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Design Document

ThermalArt: Making art tangible with temperature.

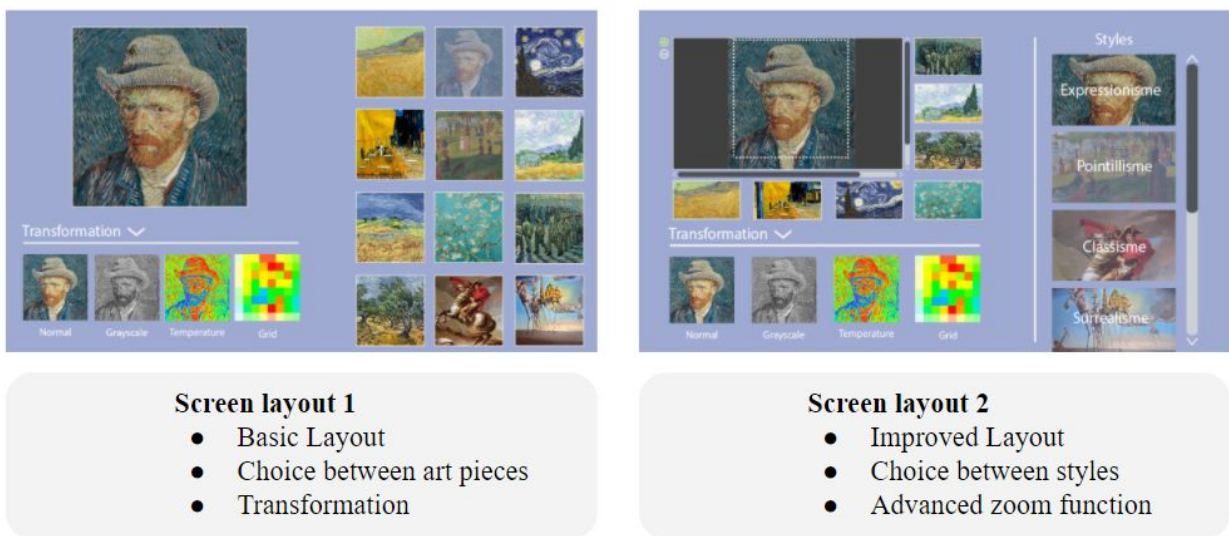**Concept interface design**

Image 5. Basic layout interface

This is the basic screen layout on the left with a choice between art pieces. Underneath you can see the transformation. It has an improved styles selection bar on the right. A selection of works around the main work on the left and the transformation at the bottom. The stippled white rectangle is what the program will use as an output. With this you can zoom in and out on the artwork to have a more detailed version. The white rectangle is a really important note because the output will be a rectangular grid but the input probably has a different aspect ratio. This layout was just an idea to start with. Now we should quickly test this with user and task analysis to improve and change these ideas.

User Analysis

The user group we should aim at, is people who maybe do not feel something special with conventional paintings and art. These users aren't necessarily people who often go to museums, it can be any person interested at that moment in time.

The peltier grid will primarily be used as a new way to experience images, adding a new dimension. One of the most straightforward applications is a potential higher appreciation for artworks. Will people see it as a way to convey information? How will people react on this assumption and how will we test it? Trying different conversions from the art piece to de ThermalArt plate should be a good start to test this.

We're planning on interviewing users after testing, to see if we should make changes. Some examples of questions we could ask are:
● Did users like it?
● Did they think it could be improved upon?
● Did they think it added to the experience?

What would users expect from your development ?
Then we could check if it made a difference when experiencing or appreciating from someone who generally is not interested in art against someone who is already fond of paintings

Task Analysis

To test our hypothesis: How can an image be expressed through sensation of temperature and can it be used as an additional way to experience art? We need to analyse the following tasks:[1]
● What are the users goals, what are they trying to achieve.
● What do users actually do to achieve those goals?
● What experience users bring to the task like personal, social or cultural.
● How are the users influenced by the physical environment?
● How is the users' previous knowledge experience influence:
  ○ How they think about the work.
  ○ The workflow followed to perform a task.

These questions are different from the user analysis because focused on the tasks the users have to follow. After the feedback we can improve the user centered design. With first Wireframes and prototyping and then usability prototyping.

