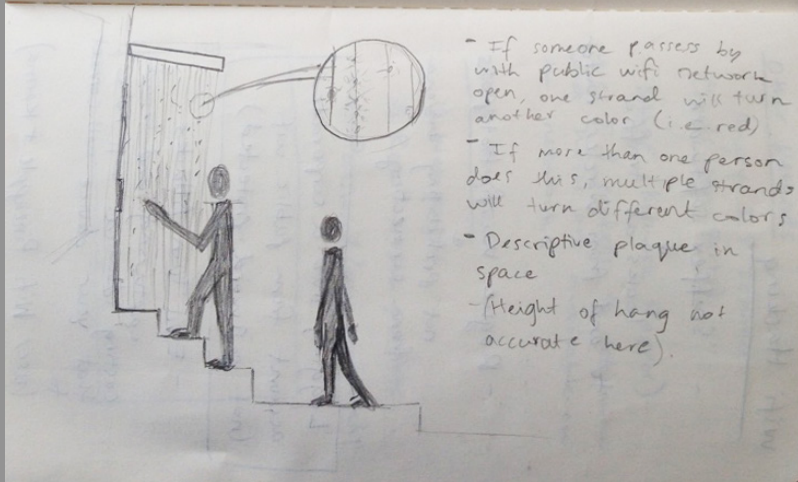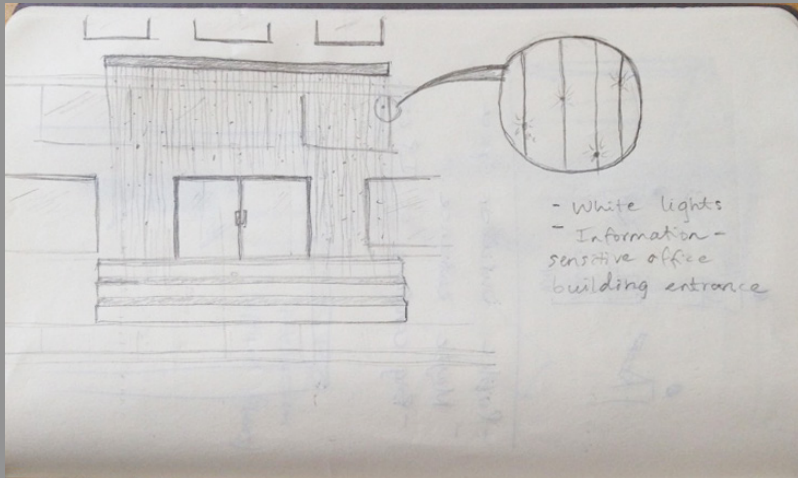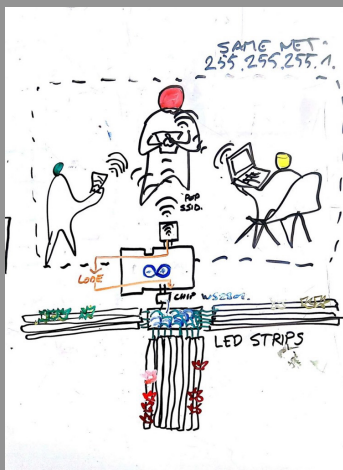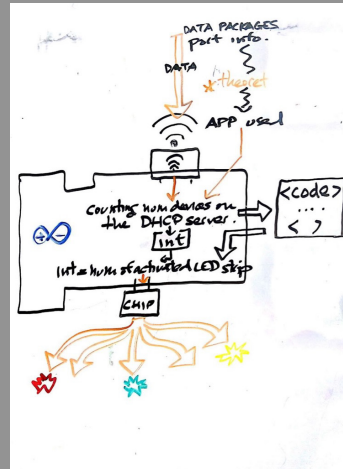# FINAL COMPILATION OF PROCESS DOCUMENTATION

