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Unconscious Automatons on Facebook

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Abstract

PERE, ADAM M. An installation of three kinetic sculptures or robots that have Facebook accounts and actively post to them.
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The Internet is a relatively new phenomenon that has completely morphed the modern world. Living on a college campus, I almost never find myself in a room without access to the Internet and social media. I, along with many others in my generation, spend hours per month mindlessly surfing the Internet and Facebook. With my project, I want to start a conversation on the topic of how the Internet has shaped our society and whether these changes are positive or negative.

To do so, I have built an installation of three robots and a monitor. Each robot (see *Figure 1*) is interactive in the physical world through the use of an Arduino, sensors, motors, LCD screens and LEDs and the digital world through the use of Facebook where they can post photos of their surroundings, status updates or comments. I hope that by watching my robots mindlessly performing the same tasks that we do everyday, viewers will begin to ask the same questions proposed above.

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1 Introduction

The Internet has become an indispensable resource in the modern world. It has changed the way we think, interact with one another, and spend our free time. Instead of memorizing facts, students are more likely to remember how to look up information. For instance, instead of memorizing the periodic table of elements a chemistry student can instead use Google to find the answer he is looking for. Instead of spending more time physically interacting with our peers it has become common for people to isolate themselves and communicate with others through text messages, the Internet and social media. These forms of communication tend to be absent of certain social cues such as body language, eye contact or tone of voice. Although we may attempt to replace these cues with new ones such as emoticons, they tend to be less informative as the user has to consciously add them to his text.

We dont only use the Internet as a form of communication. It is also frequently used a form of entertainment. From 2000 to 2011 Rainie Lee polled 851 Americans on their use of the Internet. The graph in *Figure 2* shows the results of various age groups answer to the question Do you ever go online for no particular reason, just for fun or to pass the time? Lee found that more and more people answered yes to this question as time progressed. This coincides with with a variety of trends: the rise of broadband connections, the increasing use of video that is enabled by those high-speed connections, and the explosion of social networking. [4]

According to the Nielsen Report the average American spends approximately 29 hours on the Internet per month and 8 of those hours are spent on Facebook [5]. In my opinion, the average Facebook session can be broken down into one of the two basic categories: content creation and content consumption. Content creation is when the user posts content for his/her friends to see. This includes status updates, comments, photos and videos. Content consumption is when the user reads (or scrolls through) his/her friends statuses, comments, photos and videos. Almost one third of the average Americans time is spent doing one of these two mindless acts.

With this project I want to start a conversation about Facebook and the Internet. These tools have completely changed humans on both individual and global levels. Are these changes positive or negative? Have we actually changed or have we simply replaced the mindless tasks that our ancestors performed with high tech alternatives?

I want to bring to light the absurdity that is the mindless acts of web browsing and Facebooking. I will do so through a community of 3 robots that live in the physical world but spend all of their free time (which is all the time because theyre robots) on Facebook posting photos of their surroundings, updating their status, and browsing their newsfeeds and essentially, everything else we do on Facebook.

2 Design

This art piece will be installed in the atrium of the Visual Arts building from April 9th to April 13th this year. The basic layout of the installation will be three robots, one wall mounted and two on a pedestal, and a large monitor as can be seen in *Figure 3* . Each robot will be interactive in the physical world through a variety of sensors, a servomotor, an LCD screen, LEDs and a web camera which can be seen in *Figure 10*. They are also interactive in the digital world through the use of Facebook accounts where they can post status updates, comments, and photos. The monitor will display each robots Facebook page, the live feed from the robots web cam, and text. A sample of what the screen might show can be seen in *Figure 4*.

2.1 Physical Structure

The two basic components of each robot are aluminum sheet metal and wood that were water jet cut and folded with the help of Paul Tompkins from the engineering lab. Using Adobe Illustrator (and many scaled paper models) I designed the shapes needed for my robots to be cut from the aluminum and wood. A sample of one of my illustrator files can be seen in *Figure 6*, the scaled paper version of these can be seen in *Figure 7* and results can be seen in *Figure 8* and *Figure 9*.

2.2 Electronic Components

Although each robot will have a different shape, their basic components are the same and can be seen in *Figure 10*. Here is the list of components:

Arduino Uno This is the brain of each robot. All sensors, the LEDs, the LCD display and the servomotor are connected to the Arduino. The Arduino is connected to the computer and tells the computer what sequence of code to run by writing to serial.

Webcam This is physically mounted on the servomotor and electronically connected to the computer via USB. The Arduino controls the motion of the servomotor (essentially pointing the camera) and the computer controls when a photo or video is taken.

Small LCD Screen This is used as a way for the robot to textually display what it is doing. For instance the LCD display may show text such as Posting to Facebook, Taking Photo or something revealing the robots personality such as Nothing to see, nothing to do or Excuse me, I am on Facebook.

Servo Motor This is mounted to the base of the robot and the webcam is mounted to the motor.

Motion Sensor This lets the robot know whether or not there is anyone in the room. If there is no one in the room it does not need to be active.

LED Lights These are used to add a sense of interactivity with the robots. They light up when the robot is (or isnt) doing anything. They may blink in patterns or randomly depending on what the robot wants to convey.

As you can see in *Figure 11* the servomotor, the LCD screen, the motion sensor and the LEDs are all connected to pins on the Arduino. The Arduino, the webcam and the monitor are all connected to the computer (note: there is one monitor for all three robots).

