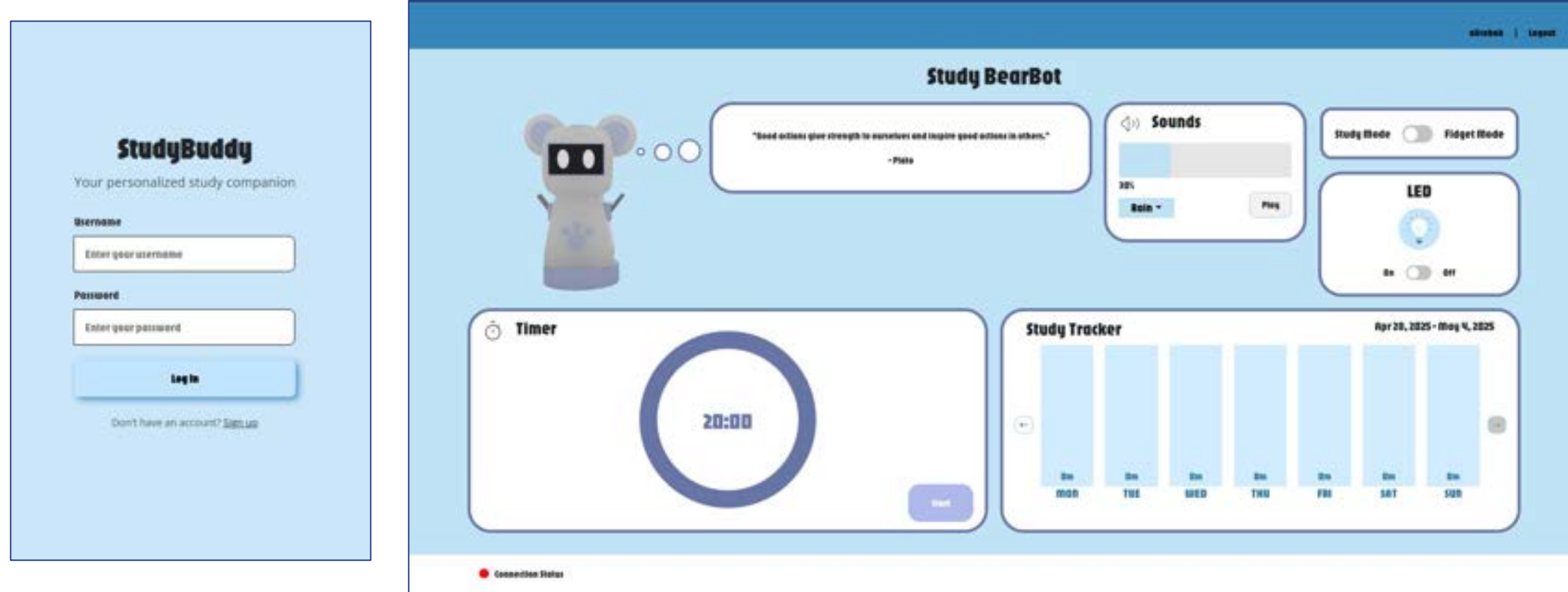
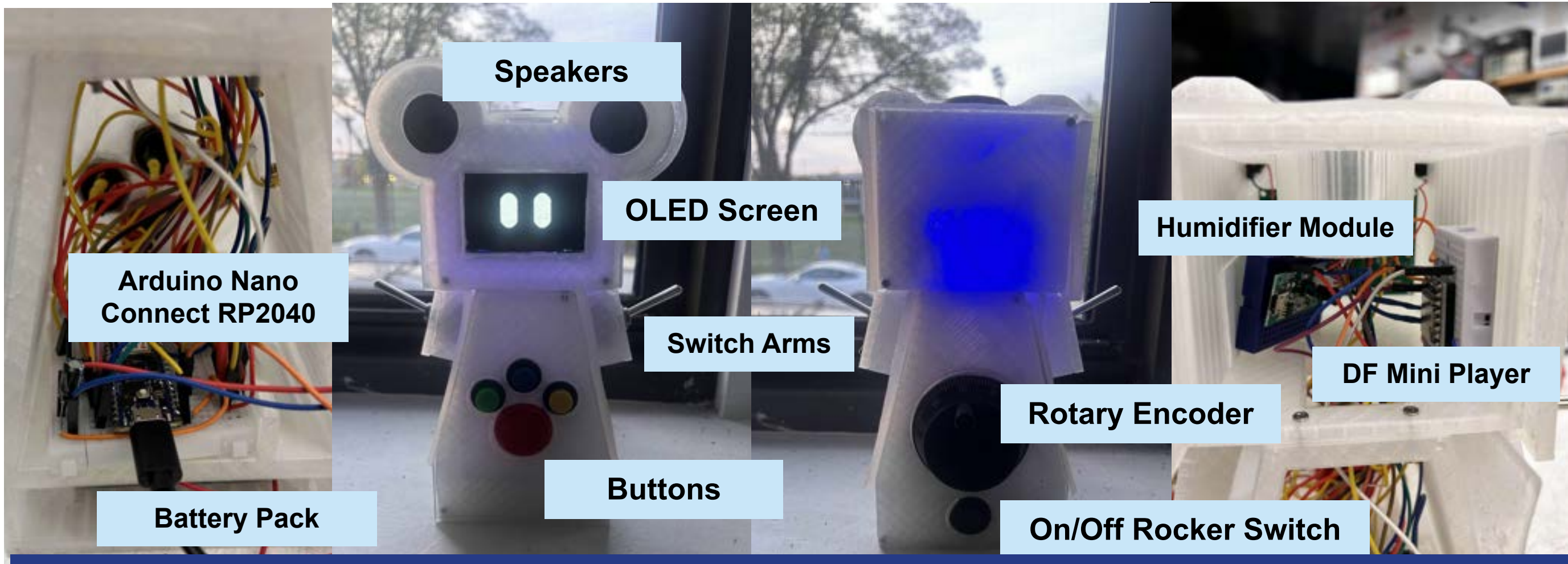


