Smart Face Mask for Reliability and Comfort for Indoor/Outdoor Use

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Abstract

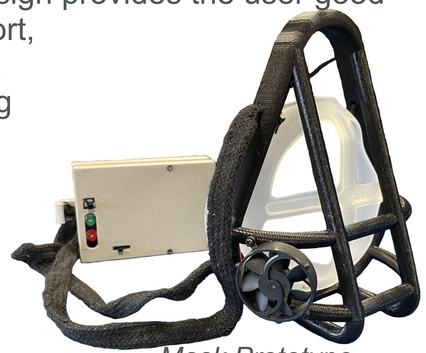
The rise of COVID-19 led to many face masks being created and used, many not providing a comfortable breathing or wearing experience. The Smart Face Mask provides a better wear experience for the user while still being reusable. The mask is also affordable allowing a wider population to afford it. The mask is unique in that it is a skeletal frame with a fan attached and also has a housing containing the circuitry to be located on the back of the user's head.

Circupro

Product Logo

Introduction

- Smart masks are a better reusable option for effectiveness and comfort, but can be expensive because of the technology
  - If it were more common and cheaper, more people could afford better masks
- The project design provides the user good filtration, comfort, and reusability, while remaining affordable



Mask Prototype

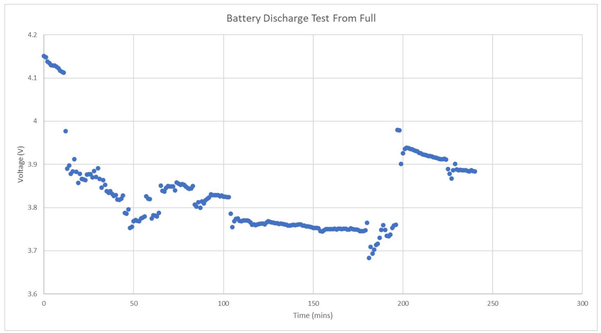
Methods and Materials

- Mask frame 3D printed from PETG
  - Fan and silicone frame attached to mask
- Housing 3D printed from PLA
  - Electrical components inside
  - Placed on back of user's head
- Elastic and cotton cord used to attach frame and housing

Mask Frame and Housing

Results

- Device was tested to ensure all components work properly and reliably and are functional
- Battery discharge test was conducted to ensure fan will run at full speed for 4+ hours, test was done with battery right off of charger



Battery Discharge Test

Discussion

- From results of testing, mask will run as it should, and meets goals of project
- Battery will allow fan to run for at least 4 hours at full speed
- Battery loses 0.1 V around every 100 minutes, loses more rapidly around 3.5V
- Graph indicates when battery output nears 3.5V, it will be empty soon
- From tests, threshold for the battery indicator circuit was centered around 3.4-3.5 volts.

Conclusions

- Device will assist user with breathing while wearing mask
- Will also provide better wearing experience
  - Comfortable, worn for 4+ hours
- Mask is reusable and sanitizable, helping with sustainability in a time of many disposables being used

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