

Exploring Wearable Technology: Solar Powered Book Bags

Introduction

Our research attempts to answer the question of:

Why wearable technology cannot be found everywhere in day to day life?

We will then develop a wearable technology product that surmounts the obstacles found in our studies.



Design Process Model

Focus Group Interview

Objective: The focus group was held in order to understand key points in the design of wearable technology. The information gained was then used to develop the survey.

Method: The focus group was presented with a video to provide some background on what constitutes wearable technology and asked questions to gather their opinions.

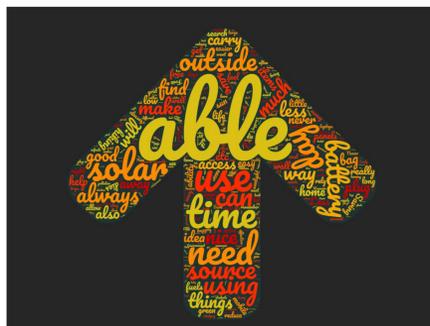
Results: The main concerns in the focus group were about the usefulness of the technology and whether or not the technology could be integrated easily into their lifestyles. If the user had to significantly change their lifestyle then they are less likely to utilize the technology. After this focus group, we decided to design a solar powered backpack with the capability to charge portable devices.

Qualtrics Survey

Objective: The purpose of the survey was to obtain quantitative data to use when designing wearable tech. We will use the information gathered to design a solar powered backpack.

Method: The survey consisted of questions about personal preference on the design of wearable technology and more specifically, solar powered backpacks. It was sent out to all the students of Iowa State. We then analyzed the data to find more general trends.

Results: General preferences and concerns across a broad range of people were gathered with the survey. Those preferences are listed in the up arrow word cloud below, and the concerns are listed in the down arrow. The larger the word, the more it was mentioned in the survey.



Perceived Benefits of a Solar Backpack



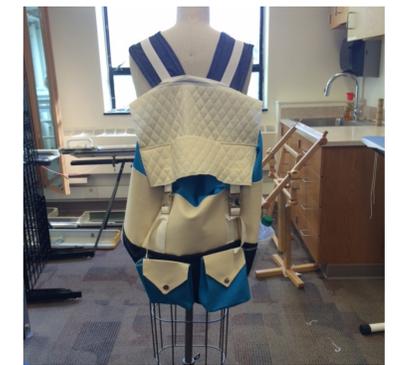
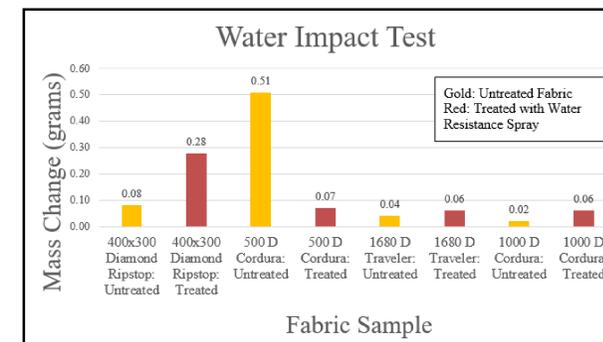
Perceived Problems of a Solar Backpack

Prototyping

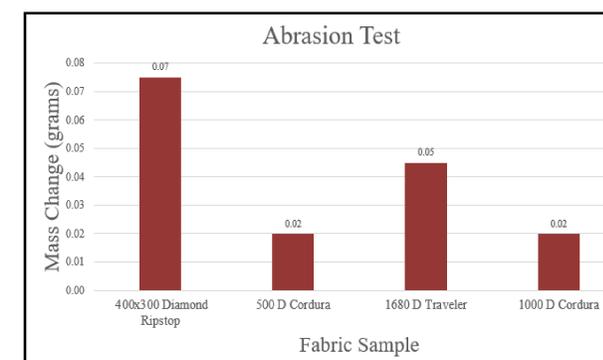
Objective: Prototyping was performed in order to prove the concept of a solar powered backpack. This phase included textile testing on four types of fabric in addition to design.

Method: For textile testing water impact penetration, abrasion, and UV color fastness tests were performed. Then preliminary sketches were drawn and flat patterns were developed.

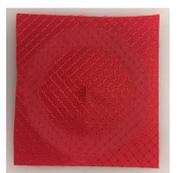
Results: Through textile testing, the final fabric type for the book bag (1680D Traveler) was selected. This was due to its superior performance in the water impact penetration test while still performing well in the other tests. With the completion of these tests a flat pattern was developed. The results of the water and abrasion tests are below in the graphs.



Preliminary Solar Backpack Prototype



400x300 Diamond Ripstop Pre-Abrasion



400x300 Diamond Ripstop Post-Abrasion

Conclusion

Our research has identified several key design points to be considered in the design of our solar powered backpack:

- The solar panels must be well integrated into the design, and the bag must be aesthetically pleasing.
- The backpack must also have some additional uses beyond what a normal backpack would offer, and it must be just as durable.

When this information is taken together with the textile testing, a clear vision of a solar powered book bag is formed. Designs and flat patterns have been developed, and the final prototype is in the process of being produced.