Part 3: Final Prototype Development

Team Possible

Team Number 8

Backpacks

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Executive Summary

In this project, we will explore the backpack. Despite immeasurable changes in its user base since its inception, the backpack has largely remained the same. We plan to create a modern bag by starting from the ground up with the today's users in mind. As it stands, a backpack only carries materials. However, many stakeholders carry it throughout their day, so why not take advantage of its pervasiveness in everyday life? We will leverage the backpack's day-long use to create features centered around the tech-savvy, on-the-move users of 2018. This product will support phone charging, customizable pockets, and extensive safety features which all sit right on the shoulders of its user throughout the day.

1. Design Criteria

Our team settled on the three final design criteria: versatility, individual safety, and convenience. These were decided based on feedback that was received during the in-class critique as well as issues that were reported by backpack stakeholders. We felt that the majority of backpack companies do not address these user concerns so we focused our designs around them.

- ***Versatility*:** The backpack needs to be able to transition well between various tasks someone needs to complete throughout their day. The success will be determined by how modular the product is. The user must feel as if they have control over how they organize their backpack, and must not feel limited by the form of the bag. This can be measured by the number of distinct tasks that can be done with the bag. We will measure how modular and versatile the bag is by giving people different scenarios that could occur during a typical day and determining if the users are able to pack their bag to complete these tasks. Tasks could include situations like charging a device with a low battery, going to the gym, going to class, etc. If the majority of users are able to complete the tasks that are requested of them, the solution will be successful in implementing this criteria.
- ***Individual Safety*:** The backpack can also be thought of as the eye to the back, so we decided to take advantage of this fact by improving the safety of the user. Our team found that many people hold valuables within their backpack, so we are looking to increase the safety of the backpack as a whole. The backpack must put the user at ease as they travel through their day, whether they are walking during the day or night, are in class or at work, or traveling in between. The safety options must be easy to use and easily accessible by the user. They also must work reliably as to not put the user in further danger. The safety will be determined by how quickly the user has access to the safety options. Our team will time the user and determine the speed at which they are able to reach the headlights and the silent alarm button. If the time falls below a certain predetermined threshold then that aspect of safety will be deemed successful. The safety of the backpack will also be determined by how the user feels while walking at night with the backpack. This will be measured through a short survey given to users during in a pilot study. They will provide feedback after they have walked somewhere with the backpack at night.
- ***Convenience*:** Most people have their backpack with them constantly as they move throughout their day and are only without it when they reach home. Our team decided to make the backpack work for the users wearing it. The backpack should have features that work towards fixing common problems experienced by the user throughout their day. One of the largest problems is accessibility of items in the backpack that are of importance. This will be tested by how quickly the user is able to access items in their bag. The team will time users with their normal backpack and the new prototype (with

the retractable pocket) to determine if they have faster, easier access to certain objects like their phone, wallet, or keys.

2. Convergence on a Coherent Solution

Build-a-Backpack

Many critiquers liked the modularity and customizability of this design. However, others were concerned with weight distribution, the effect of multiple zippers on style, and how easy it would be to steal a component.

For the final product, we will consolidate this feature to a single retractable pocket for the sake of having a focused, clear product definition. Having a slew of interchangeable pockets conflicts with other features to which students also responded well, such as the solar charger and the silent alarm. This retractable pocket addresses criteria of customizability and convenience without the complexity and cost of a fully modular backpack.

Tech Pack

Most concerns came from the solar panel portion of this feature. Students suggested that a solar panel would greatly increase the cost of the bag and possibly even overheat. They also pointed out that a Chinese company had already created a solar backpack and that it would be worth researching their approach and materials. We presented a feature that would lock somebody's phone for a set amount of time for productivity, but a student seemed concerned about emergency situations and pointed out that there are apps that have the same effect.

Students showed a lot of interest in the convenience of a solar panel, so we are more than glad to include it in our final product. We will exclude the phone-locking pocket due to concerns about emergencies and redundancy with existing phone apps.

