ShowMi Technology Inc.

Post Mortem for the

MagicMirror

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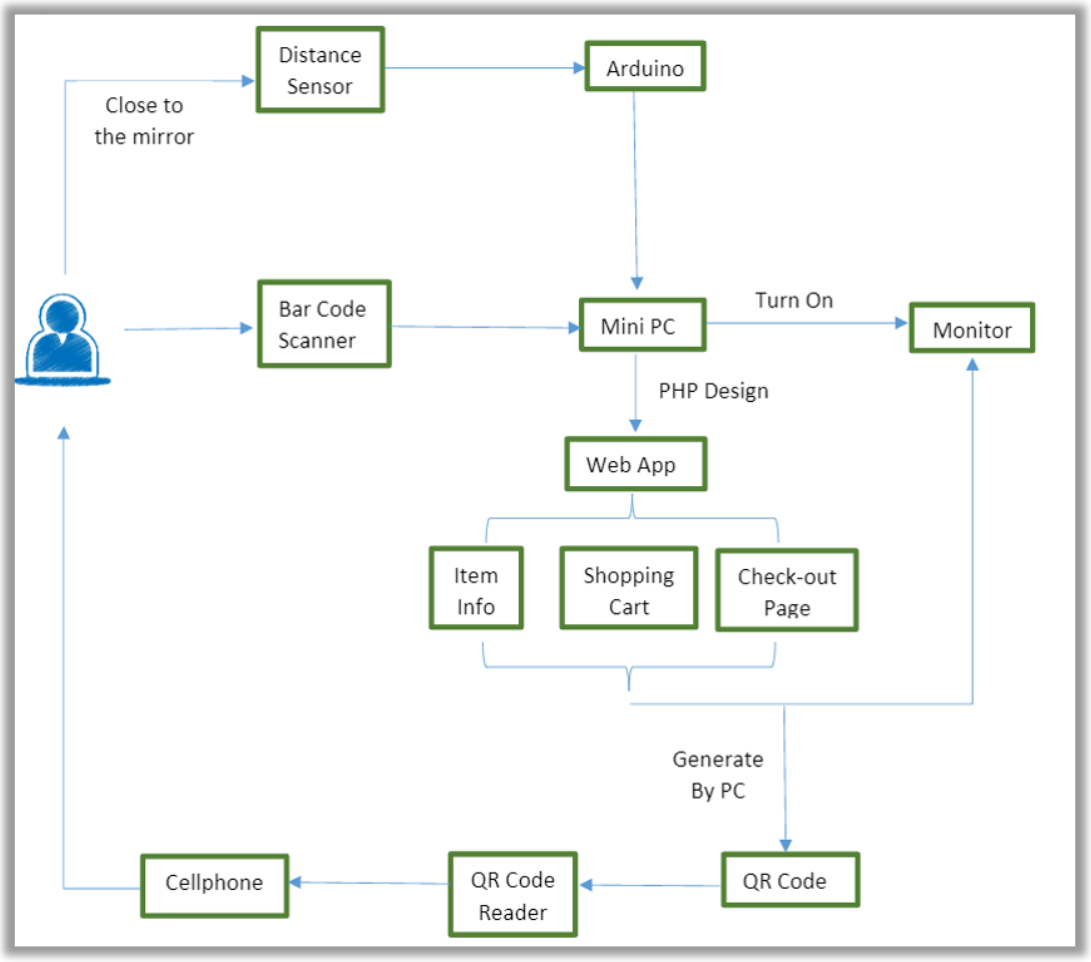
1. Introduction

The purpose and solution that our project brings to customers is to make the whole shopping process time-efficient and convenient. Our team did research within few Vancouver area clothing stores, and most of them still keep the traditional way to complete the shopping process. Especially during some big event or on-sale day, customers will have long time queuing instead of enjoying and picking their favorite clothing. Also, clothing store with many technical functions very match to modern information era. In this case, developing a smart mirror has huge potential for clothing store.

Our project, *"MagicMirror"*, has three major functions. The *"MagicMirror"* has three major functions. Firstly, when the customers scan the cloth labels, *"MagicMirror"* could help the customers check its detail information, like size, color, and the amount in stock, so it will help the customers to choose their most favorite items and add to the shopping cart; secondly, the ambient light intensity is adjustable when people using the fitting room; lastly, it allows people to use their phones to scan the barcode that generated from the *"MagicMirror"* to pay for the items.