System Diagram

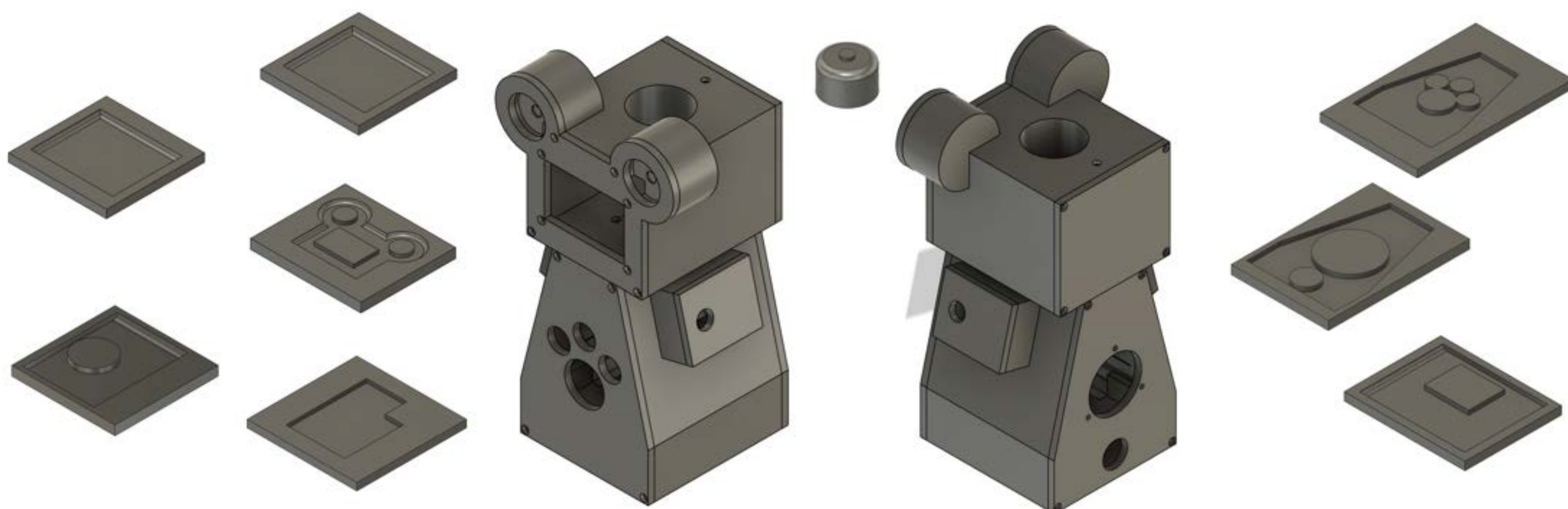


Physical Diagram

## System Description



Website Architecture



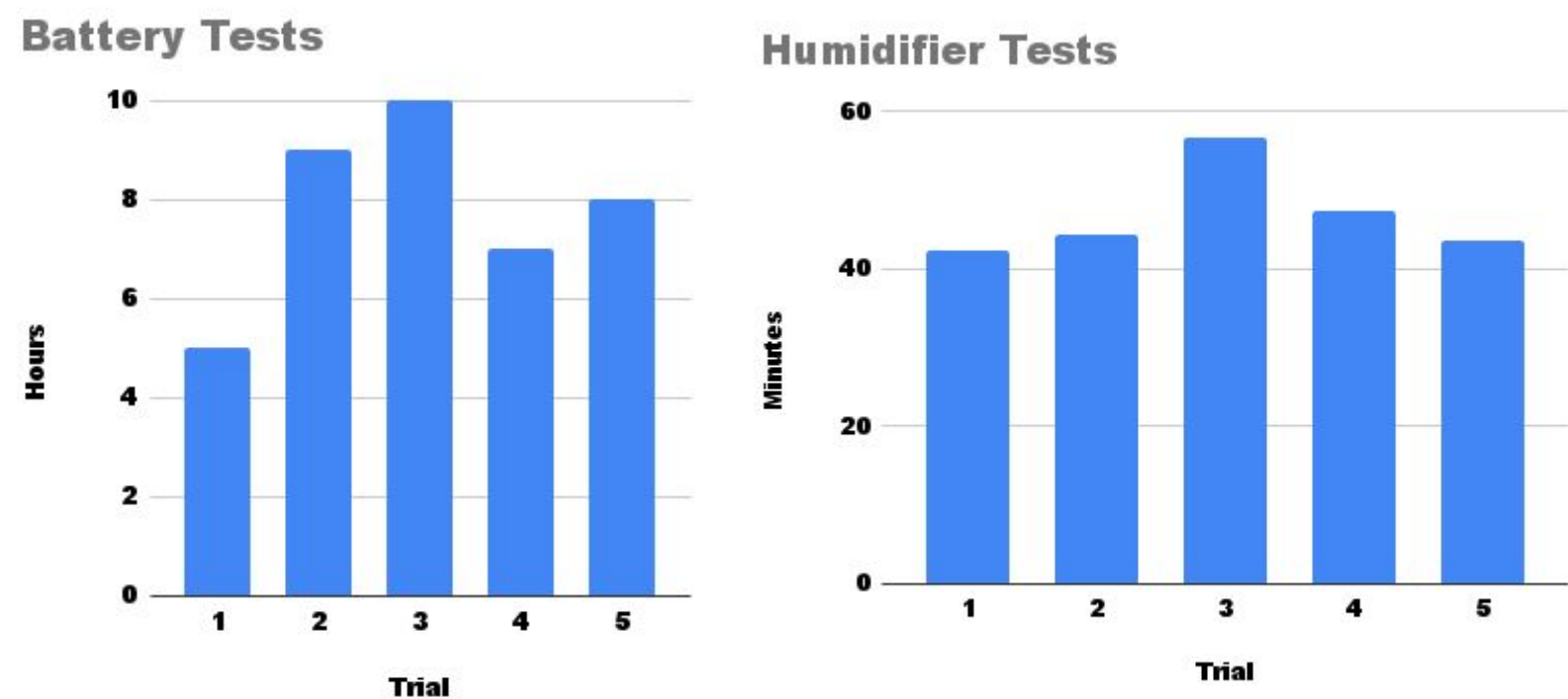
CAD Face Molds Models

CAD Body Models

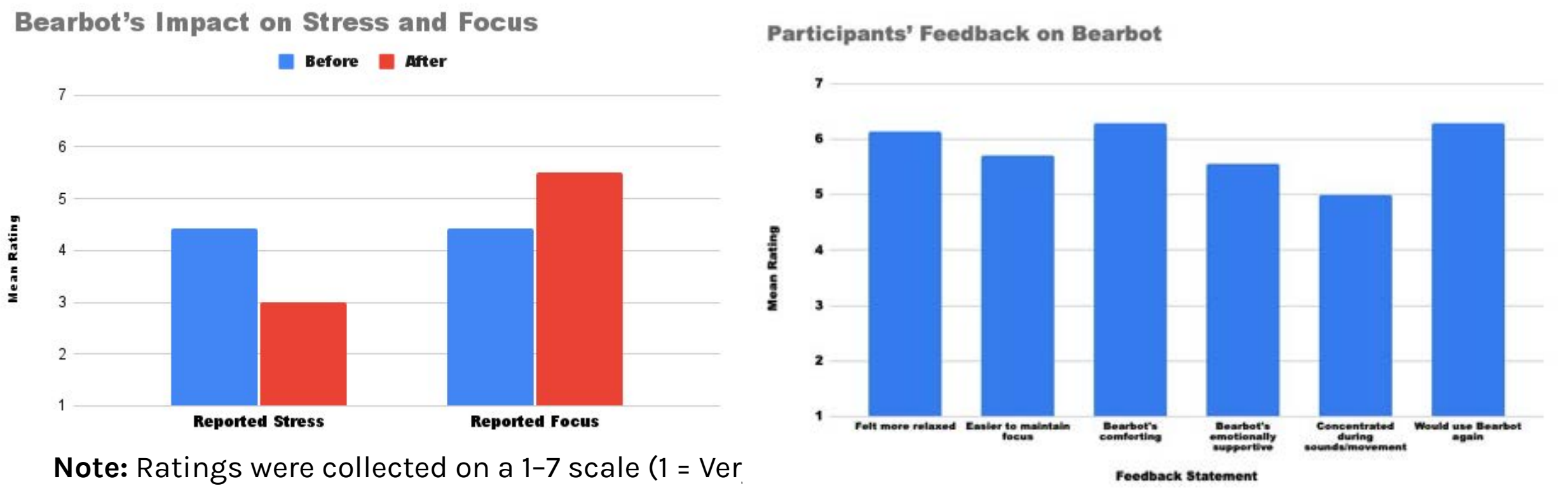
CAD Body Molds Models

## System Evaluation

Both the battery and humidifier tests were conducted with a stopwatch. After an interval of time -15 minutes for humidifier tests and 1 hour for battery tests, the system was examined to confirm that all the functionalities were operational. If the Bearbot remained functional, another interval would commence. This process would continue until the Bearbot failed to pass the examination phase.



## User Study



**Note:** Ratings were collected on a 1-7 scale (1 = Very relaxed/unfocused, 7 = Very stressed/focused). Lower stress ratings and higher focus ratings after Bearbot