Night Mode

Night Mode was the most heavily discussed feature. Reviewers asked about how reflective material could be implemented without affecting the style of the bag, how the alarm button would be pressed, and how to cancel accidental calls to the police. One even suggested a feature from another similar product, which would only make the emergency call if the user presses the button in a particular pattern.

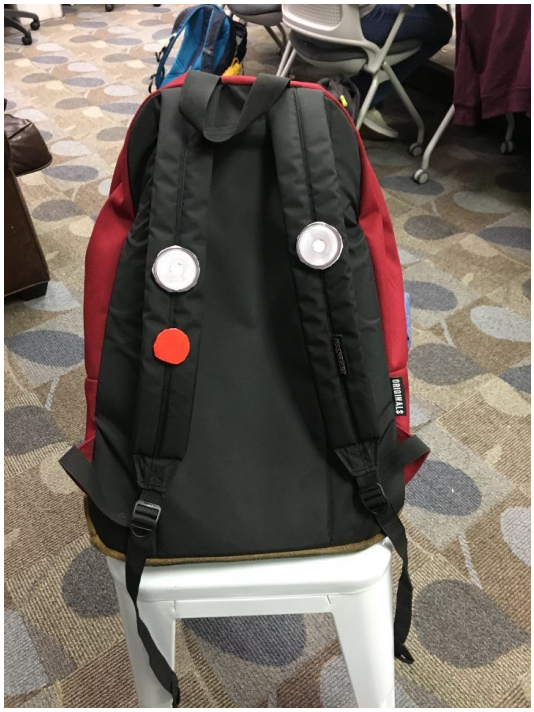
Due to the positive response to this feature set, we plan to include headlights as they were and add the alarm button with a pattern. Rather than a single press or a long press, the user will now program a pattern when they get the backpack to avoid accidental presses and a separate process for undoing calls. We originally planned to have taillights for bikers, but from the feedback it

seems like this feature is too niche to include on a general backpack. We will look to include it as an expandable feature.