PROJECT ONE- REACTIVE SPACES + MEDIA ARCHITECTURE

CREATED BY ARNITA SAINI, NEERAJ VERMA, JAVIER ARGOTA SANCHEZ- VAQUERIZO, & GILLAN JOHNSON

OCTOBER 12, 2016

First drawing of user interaction with light installation

First round of diagramming the technical system

During the initial creation of our concept our team worked with several different ideas, most of them dealing with the concept of data leakage while on public wi-fi. We explored concepts such as creating an active and ongoing painting that sprays paint onto a canvas and drips, representing data leakage. We also considered a water installation that would leak water. We eventually settled on the idea of using a lighting installation that would have lights trickle down to symbolize data leakage.

We also considered various places in terms of setting up this installation. We decided that an entry way to an office building with reasonably high levels of sensitive information would be a good place for it to live.

IDEATION OF CONCEPT

Placing the lights in an office and events setting


Placing the installation in an airport hallway

In order to get a better understanding of how we wanted our installation to look in space, we decided to put together some renderings. One explores the idea of putting it in an office lobby or hallway. As many people are using their phones in this area, we realized it may be hard for people to understand what relation they have to the lights if any. The second idea was to put them in an airport. We thought this would tackle two main issues we wanted to touch on in the project; one was to place it in a space of relatively high security in terms of information, the other was to place it in an area where many people are connecting to public wi-fi.

At this point in time we are still unsure of where the best place to stage this interaction is, and our options with regards to filming are also slightly limited.

VISUALIZING THE PIECE IN SPACE
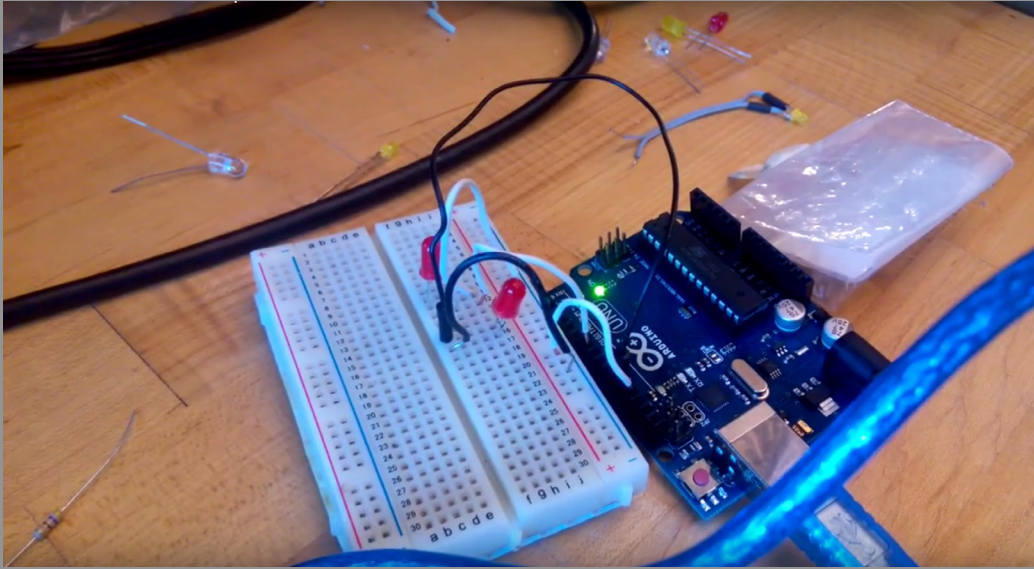
Manipulating the arduino and figuring out the wiring to create the lighting effect
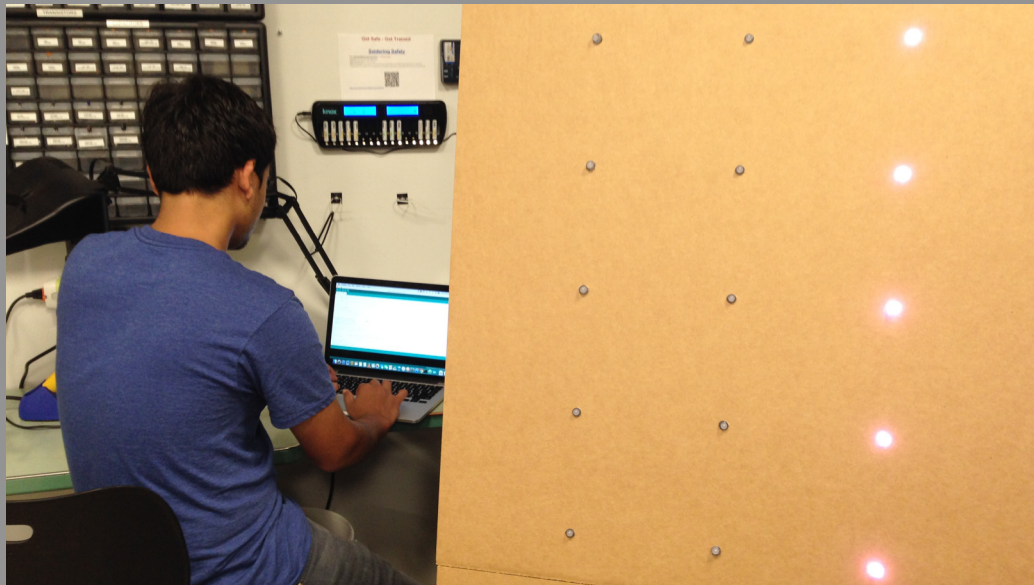
Neeraj working with Arduino, coding and creating the lighting pattern