interaction suggest Bearbot helped participants feel more relaxed and focused during their study sessions. (n = 7 participants).

**Note:** Ratings were collected on a 1-7 scale (1 = Strongly Disagree, 4 = Neutral, 7 = Strongly Agree). High mean ratings across feedback statements indicate that participants found Bearbot comforting, supportive, and helpful for focus during study sessions. (n = 7 participants).

## Use-Case Requirements:

| Metric          | Target    | Actual                |
|-----------------|-----------|-----------------------|
| Battery Life    | ≥ 2 hours | ≥ 7.8 hours average   |
| Humidifier Life | ≥ 1 hour  | 46:55 minutes average |
| Weight          | ≤ 2 lbs   | ~2.63 lbs             |



<https://course.ece.cmu.edu/~ece500/projects/s25-team6/introduction-and-project-summary/>

Originally we aspired to have additional sensors, a rotating base, and the aromatherapy option toggled with the Arduino Nano Connect RP2040. These features were cut because they detracted from the user experience (rotating base), conflicted with other requirements in ways we didn't expect (additional sensors), or time constraints (aromatherapy toggle). Most of the features we planned did make it into the end product however, and led to a fully realized desktop study companion.

Extensive research early in would've saved us a couple of weeks - especially for switching from using a Raspberry Pi 4 8GB, Arduino Uno Every, and finally settling on an Arduino Nano Connect RP2040.

For continuing the project, there could be the possibility of manufacturing a chip specialized to the Bearbot's functionality instead of using an Arduino Nano Connect RP2040 and adding more features into the firmware and web application.