3. Final Prototype

3.A Physical Prototype

The What-A-Backpack



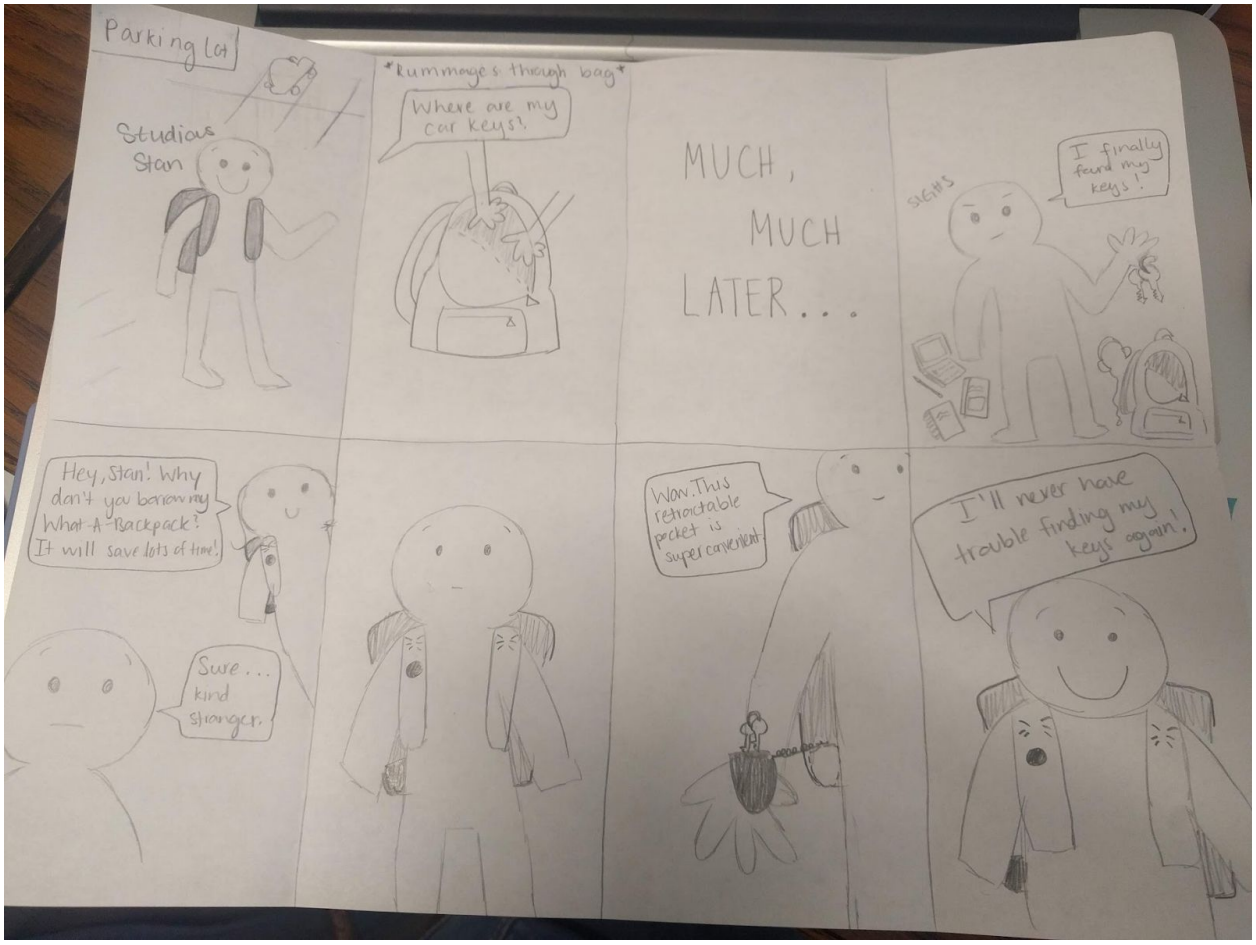

WELCOME
BACK CARLY


Jesiin

3.B. Visual Storyboards

Task #1: Retrieve Something from Retractable Pocket

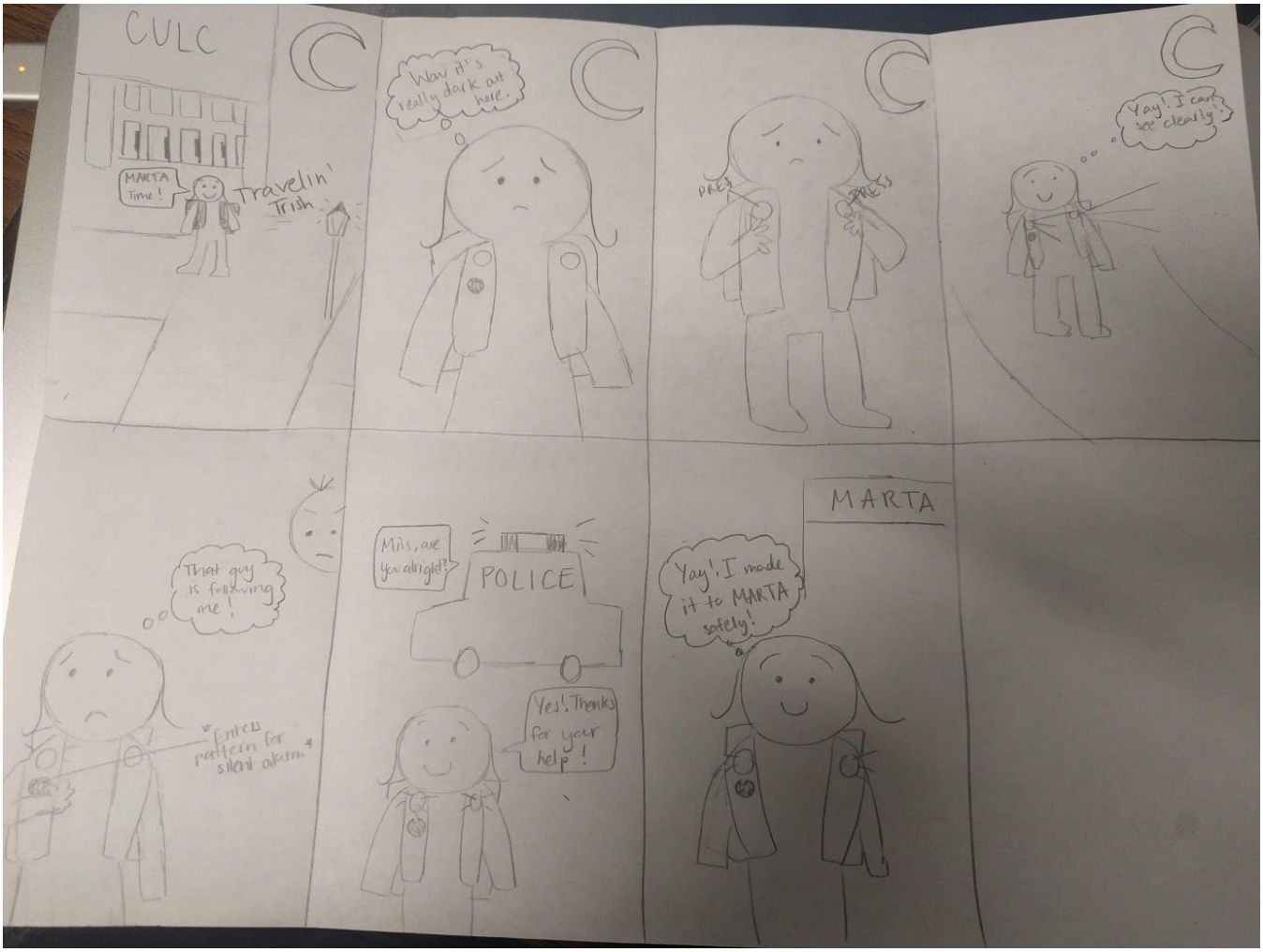
Retractable Pocket Storyboard



Retractable Pocket Wireframe

Task #2: Activate Silent Alarm and Lights

Silent Alarm and Lights Storyboard



Silent Alarm Wireframe:


wp

Lights Wireframe:

3.B. Video Prototype

The final video can be found on YouTube at the following link: https://youtu.be/Z0fuZ919K9g

4. Reflection

Parts 1 and 2 gave us a great jumping off point for part 3. Throughout the first two parts of this project, we were able to iterate through our design criteria to find the right balance of what our users needed, and what would make a quality backpack. From part 1 our themes came down to different sections of the backpack (e.g. inside organization, external structure), but in part 2 we focused on what aspects (e.g. versatility, safety, and convenience) would make our design unique and best for the user. In part 3 we were able to be more clear about what made our design criteria measurable. The in-class critiques in part 2 gave us great feedback and outside perspective on which elements of our ideas appealed to students, and which ideas were the most attainable. We focused more on safety and convenience for this part of the project.