One of the biggest challanges we as a group faced was deciding on the technology we were going to use and figuring out how to use it. As our project had two major components (setting up a twin wifi network for people to connect to so that we could track their data and creating a responsive light installation that senses open wi-fi networks passing by), we were faced with the challenge of learning how to use them within a relatively short period of time. We had also never worked with lights that could be controlled via an Arduino so this was a new learning experience as well.

Eventually we were able to bring it all together and make adjustments when necessary, as our ideas evolved throughout the creation of this project.
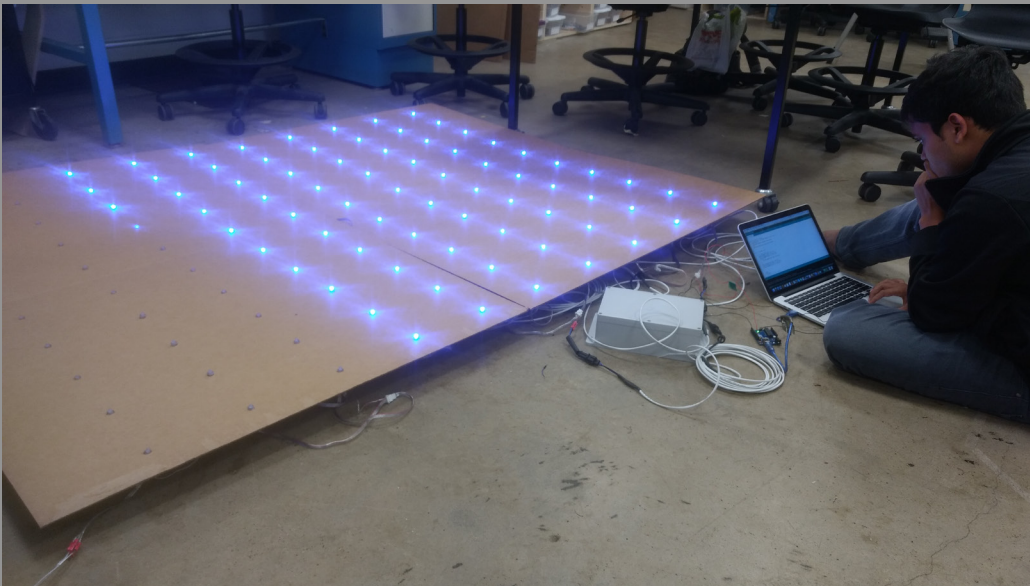
WORKING WITH THE TECHNOLOGY