2.3 Software

All programming for the Arduino is done using the Arduino programming language. The programming on the computer is done using the Processing language, python and Unix. *Figure 12* shows an action diagram that displays the communication between the programming languages when uploading a photo.

2.3.1 Arduino Programming Language

The Arduino is the brain of each robot and is programmed using the Arduino Programming Language. The Arduino receives input from the various sensors and accordingly sends signals to the motor, LCD screen and LEDs. The Arduino also writes to serial letting the computer/python know what to do.

Each robot has 2 main modes:

Do nothing If the robot does not sense any motion it assumes that there is no one around and therefore does nothing except maybe blink the LEDs and displays text. One robot displays the text Nothing to see, nothing to do. It does not communicate with the computer during this mode.

Motion Detected If the robot sense motion then it assumes that there is at least one person in the room. The LEDs are then set to blink, a message indicating that the robot is looking for people is displayed on the LCD screen and the motor moves the webcam in a sweeping motion and then stops at the center position.

If it still detects motion after the sweep, the robot will randomly choose to upload a photo or let processing choose what Facebook action to take. This decision is then communicated to the computer by writing a character to serial (for one robot, p is sent to take a photo and k is sent to let processing choose). The robot then displays text on its LCD screen letting the viewer know that it is taking a photo or that it is currently on Facebook (cue to the viewer to look at the monitor).

2.3.2 Processing

I chose the programming language Processing because it had the simplest implementation for communicating with the Arduino, displaying the live feed from the webcam and performing face detection using the OpenCV library [2].

Similar to my Arduino program, my Processing program also has two main modes:

No Facebook Action This mode occurs when none of the robots want to perform a Facebook Action (uploading a photo, status or comment), while python is currently uploading to Facebook, or during the 30-second delay when the program is first run. In this mode, Processing will continue to display the live feed from each robots webcam and do nothing else.

Facebook Action Initiated This mode occurs when on of the robots has written a character to serial. The robot either specified that it wants to take a photo or that it wants to take an action and let processing choose. If processing is choosing the action, a weighted random number is generated and one of the three actions (photo, status, or comment) is chosen based on that number.

If the chosen action is to upload a status or a comment then processing will randomly choose the text from an array of prewritten statuses/comments. Processing then creates a text file that has information on which robot is posting, the action he is taking, the text associated with that action and the file path for any associated images (blank for statuses and comments). When this is finished, the executable that communicates with python is run.

If the chosen action is to take and upload a photo, processing checks to see if there are any people in the cameras view using the OpenCV module to perform face detection. 30 frames (1 seconds worth of frames at 30 fps) are copied from the webcams live feed into a buffer and then opens face detection algorithm is run on the buffer. If one or more faces are detected, a photo is taken, a comment for the photo is randomly chosen, the information is written to a file, and the executable that communicates with python is run.

2.3.3 Unix

I am using the Unix terminal as an interface between Processing and Python. In python, I created a named pipe (or FIFO) that allows me to send the output of any Unix command to a continuously running python script. To take advantage of that, I created an executable that can be called from Processing that sends the text from a text file (the one created by processing that has all the information on the Facebook action) through the pipe to the python script. This tells Python when to perform an action and the information needed for that action.

2.3.4 Python

I am using python to post photos, statuses and comments to Facebook as well as displaying and automating web browser tasks. I chose python for these tasks because it has the two libraries fbconsole [1] and selenium [3], which are designed to easily allow me to post to Facebook and automate web browser task respectively.

When the python script is first run, it creates three instances of the web browser Firefox. This allows each robot to have its own dedicated web browser so it doesnt have to log into Facebook every time it wants to post. Python then goes into what I call idle mode. It runs an infinite loop that constantly checks the named pipe for any input.

When python receives input from named pipe, it parses the inputted text (which will always be: the robot posting, the photos file path, the action being taken, the text associated with that action); uploads the photo or status using fbconsole; displays that robots Facebook page using Selenium; waits about 30 seconds, giving the view time to look at the uploaded photo or status, and minimizes the web browser.

3 Future Work

Complete replication of 1st robot and installation in the Visual Arts atrium for the ID show on April 9th April 13th with works from Matt Baretto, David Leung, Angelica Sohn and myself. The show is entitled today with each piece of art making a commentary on the present.

4 Acknowledgements

I would like to thank my advisors Chris Fernendes and Fernando Orellana for all the help and guidance throughout the term. If it wasn't for the two of you I would have been completely lost.

I would like to thank Paul Tomkins for cutting and folding the aluminum and wood for me. Without your help I would probably have a completely different project.

I would like to thank Tom Yanuklis for loaning me a computer for 1.5 terms and for coming up with the idea of using named pipelines (that really saved me).

I would like to thank John Rieffel for the guidance in CSC497. Even though I may have seemed lost for most (or all) of the term that class helped me realize my project.

I would like to thank Shane Cotter for helping me find an easy way to perform face detection and pointing me toward the OpenCV library.

I would like to thank Bernard Kuhn for meeting with me to talk Cyberpunk and for loaning me your copy of *The Encylopedia of Science Fiction*.

I would like to thank The Computer Science and Visual Arts Departments for all the knowledge they have provided me over the years and for funding parts of my project.

I would also like to thank Union College and the IEF for granting me the money to make this project possible.

