**Team TMG**

**Members:** Gamutan

**Overview:**

As a person that lives in a tropical country like the Philippines, it is by no means a surprise that almost everyone complains about the heat in this country, especially during peak heat seasons, and the fact that there are not any seasons where it is cold. For this project, the team would like to focus on understanding about the temperatures where in this case would be the hot weather that Filipinos are forced to live under, and how it affects those people in their everyday lives and their wellbeing.

**Solving the problem:**

Through the progression of our technology and the ways we cope with the heat in this country, we have alleviated the heat problem with air conditioners and fans which helps lower the temperature. However, this could only benefit people in rooms or in closed spaces like in the car or the train. Avoiding the heat was also a good solution through the introduction of umbrellas and caps to not get directly hit by the sun rays.

For the people that would want to go to places by foot and walk to their destination, the latter solution would be a good option to have, but even if you cover yourself from the sun, for how hot the Philippines is, it will still make you sweaty and sticky from the high temperature and hot air the sun gives you. We then find the solution of having handheld fans which are a good source of wind blowing to you, helping you cool down. We also now have electric hand fans that are rechargeable and handy for getting cool air more efficiently.

With these solutions in mind, the team’s project plans to get the best out of all these great solutions and turn it into one that efficiently provides the necessities of a sweating Filipino. The tasks that the project seeks to perform are to provide the benefits of a portable electric hand fan as well as the benefits of a comfortable cap that can regulate the temperature of your head keeping the wearer cooler in the summer.

**The Device:**

* **Device name:** Cap-Ice
* **What it is:**
* Cap-ice is a product where it would essentially be a cap that has cooling technologies embedded, where it would give a breeze of cold air.
* **Features:**
* **Cooling System:** The main feature of the device where it functions as a fan, giving cool air for the user
* **Comfortability:** Receive the benefits of a cap you wear which helps in regulating your heads temperature and cover your scalp
* **Efficiency:** A full charge will be enough for remaining cool throughout the day
* **Questions about the Application:**
* **Who are the potential users?**
* The users of this device will be people living in tropical countries and generally everyone who is going through hot weather
* **What tasks do they seek to perform?**
* People would want to keep cool and not sweaty through their days with hot weather
* **What functionality should any system provide to these users?**
* The device should provide users with cooling functionalities as well as comfort without the need for carrying hand fans or umbrellas
* **What constraints will be placed on your eventual design?**
* The device should not be bulky that it would be hard to carry around and wear on the head. The device should also be efficient enough to carry a full charge for the day. As for charging, the method should also be in a way that it does not take long and it utilizes the sun, such as solar power charging.
* **What criteria should be used to judge if your design is a success or not?**
* **Size**
* **Battery Life**
* **Cooling**

**Project Description**

The project focuses primarily on tackling the main problem of the current heatwave we have in our beloved tropical country. While other countries are enjoying beautiful aurora skies, we are suffering from the worryingly high temperatures and heat causing people to easily sweat and get uncomfortable while going on through their day.

With the problem in mind, a device concept was made in which it would be a wearable cap with cooling features that either (1) Uses the materials of a small hand fan, (2) Uses refrigerating methods in a smaller scale, or (3) Utilizes small compact fans like in computers.

For the part 2 of the project, some design concepts will be shown in order to display the general idea of the final product of the device.

**Key Requirements:**

**Comfortable wearable cap design** – The design should still suffice as a typical cap that anyone can wear.

**Cooling features**

1. **Cooling** – The key feature of the design which will provide cool air for the user
2. **Battery** – The supporting feature for determining the device’s capabilities in battery life and cooling strength

**Design Space:**

In designing the device, a lot of the features must be balanced. It is important to remember that a user is most likely going to be wearing this throughout the day, in which it would be burdening if the device is very heavy. This can prove to be hard as we would need to find the perfect mix of cooling, good looks and efficiency in battery life.

**Design Concepts:**

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For the concepts, I have decided to use small, powered fans for the cooling feature of the device, in which the choices are to be to embed it on the main body of the cap on its sides, or on the brim facing the user’s face. A possible choice would also be to merge the two concepts and add three fans overall, which would be a different problem regarding what battery would be sufficient to power the three while staying light and non-protruding.