The Abowd & Beale interaction Framework is still a good example of how the interaction should take place between the user, input, system, output.
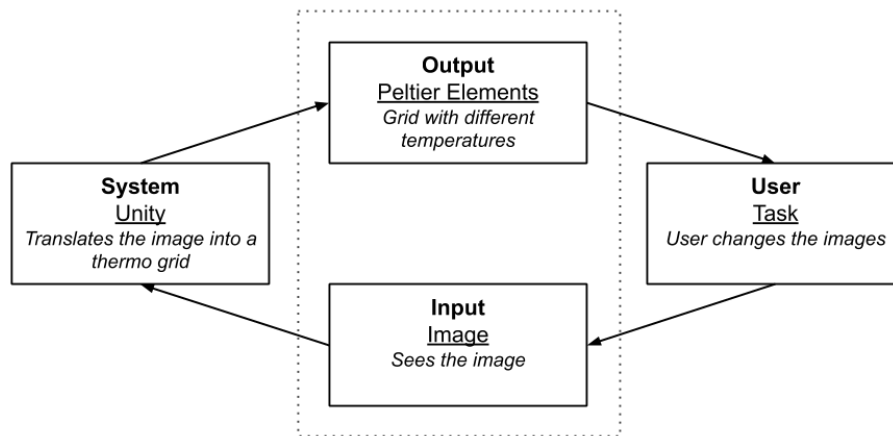
Image 2. Abowd & Beale interaction Framework of - 'HCI & InfoVis 2020, Lecture 5

Sketch Interface

The sketch interface will be made in adobe XD to test the content, functionalities and intended behaviours. No colors or images and a generic font will therefore be used. By testing with wireframes we can connect and clarify consistent ways for displaying particular information on the sketch interface. As well to determine the intended functionality and again prioritize the determination of how much space a given item needs and where that item should be located.[2]
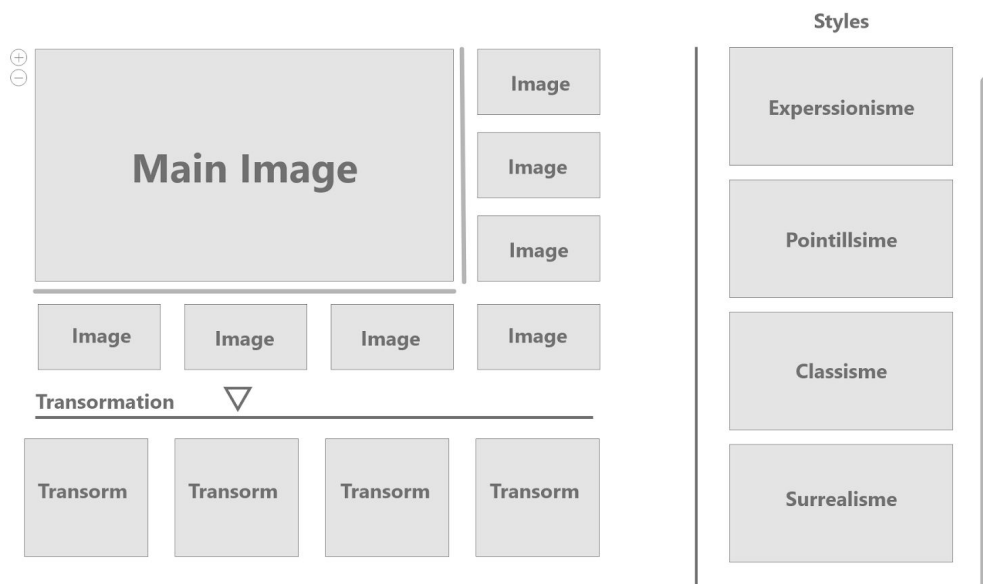