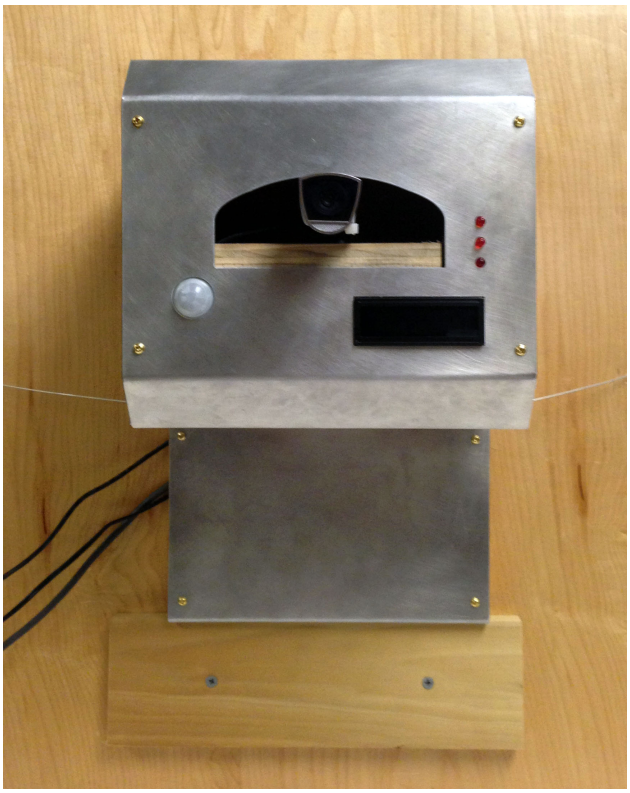


Figure 1: John Roboson. The finished product of one of my robots.

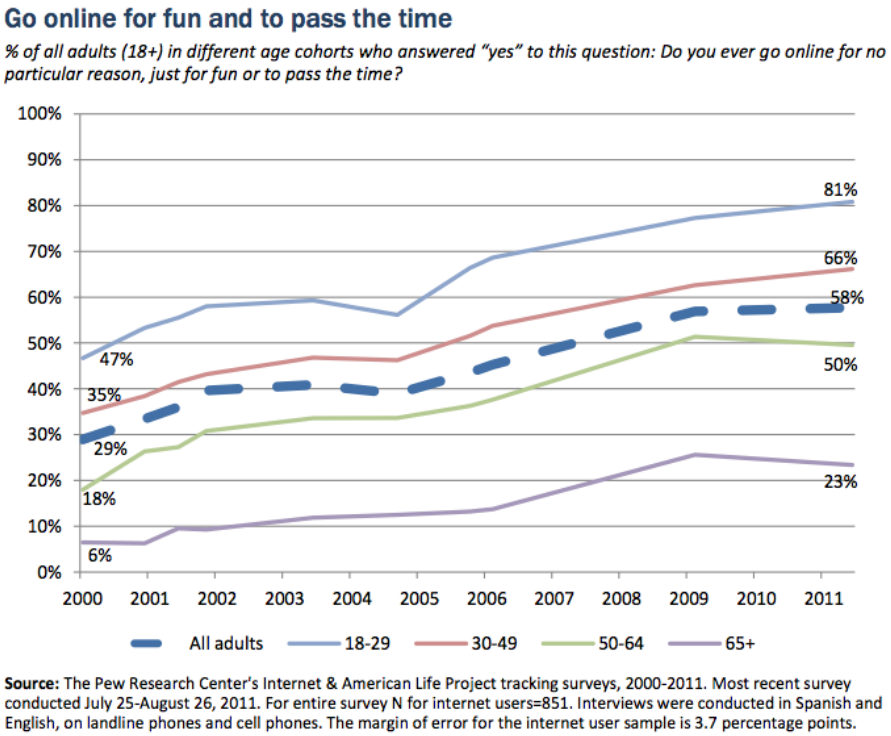


Figure 2: Percentage of adults ages 18+ in different age groups who answered *yes* to the question *Do you ever go online for no particular reason, just for fun or to pass the time?*

Figure 3: A 3D Model of the full installation including 3 robots and a monitor. (note: the design for the middle robot has since changed)

Figure 4: An image of the the monitor that was on display during the exhibition in the visual arts building. This monitor displays the live stream from each robot's webcam eye.

Figure 5: TAn image of the the computer that was on display during the exhibition in the visual arts building. The computer handles a great deal of the computing and displays each robot's Facebook feed for those in the gallery to see.