Traveling to the location

Transporting the installation

Preparing the board before filming

There were many logistics that needed to be figured out before we were actually able to shoot our video. First, the creation of the lighting concept took much of one weekend to create, so we were working up to the point of transporting the piece. We were also shooting outside and inside of a private corporation, so we had to approach the managers and request permission to shoot our video.

As our product was quite large in scale (80 inches wide to be exact), there were transportation considerations we needed to make (i.e. is our location too far to carry it? should we take a car?)

We were eventually able to figure out all of these issues and shoot our video. We would like to recognize and thank the staff of Starbucks on Craig Street for their generosity in letting us film inside.

PREPARING FOR CONCEPT VIDEO

Shooting the time lapse video

Setting up the installation and testing the lighting interaction

Prior to actually filming the video, one of our team members wrote the narrative or script, so that we had a foundation to work off of. However, once we began shooting and encountering certain obstacles, it became clear that the script needed to adapt slightly. Thankfully, what wasn't entirely clear visually became clearer once we added a voice-over narrative. It was pretty wonderful to see the lighting interaction actually work and the user's movements to be tracked.

SHOOTING THE VIDEO
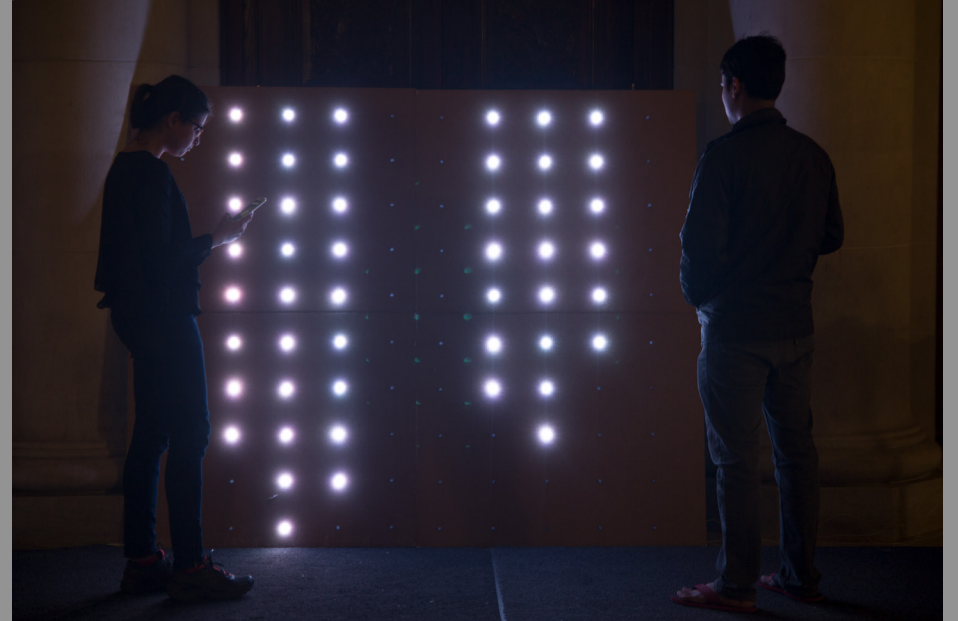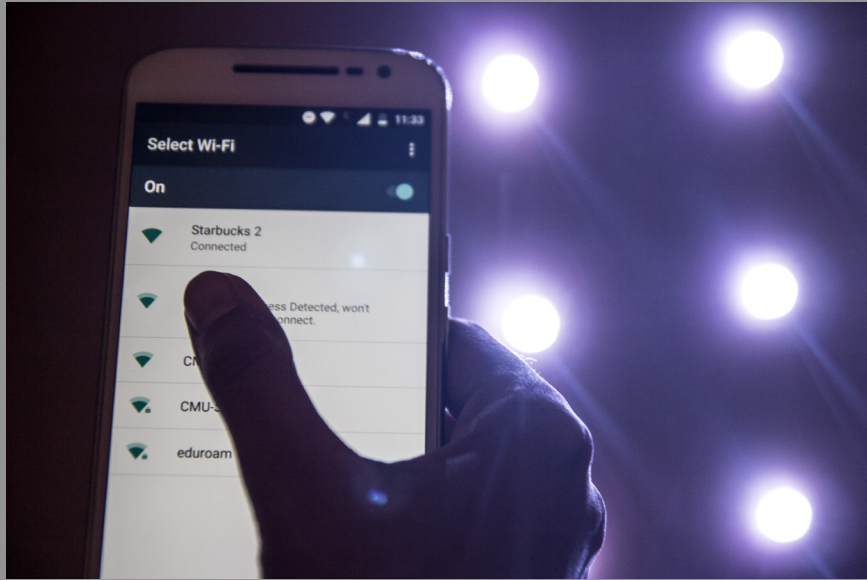
THE FINAL IMAGES