2. System Overview

The flow chart figure# below shows the overview of our whole system below. The essential part of our product is the two-way mirror in which the side of the light source will be reflecting. The HD monitor is put behind the mirror so that the mirror monitor is set up. Furthermore, a website application is developed for the self-checkout system in a Mini-PC and we implement the program for the Leap Motion RealSense Camera to capture the hand movement so that the users are able to control the website application through the mirror monitor.



(Figure1: The Flow Chart of System Overview)

3. Hardware System

Our actual cost comes to 557 Canadian Dollar, which is less than the estimated budget 665. The main reason we were able to reduce the budget by 108 is we found a lot of second-hand trading place where we purchase our material in a relatively low price. Further, one of our team members has the source to order product from other country with a low shipping cost, which saves us a lot of budget.

Indeed, during the process of building our product, there are some unexpected accidents

happened which cause the increase of the cost. For example, we tried 4 different types of distant sensor of which first three of them are broken in unknown reason, which triples the budget spending on the distant sensor.

Moreover, the change of our idea also factors the budget a lot. In other word, the function of the final product is slightly different the product of our proposal. Thus the material we were utilizing is also different which factors the save of the budget. The table table shows the difference between the actual cost and the estimated cost from our original proposal.

Table1 Comparison between estimate cost and actual cost

ITEM	ESTIMATE COST	ACTUAL COST
Ardunio Uno(x2)	40 (x2)	33
Screw Driver Set	20	22.39
Ultrasonic Range Sensor	20	19
USB Cable(x2)	3(x2)	3.05+3.86
Bluetooth	30	35
Breadboard Jumper	15	2.2
Potentiometer	2	2
Distance Sensor (x4)	20(x4)	15.5(x4)
Jumper Wire	2	1.75
Two-way Mirror	120	106.85
Barcode Scanner	100	78.30
Mini PC	100	97
Wood	50	48.9
Leap Motion	50	25
LED	2	1
TOTAL	665	577

4. Schedule

The figure below shows the Gantt chart of our original plan (in red color) and the actual duration (in shadow). The software design and hardware design are completed as scheduled. We had spent more time on the software and hardware testing than we scheduled at the beginning, and the mechanical development is two weeks behind the schedule. And since the accident of mini PC, we couldn't find a new mini PC but replace it with a laptop. So our final product has a little change comparing what we planned.

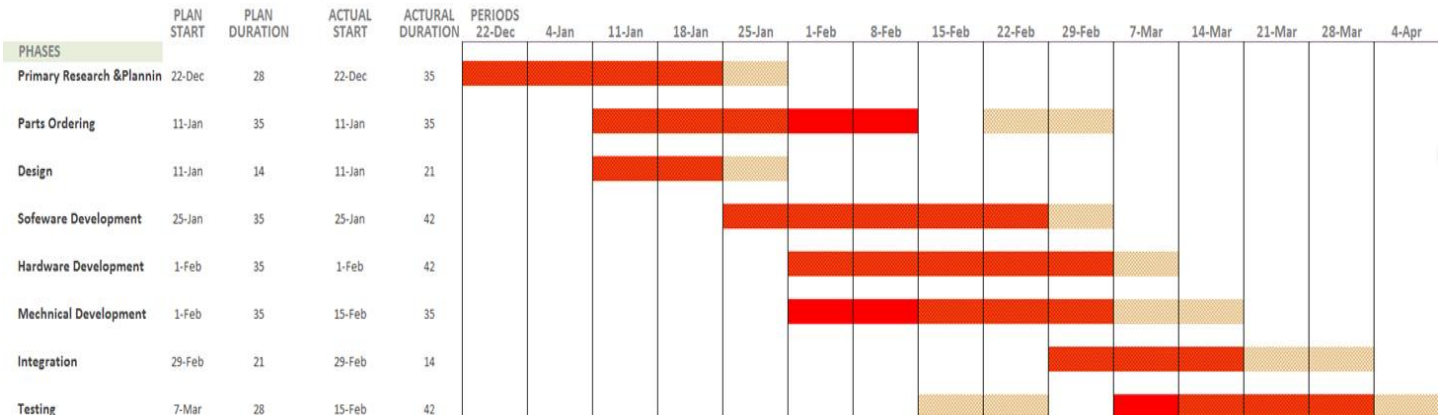


Figure2: Our Product Schedule

5. Business

Because we have very specific market target, we believe would be popular in clothing stores. We are targeting not only the chain clothing stores, like H&M, Forever 21 and Topshop, also private clothing stores will be our potential cooperative enterprise.