The low fidelity video prototyping lectures were the most helpful for this part of the project. We learned that you don't have to have a really high production value to get your point across to the audience. Rather, it is more important to capture few key shots of the prototype along with scenarios that highlight the user's interaction with it. The short video we made provided us a great opportunity to practice coming up with a script, videotaping, and editing the clips.

Due to the large size and complex design of the backpack, much of the physical prototyping work we did in class was not particularly applicable to our project, and neither was the digital wireframing. The digital prototyping with Blender seemed to be a good approach, but our group had a lot of trouble following along in lecture. We ended up going with what we were more familiar with, Powerpoint, for the wireframes and made some makeshift adjustments to a

backpack for the physical prototype. More specific instruction for the larger objects would have been helpful.

Appendix

In-Class Critique Feedback:

Build-a-Backpack

- What keeps people from stealing it?
- Weight distribution
- What is the minimum structure? → base straps and bottom
- Working professionals might want a sleeker look, not zippers everywhere → flap to hide zippers
- More questions about security → consider touch ID

Tech Pack

- Clarification - are the solar panels outside? Yes
- Research solar panel overheating
    - Check out company based in China that makes solar panel backpacks?
- Does flexibility/stretch change the effectiveness?
- Costs

Night Mode

- Reflective material
- Accidental presses? Use a pattern instead of press and hold
- More questions on fail-proofing
- Athena, special pattern