Image 3. Wireframe in adobe XD

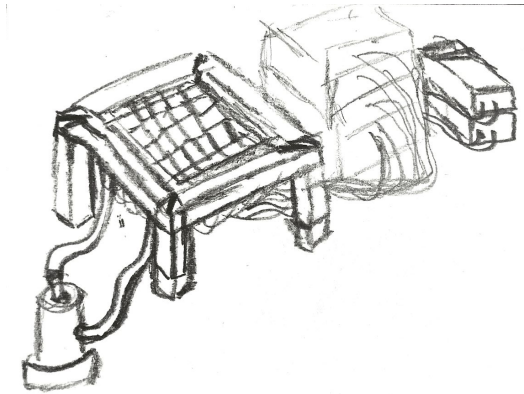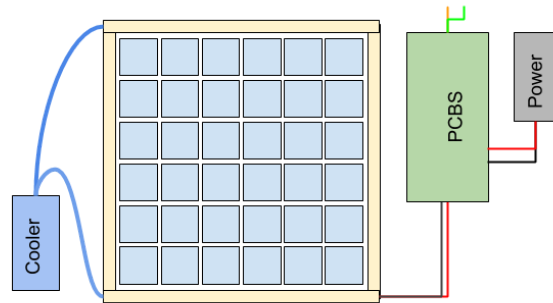Basic hardware drawing setup:

Image 4. Hardware drawing

Image 5. Hardware top down view
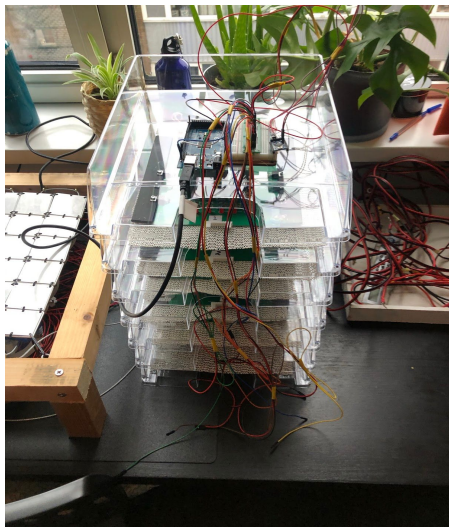
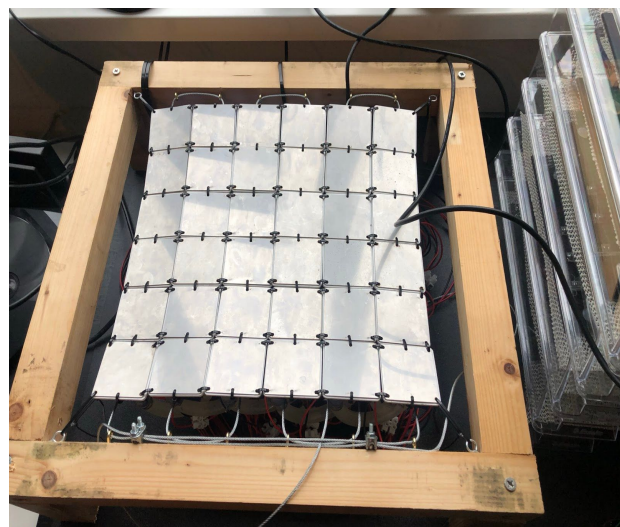Hardware prototype functional:

Image 6. Computing part

Image 7. Physical plate prototype

Usability specification

One of the things that is important for us to get right is the user experience. Since this project is very focused on having the user experience something, it is essential that we test the prototype extensively and make changes according to feedback we get.

One thing that we're planning on testing in our prototype is what range of temperatures are most practical / comfortable. It is important for the user experience that there is a balance between having temperatures that contrast each other enough so that colours can be differentiated and

temperatures that are still comfortable enough to the touch. This is something that is somewhat subjective but will still be of importance when prototyping the hardware.

User feedback is another thing that is also important to take into account, such as the clarity of the user interface, but also the physical hardware. Because peltier elements take a small amount of time to change temperature, when exactly is it clear to users that the image is fully rendered? Should there be some extra feedback or is this negligible because the timeframe is so short anyways?

Do the peltier elements 'leak' temperature to adjacent pixels? Is this a big issue and are there ways we can combat this? All of these things are crucial to get right.
Most of these issues will depend on what users tell us what they think during testing.

Reference

1. Affairs, Assistant Secretary for Public. "Task Analysis." *Usability.gov*, Department of Health and Human Services, 6 Sept. 2013.
2. Affairs, Assistant Secretary for Public. "Wireframing." *Usability.gov*, Department of Health and Human Services, 6 Sept. 2013.