6. Problem and Challenge

During process of our project, we met many different difficulties in software, hardware, mechanical and integration of the system. Problems and solution are listed below.

- Decide between home-use smart mirror or clothing store smart mirror.

We decided to do clothing store smart mirror because it is more applied in life. Also, we considered that home-use mirror not necessarily need any functions and it cannot solve any problems; on the other hand, clothing store smart mirror that development by our team has check-out function and item information function. These functions make the whole shopping process time-efficient and convenient. Also, clothing store smart mirror can deduct labor for any clothing store.

- Distance sensor always detected noisy frequency that influence the accuracy.

Firstly, we used Ultra Sonic distance sensor, and we built a circuit as filter. the detected result is better without using a filter. Then, we tried to use Infrared distance sensor that has two ports emit two infrared ray to the object, and we found the result is very stable.

- Scanner and Leap motion controller cannot use simultaneously.
- Our sample website could not display image properly in google chrome.

We changed our script function so that the image can fit in the format of google chrome.

- The button of the page jumping conflicts with its format

We decided to change the format type of our buttons.

- Place wire and organized the backside structure

We bought cable tie from electronics store, and we used glue every individual wire on the side, so they do not effect each other, and looks organized.

- Where to place leap motion is the best

We considered many factors, for example, people's average height and arm's position. We also thought about left hand people, but we don't have any time to fix this. We made an arm on the right side of our mirror and there is extra free space can provide people with place to put stuff like wallet, key etc.

7. Group Dynamic

ShowMi Technology Inc. team has five passionate engineering student organized to work together cooperatively and interdependently to achieve the project *MagicMirror* that is a faddish modern smart shopping mirror. Before the project start, we had several meeting to decide what kind of product we are going to developed, and we all made determination to

complete the project. Also, we met up regularly about three times per week, so we have a good communication environment; besides, every member in team keep a great manners of understanding. Although we had conflict and ambiguous understandings to each other, we all have same goal to achieve and we all put lots of effect on it.

On the software part, Aaron programmed the QR code connect to sample website, and make them interactive. Also, Terrence helped Aaron with developed website interface and function. These two members have work experience about develop website, so it is a great chance to make use of what they have learned; they also developed three samples of product with QR code for following tests and demo. Furthermore, Aaron programmed HTML to generate QR code for check out.

On the hardware part, Nick programmed Arduino code for measuring distance within 60 cm will activate our screen; also, Nick connected our screen to the Arduino board and wiring other components' cable, for example: leap motion, bar code scanner and voltage transformers. Jenny and Tony helped Nick ordering components and testing.

On the mechanical part, five of our group member all spent time and energy cutting woods, measuring components, designing structure, drawing holes, wearing black wrap, assembling everything and placing wire.

On the rest part, Tony contacted and communicated with professor and Ta regularly and distribute work equally to individual group member. Jenny recorded expense, process and meeting minutes for entire journal. Basically, Jenny is responsible for financial planning and budget management. Lastly, every member participated in brain storming, problem solving and voting opinion when there is problem raised. All in all, everyone in *ShowMi* team appreciated each other, professor and TA.

Table2:Work-load Distribution Chart

Works	Tony	Jenny	Terrence	Nick	Aaron
Documentation	X	X	X	X	X
Research	X	X	X	X	X
Financials		XX			
Hardware (Arduino Programming)	X		X	XXX	

Software			X		XXX
Mechanical Implementation	XX	X	XX	X	X
Testing	X	X	X	X	X
Management	XX	XX			
Assembling	X	X	X	X	X

8. Conclusion

Over the course of this project, *"Magic Mirror"* basically meet our expectation and achieve switch either mirror or screen function and self-checkout function. Also, the bar code scanner and leap motion hand gesture work good during our testing and demo. We believe that *"Magic Mirror"* has huge marketing and technical potential, so we are going to continue developed more functions and optimization *"Magic Mirror"*. Besides we want to improve accuracy of our distance sensor and leap motion hand gesture, we want to learn and developed skills on image processing. With imaging processing skills, we definitely are capable to make *"Magic Mirror"* more powerful.