What is it?

For our project, we completed two different processes. One was the setup of the evil twin wi-fi network. Through this network we were able to access people's web and browsing activity while they are connected to the wi-fi network we set up. The second part of our project was to create a light installation that reacts to nearby devices that are on public wi-fi networks. When someone passing by the installation is connected to a public wi-fi network, the lights will trickle down at a rapid pace, reminiscent of data leakage. As the person continues to walk the lights will follow the user. Once the user recognizes their impact on the activity of the board, they will notice a color change in the lights, symbolizing the color scheme of the app they are currently on or using. Immediately following, an audio indicator in the space will play the notification sound of this specific application. We hope that the actions of our installation will intrigue people enough to read our placard on the wall and inform themselves about how easy it is to have data from their phones leaked. Furthermore, we hope that they will remind themselves in the future to turn off their wi-fi.

Why is it worthwhile?

Data leakage is a huge problem plaguing the technology world today. It is incredibly easy for virtually anyone to access someone's private data, and even easier if the user is connected to a public Wi-fi network. Placing our light installation in a location where people frequently connect to public Wi-fi will reinforces how easy it is to have data leakage occur on your device. Our installation is non-invasive and relatively unobtrusive, however we have implemented visual and auditory indicators that clearly inform the people passing by of their open public wi-fi networks. After hearing critique from the visitors during our presentation, we now realize that the project may have been more impactful if we had staged it in a location with more sensitive information sources. People who care about data leakage are aware of the risks of being on public wi-fi, especially in places like Starbucks.

What insights brought you to this project?

We were inspired by an experiment that was conducted by Avast mobile security and presented at the Mobile World Congress last year in Barcelona. Avast's team set up several wi-fi hotspot networks in the Barcelona national airport and, within a matter of only four hours, was able to capture more than 8 million data packets and gather personal information from thousands of users including which websites they visited, what kinds of phones they had, and much more. As it is relatively easy to setup a hotspot network or, in our case for this project, an evil twin network, and gather information about online activity of people using it, we felt that it was important for the public to be informed about this. We chose to tell this story through a light and sound installation. In terms of the design of the installation, we drew from Julian Oliver's work with data leakage, however we chose use lights in a very different way than Oliver does.

## Any new considerations after being given feedback?

After presenting our concept and hearing the feedback, we now realize the potential disconnects that can occur between our concept (being data leakage) and the manner in which we chose to present it (the 2-dimensional lighting installation). This may have not been the most impactful or clear way, as people may not understand that they are actually the thing manipulating the light patterns, color changes, and sound. We also now see that our concept may be too playful considering that we are dealing with data leakage issues. We would have liked to bring this concept to a more information-sensitive location, however our resources and time did not permit us to organize this, so we found the next best solution; a public wi-fi setting close to campus. We have re-edited part of the video and added in a new clip that better illustrates our implementation of the installation into the space. If more time was available, we could also change the beginning sequence to focus more on the user interaction.