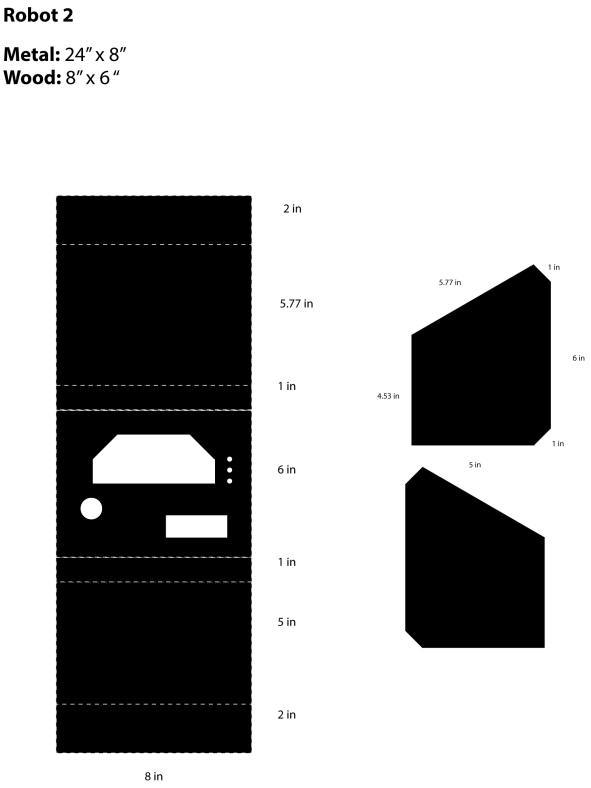


Figure 6: The illustrator file used to cut one of my robots. On the left you have what was cut out from the aluminum and on the right you have what was cut out from the wood.

Figure 7: A scaled paper version of one of my robots. This was created when I was first creating the illustrator files to be used in with the water jet cutter.

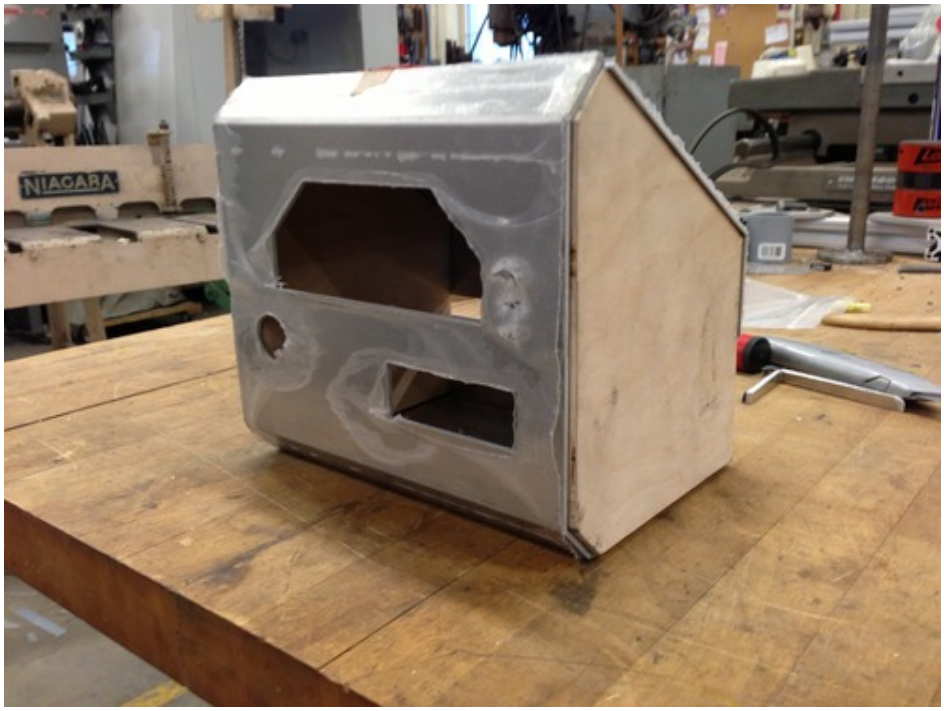


Figure 8: One of my robots partially put together after the wood and aluminum have been cut and folded.

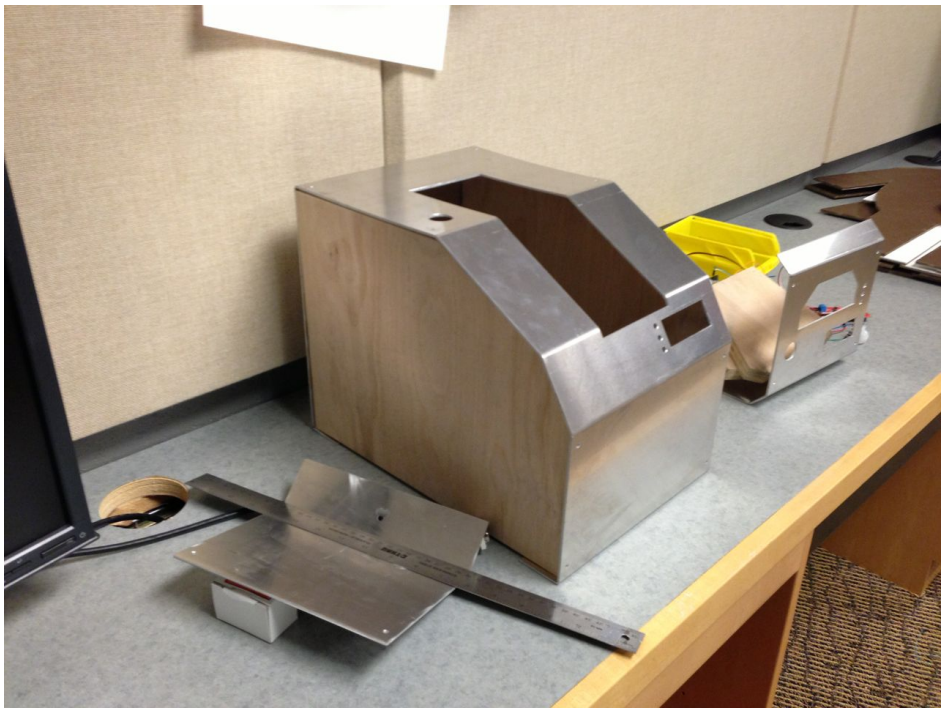


Figure 9: Another one of my robots partially put together after the wood and aluminum have been cut and folded.

