Cosplay Companion

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Description & Purpose

Project Synopsis

The Cosplay Companion is an electronic costume helmet paired with an integrated companion app, allowing for unique LED expression puppeteering and heat-monitoring safety features.

Purpose

Helmeted costumes present the danger of heat exhaustion. With the growing trend of adding electronics to costume designs, we see the opportunity to add heat sensors and fans to provide automatic cooling.

With the prevalence of IoT-compatible devices, it is possible to sync the sensors and other electronic components with a custom mobile app for convenient user control and feedback.

Design

32x64 LED matrices:
Two RGB matrices display images or facial expressions. Via the app, users can control which default color is displayed.

Heat/humidity sensor + fans:
Via the app, users can monitor heat and humidity levels, as well as set the levels at which the fans turn on.

ESP32 microcontrollers + buttons:
Two ESP32s contain button inputs that determine which image is displayed on the matrices. These buttons can be hidden in gloves for responsive user puppeteering. Via the app, users can set button mappings for the images.
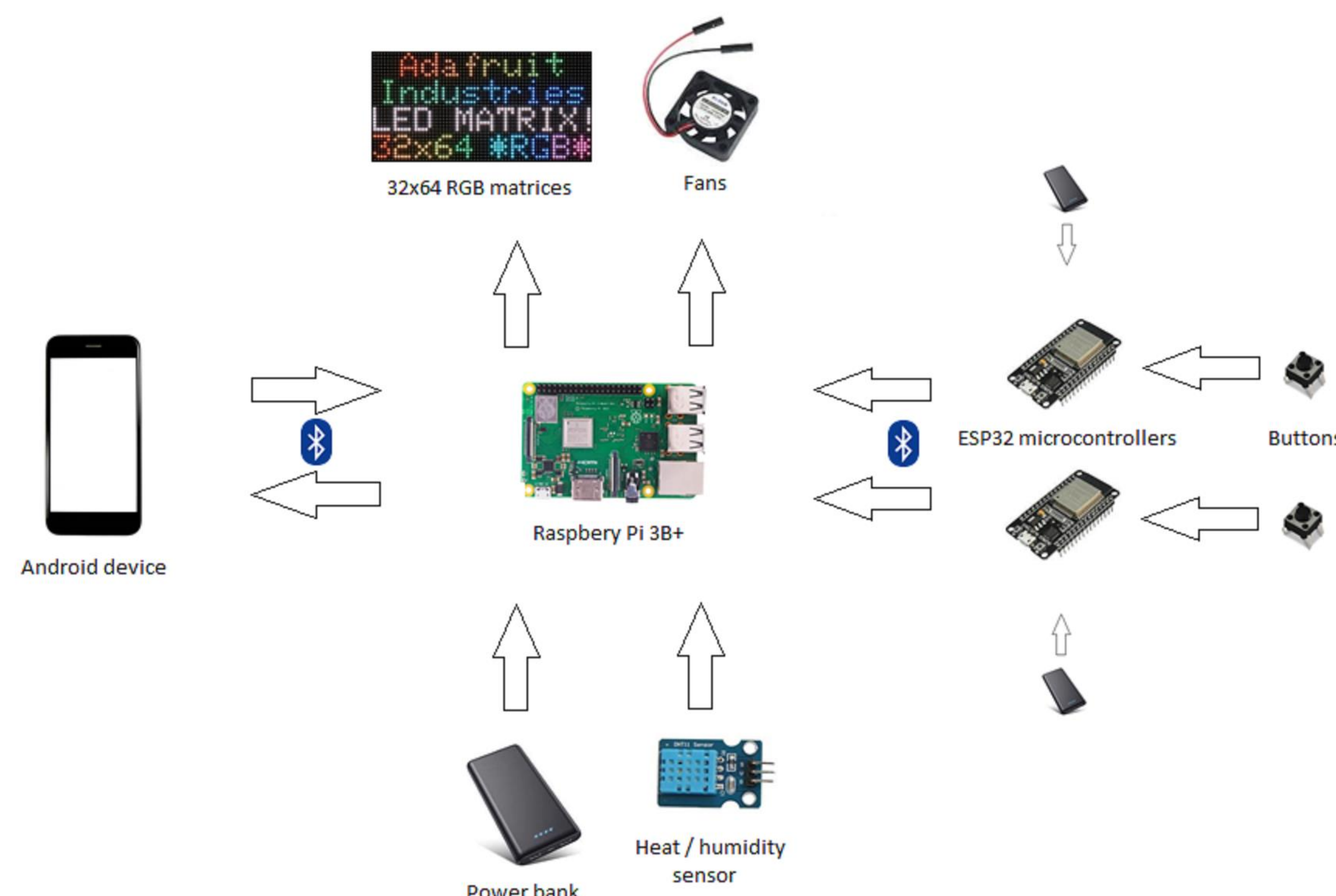
Fig 1: Device-block diagram

Ethical & Intellectual Property Issues

Power constraints may cause failure:
The maximum power draw of the devices greatly exceeds the maximum output of portable power banks. We have found that using separate ports to power the Pi and the matrices works for the images we use. However, the helmet must be tested thoroughly when adding new images or devices to ensure it is functional for the user.

Playing games and memes:
Some default images include content we did not create. One such example is the Rick Roll, a licensed music video. For a personal-use project, using this IP is akin to playing it on a personal device and constitutes as fair use.