WRITTEN RESPONSES

Data identified:
*Whatsapp application, ongoing chat*
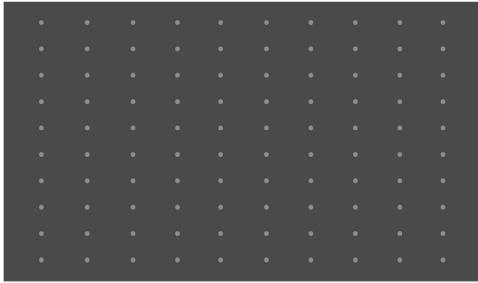
Light board is inactive, with the lights turned off

This installation is for a space that would
ideally be semi-seating, where people around the
area are moving in and out.
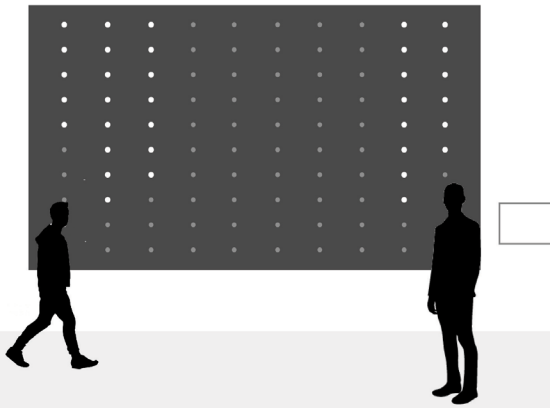
As people walk by, who are connected to public W-Fi,
the lights start to trickle down, to show dripping effect.

The light columns follow the person who's data leakage
they communicate.
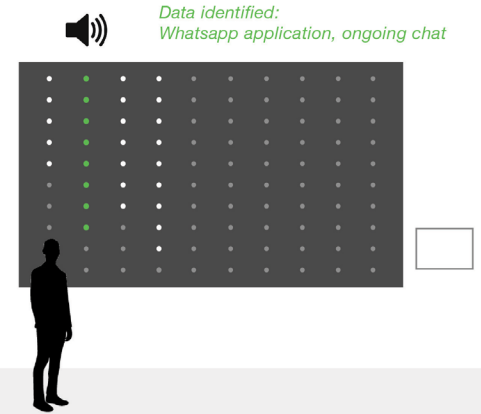
While they are on public Wi-Fi, it can be easily
understood what application they are using.

Insight - The lights depict color of the application in use.
When they get notified in that app, a sound feedback
same as the notification tone of that app is given.

TRICKLE

This light installation intends to make you
aware of the potential risks of public Wi-Fi.
The lights will trickle to show your proneness
to potential data leak. You could be re-routed
by a miscreant to a site of their choosing, or
hacked in to know your online browsing activity.

Remember to turn off your connection to
public Wi-Fi after use.

On the plaque, people can read information about
the installation and understand their potential risk of
leaking data.

WI-FI SETTINGS

Wi-Fi

CMU Free Wifi
CMU-Secure
XFinity
CMU-Guest

Upon turning off the Wi-Fi, the lights will turn off.

USER FLOW DIAGRAM
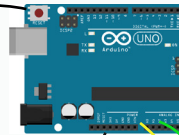
USERS

PUBLIC Wi-Fi

People connect to public Wi-Fi

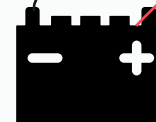Intercept the data packets in the communication to retrieve URLs that users are browsing

US

'Middle-man attack' using ARP poisoning

Clock - Pin #11
Data - Pin #12
Ground - Pin #13
Power

DATA FLOW DIAGRAM

THANKS.