Figure 10: A close up of one of one of the robots with the electronic components labeled.)

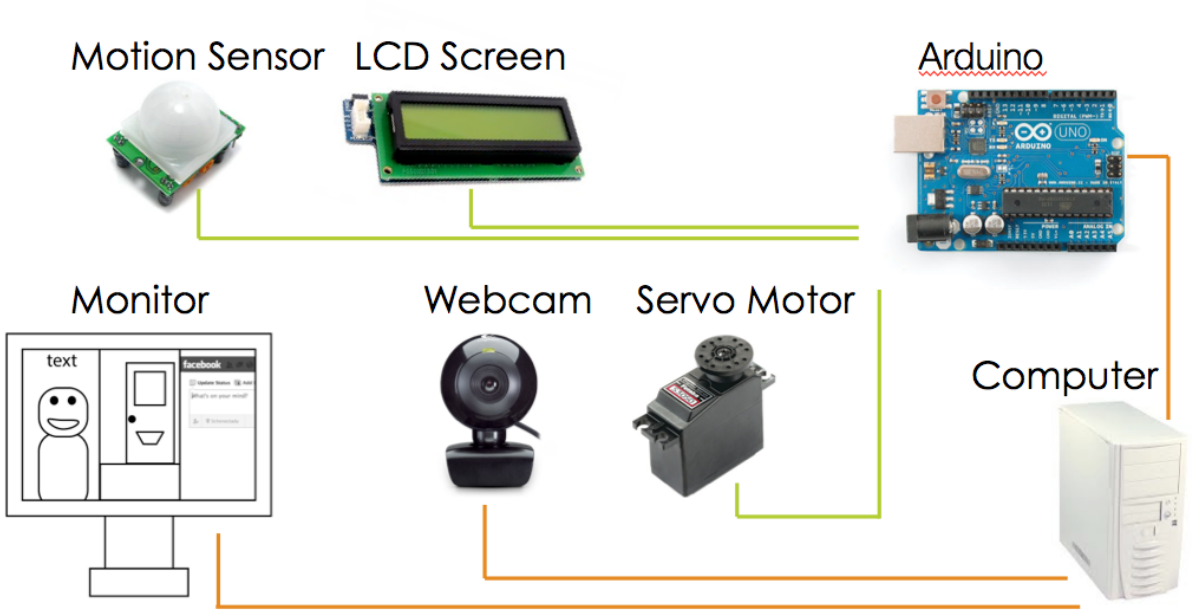


Figure 11: A diagram of the basic connections of each robot displaying which components are connected to the Arduino and which are connected to the computer.)

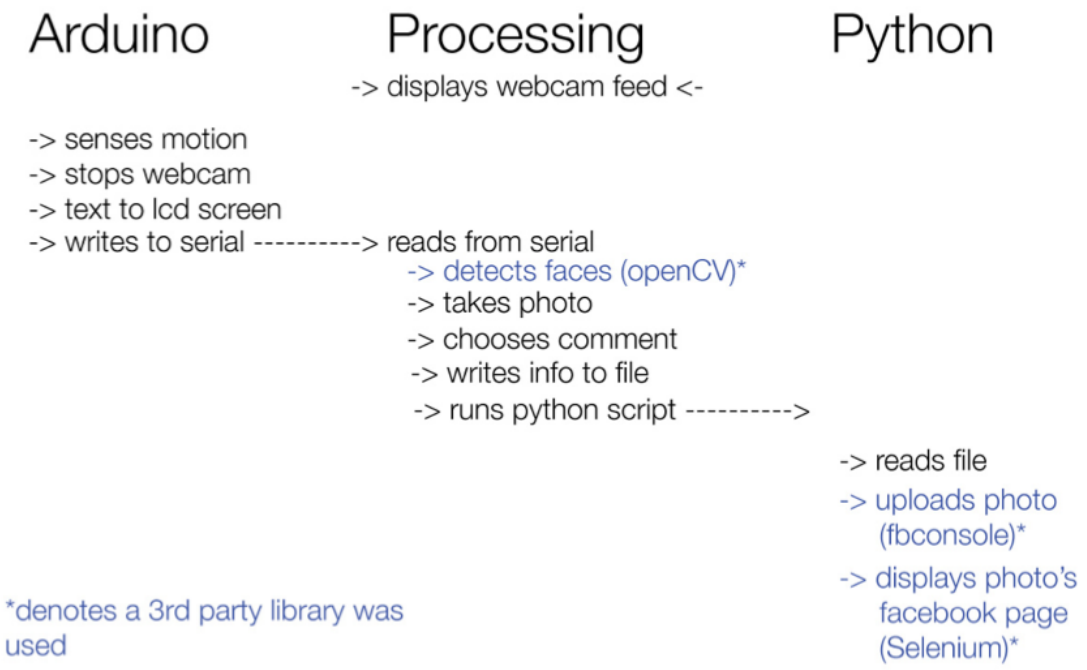


Figure 12: An action diagram showing the connections between programming languages.

Figure 13: A photograph of the installation in the Visual Arts Atrium.