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**Design Alternatives**

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The alternate designs of the device are taken from an existing idea for a cooling shirt, where water is used and is flowing in a pipe throughout the cap which provides the cooling feature, but just as the shirt is not that effective at cooling, it would also not be sufficient for a cap. The second design is like the choices for the device, but it is not as good looking as the others as the fans protrude too much, and the placement makes it annoying to hear as it is close to the ears.

**Project Description**

The Cap-Ice product will have a medium of accessing the capabilities of the device through a mobile app to control the device at the convenience of the user’s fingertips. The app should have the right number of features to turn the device on or off and control the speed of the cooling system, with a way of monitoring the battery percentage of the Cap-Ice as well.

**Requirements Summary**

|  |  |  |
| --- | --- | --- |
| **MINIMUM REQUIREMENTS** | Processor Cores | Single Core |
| OS | Android 4.4 (KitKat) |
| RAM | 2 GB |
| **RECOMMENDED REQUIREMENTS** | Processor Cores | Quad Core |
| OS | Android 8.0(Oreo) |
| RAM | 4 GB |
| **OTHER REQUIREMENTS** | Permissions | Notifications and Storage |

Table 1. System Requirements

The application would not have any intensive resource requirements, so any device should suffice to be able to run the app.

**Prototype Description**

The device’s application prototype was made in Uizard:

<https://app.uizard.io/p/70218471>

**User Scenario**

John enjoys his time outside, going places and enjoying life in general. He faces a problem of high heat and sweat-inducing temperatures from living in a tropical country. To alleviate this problem, he decides to use the Cap-Ice to keep cool during the hot day. John pairs his device to the dedicated app and he controls the speed of the fan and monitors the battery.

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**Prototype Design**

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The first screen welcomes the user to the app and prompts the user to press a button in order to get started. The user will then be directed to the pairing screen in which the user will connect the device to their phone. Once the device has been connected, the control screen will show, wherein the device’s battery is shown, as well as controls for turning on the device, and controlling the fan speed.

**Rationale**

The reason why TMG chose this prototype is to create an efficient and clean way to access the device without any complicated ways. The design of the prototype is seamless where you would only need to press a few buttons in order to get the desired outcome. Further improvements would have to be added to cater to more specific needs. The disadvantages of this would be for les tech-savvy users who do not understand how to utilize the interface, in which it could be improved in further testing, as well as a way to physically turn on the device without the use of an app.

**Changes to requirements**

In creating the device itself, I had initially thought of having a screen on the device itself, but it quickly came into fruition that it would not make much sense, as the user would not be able to see the screen when wearing the cap. A mobile application would be the best fit in this scenario, as it would be an easier way of interacting with the device.

**Initial Evaluation Plan**

For the application to cater better to the users of the device, testing and feedback from the users will be accepted in order for the team to find out what needs to be added and changed from the interface in order to create a seamless interaction between the user and the device.

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**Overview**

In evaluating the device and the application, some evaluation techniques and conditions should be set to create a way of observation in what is needed from the project, and what needs to be changed. The evaluation plan is as follows:

**Technique: Questioning**

A test user will try out the application prototype, where in these questions will be asked after testing the app

1. **How does the application function?**
2. **What features should be added?**
3. **What features should be changed?**

This evaluation plan will help in catering to the specific needs of people who will be going to use the subject, as well as a general idea of how the application is perceived.

**TESTING**

The questioning was done online, where the users try out the application and answer the questions after testing

**Data Presentation**

**User #1**

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**User #2**

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**Data Analysis**

In observation of the given data, the answers to the questions show positive response and indication that the application does its intended purpose.

**Design Implications**

For the application to cater to a specific need, the prototype should have an option to add multiple devices, as a user may have multiple devices that they would like to use. Other than that, it can be said that the application is efficient enough to access the physical device wirelessly.

**Critique and Summary**

In conducting the evaluation, it is worth noting that the user numbers are not enough to create a diverse opinion on the project, as it is only sparse. For the device application to cater to most of the people’s needs, it would need to have a big sample data to collect a general agreement and specific needs that everyone has with the product. It can also be said that through actual testing of the device, where the device functions properly, is where further improvements that are major can be made to the overall project, compared to a prototype of the application alone. With better time management, a better evaluation plan could also be conducted, along with a better sample size as mentioned earlier.