9. Individual Learning

Yanjie (Jenny) Zhan - CFO-

First of all, I have had the pleasure to work with the ShowMi Tech. team in developing MagicMirror for use in clothing stores. During the past four months, designing and building the unique product gave me an unforgettable adventure. From this experience, I realized that the course was not just about applying the knowledge that I have learnt before. The task needs to be completed by learning new concepts and knowledge.

As a CFO in ShowMi Technology Inc., I was mainly responsible for the finance part throughout. My job was to keep our expenditure as close as the budget. In addition, I also have responsibility of ordering components, make sure all the components ordered arriving on time so it would not affect the expected schedule. I positively contacted with customer

service in order to find the solutions when the order went wrong. Moreover, I have duty of system and mechanical design. For the general system design, I have to understand how the system works, how the functions related to each other, and research for each component set up environment. At the beginning of the semester, I did not have much experience with mechanical knowledge, such as the type of the wooden materials. At last, what I learned from this course not only technical skills but also the time management, team work and effectively communication. Throughout the semester, things was not going well as we planned and there are always some challenges popped up. For example, our biggest challenge is two days before the demo the mini PC had been burned down. We were trying to come out a back plan, which was replaced it with a laptop. From this issue, we realized that the time of testing individual components was taking too long to have less time to assemble everything together.

During the implementation process, it requires every one of the group to work together to get the project done. And I would like to than ach of my hardworking teammates.

Hongji Dai (Terrence) – CDO

The capstone project provides engineering undergraduate student a great opportunity to improve and prove yourself. I thought this course is same as other course, just follow instructor's lecture notes, do assignments and have a final exam to pass the course. But now, I have admitted that ENSC305W/440W is most challenging and different course among all the required course. More or less, it isn't a course any more, it is a higher level of engineering practice. Also, it is a great experience that I have during past four months. I learnt many things from this project not only technically but also interpersonally.

Firstly, I want to say a big thanks to our team member, and it is my pleasure to work with all of you guys. We met before this semester begun, and we talked many ideas at start. We thought do a smart table, but due to its mechanical difficulty, we skipped smart table idea; also, we were supposed to do a home-use smart mirror, but we talked about our idea to professor and TA and they suggested that the idea is too general and cannot solve any particular problems. Finally, we change to clothing store smart mirror that have item check

information, stimulated check out system and also can be a normal dressing mirror. The idea is inspired by the principle of double sided mirror, when our system is off, it will act like a normal mirror; when the system activated by a distance sensor, the screen behind the mirror will turned on. Initially, we want our product has switch either screen or mirror function, check-out function and adjustable ambient light function; however, due to time difficulty, we gave up adjustable ambient light function. As long as we decided our product's function, our group member has individual assigned work, including research, hardware, software and mechanical part etc.

I manly focus on designing structure of our product, also I need to help Nick with distance sensor and help Aaron with user interface of our shopping website. I gained lots of learning experience from what I did, for example: mechanically drawing sketch and using saw, drill and hammer to shape woods; software-wise programmed code to connect QR code scanner to our website; hardware-wise developed Arduino code and make the distance sensor works. Interpersonally, I learned lots of things as well. We broke down our mini PC the day before demo because we want to have a test on our system. Every member in team were very stressed out by the situation, and then we send an Email to professor about our situation. Professor Andrew allowed us to replace mini PC with a laptop, so we could demo our product. From this specific experience, I leaned when we doing a project, we should always have back-up plan, and organized work tightly and clearly, finish work before due date. Also, I learned how to communicate and share opinion within a group of workmate, as well as management skill. Furthermore, I improved of my writing skills. I wrote different kind of report and paper upon the project, and I also record our product's process by journal.

In the past four month, the experience is likes a "magic journal" created by our product "magic mirror". From this capstone project, I definitely have higher level understanding about engineering.