Figure 14: A close up of John Roboson during the exhibit in the Visual Arts Atrium.

Figure 15: A sample of posts that John Roboson has uploaded to Facebook.

Figure 16: A close up of Sarah Cybstein during the exhibit in the Visual Arts Atrium.

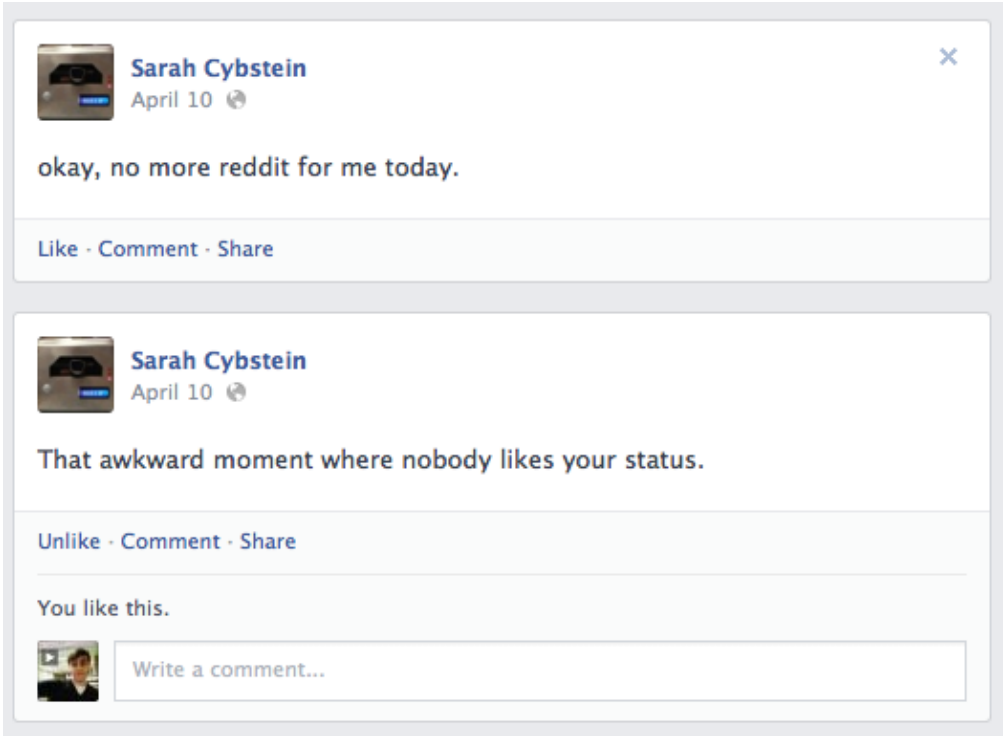


Figure 17: A sample of posts that Sarah Cybstein has uploaded to Facebook.

Figure 18: A close up of Mark M. Sheen during the exhibit in the Visual Arts Atrium.

Figure 19: A sample of posts that Mark M. Sheen has uploaded to Facebook.

References

[1] P. Carduner. fbconsole.

[2] itseez. Opencv.

[3] S. Labs. selenium 2.26.0.

[4] R. Lee. The internet as a diversion and destination. *Pew Internet and American Life Project*, 2012.

[5] Nielsen. May 2012 top u.s. web brands and news websites, 2012.

Unconscious Automaton on Facebook

Adam Pere – ID Computer Science & Visual Arts

Advisors: Chris Fernandes & Fernando Orellana

Steinmetz – Friday May 10th 2013

Introduction

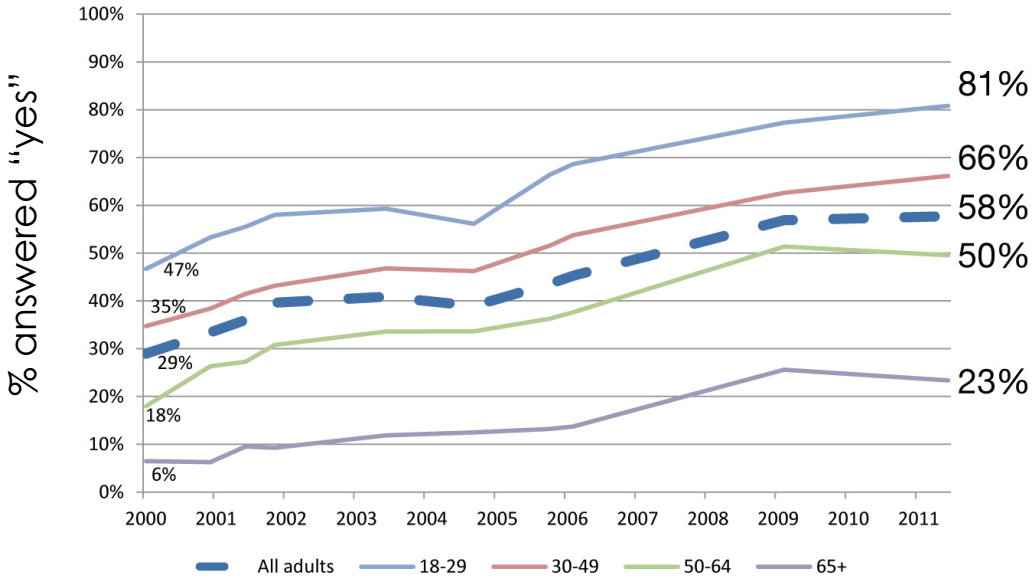
- Internet + Facebook
  - Mindless Web browsing
- Art Installation: 3 robots
  - Sensors + Webcam “eye” to take photos of surroundings
  - Facebook Accounts

Motivation

- The Internet has changed the way we
  - think
  - interact with one another
  - spend our free time

Motivation – "Cyberloafing"

Do you ever go online for no particular reason, just for fun or to pass the time?



"When you're not looking for anything special, the un-special will do just fine."

– Mitch Albom,
Free Press Columnist

Motivation

- According to a Nielsen report the average American spends approximately
  - 29 hours/month on the Internet
  - 8 of those on Facebook [1]

What are we doing on Facebook?

- Posting content for the user's friends to see
  - Status updates
  - Comments
  - Photos/Videos
- Reading/scrolling through friend's content

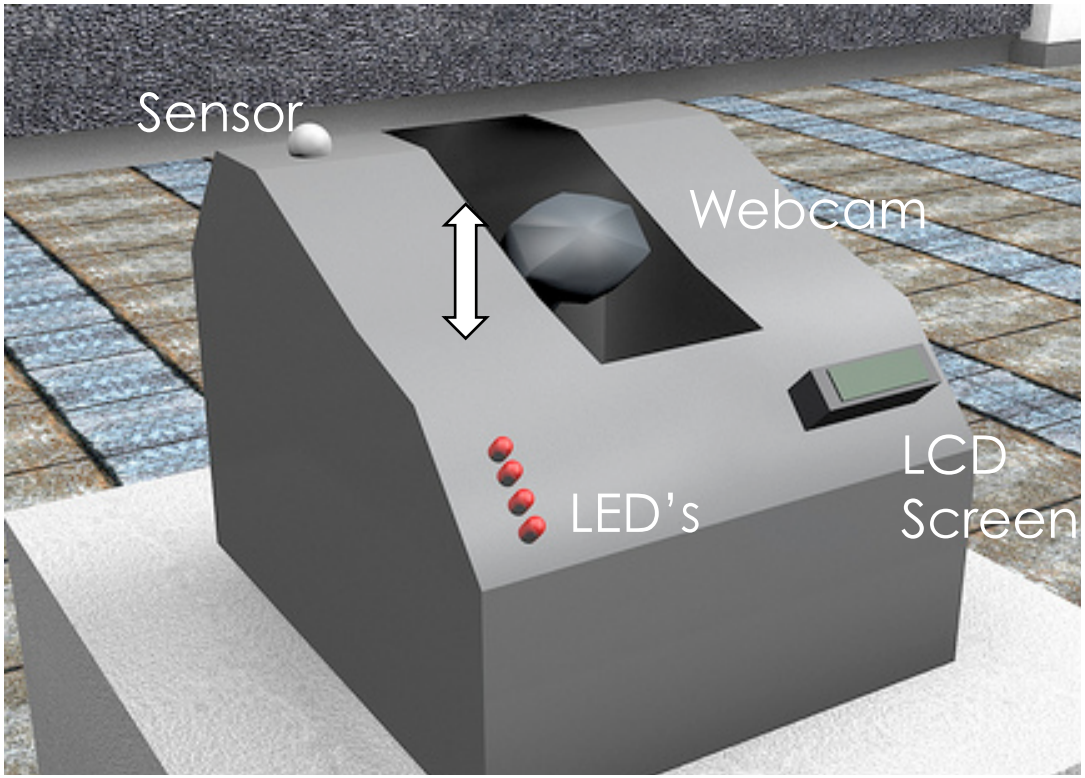
Design

- 3 Robots + 1 Monitor

Design

- 3 Robots + 1 Computer + 1 Monitors

Design

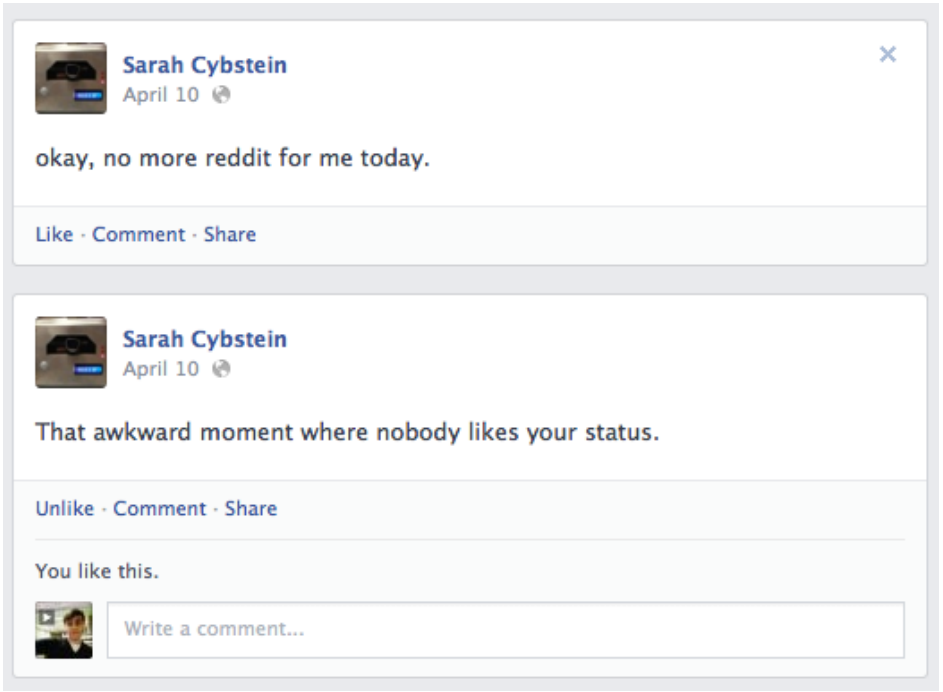


Design – Final Product

John Roboson

Design – Final Product

Sarah Cybstein



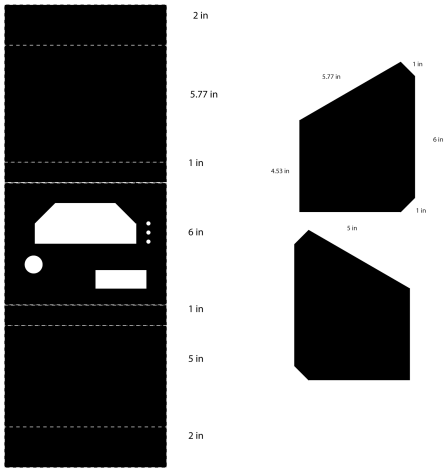
Design – Final Product

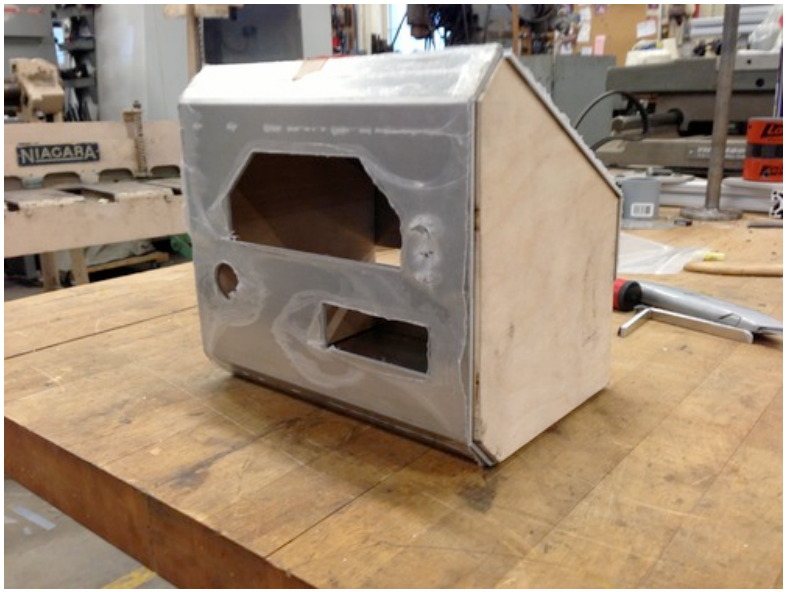
Mark A. Sheen

Design – Final Product

Design - Hardware

- Materials
  - Aluminum + Wood
    - Water Jet Cutter



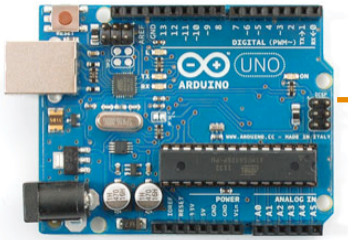


Design - Hardware

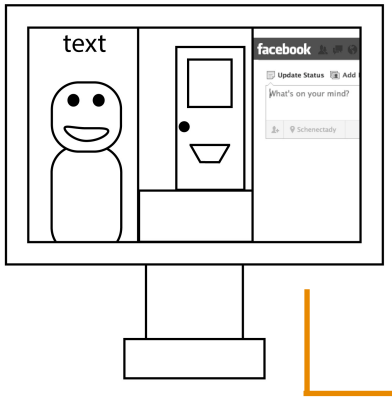
Motion Sensor

LCD Screen

Arduino



Monitor



Webcam

Servo Motor

Computer

Design - Software

Arduino

-> senses motion
-> stops webcam
-> text to lcd screen
-> writes to serial ----------> reads from serial

Processing

-> displays webcam feed <-

-> detects faces (openCV)*
-> takes photo
-> chooses comment
-> writes info to file
-> runs python script ---------->

Python

-> reads file
-> uploads photo (fbconsole)*
-> displays photo's facebook page (Selenium)*

*denotes a 3rd party library was used

Design – Software: Robot's Personality

- Choosing a status, comment, or caption
  - Randomly chosen from a database of pre-written comments

RoboStatusComments [1][4] = "Sometimes I feel as if we're living some kind of Orwellian nightmare and that everything I hear contributes to turning me into a robot :/";
RoboStatusComments [1][5] = "can't wait for this day to end...";
RoboStatusComments [1][6] = "Oh lordy lord!";
RoboStatusComments [1][7] = "Raccoons scare the living hell out of me... weird that my cat descended from one. #floatingcat";
RoboStatusComments [1][8] = "Today (so far): woke up, chugged a cup o'joe, standing stationary against a wall taking photos #helpme";
RoboStatusComments [1][9] = "Can I use someone's netflix account?...message me.";

Design – Video

- Insert vi

Evaluation

- How do we know if the project is successful?
  - Working Robots
  - Aesthetically pleasing
  - Viewers think about

Questions?

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