Tony Feng – CEO

For our project, I am mainly in charge of the administrative function of the ShowMi Technology Inc. and is the one that assigns parts to other team members. Also, when other team members have difficulties with their parts, I would assist them with what I can do and

try my best to help them finish things on time. During these helping opportunities, I gained knowledge in different places including team management, hardware, mechanical and how to integrate system.

For team management, I realized that having a team that communicates well is very important and that it is crucial for team members to have an open mind. During the whole time, I encourage team members to criticize what they think other members have done insufficient so that we can practice our critical thinking skills and improve among ourselves. When I assign parts, I also assign them according to team members' strengths and what they are good at so that the maximum result can be achieved.

In the hardware section, the main components we used are Arduino UNO, Ultrasonic Distance Sensor, IR Distance sensor, jumper wires and mini PCBs.

During our research and testing we mainly dealt with 2 types of distance sensors that are purchasable at local electronic stores: ultrasonic distance sensor and infrared distance sensor. From the 2 different types of sensors we learnt that these two sensors work differently in a way that ultrasonic sensors shoot out fan like waves and retrieves the distance whenever a different shape enters the wave; for IR sensor, the sensor sends out an infrared ray and the receivers next to it receives the reflection of this ray. During this process, the straight line distance of the ray is calculated using the angle measured by the transmitter and the receiver hence giving us a feedback signal which shows the distance measured.

Next is coding on Arduino, Arduino code is being implemented on the Arduino software to control retrieve the distance measurements from the sensor. Through coding, we learnt how to assign different pins on the Arduino to the corresponding pins on the sensor. Calculation formulae are created to calculate the distance measured from the sensor since the measurements obtained from the IR sensor are voltages whilst the measurements obtained from ultrasonic sensors are time it takes for the wave to reach the object and come back.

Before can make monitor being controlled by Arduino through distance sensor, the monitor is disassembled and the wirings are being analyzed. Inside the monitor, there is a mini PCB that controls the different buttons on the monitor. Through

In our project, the distance sensor is used to control the monitor so that when an object

reach within the detection distance of the sensor, the monitor will turn on and if the object moves out of the range the monitor turns off.

Mechanically speaking, I was involved in dimensioning the wood planks for the frame and processing them. The process was rather laborious and fun when we gradually build up our frame from pieces of wood planks. During these processes, I learnt how to process wood and how to use hinges and screws to connect them together to make a frame.

Lastly, for system integration I learnt how to wire everything together inside our wooden frame designed to create enough space for components and maximize the space. After all these processes are done, the system testing is performed to make sure that everything works at the same time and that the logics and algorithms are correct as we designed. Furthermore, decoration is particularly important to the product as well as appearance matters for a product to have a good sale.

Xukai Zhong– CTO

For our project, my main task is the software function including the Leap Motion implementation and the web application development. Furthermore, when other members encounter technical problem in their own part, I will provide assistant and suggestion with what I can do the best. During the time I contribute to our team, I gained lots of technical knowledge such as image processing skill and website developing skill as well as the skill to team management. In deed, I encounter lots of difficulties in various places including time management and technical skills.

In terms of managing to work as a team member, I realized that good communication with the team members is going to significantly increase the efficiency working on our product. As a person, I have to open my mind to listen to the advice and even the criticism from the teammates and as a team member, if I have a better idea I will never afraid to speak up. Besides work, it is important to keep a good relationship with the team member so I encourage them to keep doing what they have been doing well and give help to the part they are struggling.

For the technical part, I mainly focused on the software developing which contains the algorithm of hand gesture developing and website application developing. We had three

options in choosing hand gesture at the first place, which are Kinect from Xbox, Intel RealSense Camera and Leap Motion. Consider the price of Leap Motion is relatively low and Leap is specifically designed to replace the control mouse, which is what we are looking for, we made a choice to take Leap Motion as our hand gesture. During the implementation of the hand gesture, I develop a program to capture the movement of the finger and use the information we captured to control the movement of mouse.

Next is the development of the website application. The interface of the web page is developed by produce clear and organised HTML and CSS program. Through coding, the web page and QR code scanner.

Also, for the mechanical part, everybody gets involved into the mechanical building including myself. We built up our frame from pieces of wood step by step. The process is laborious but with lots of fun. Our team member built up a very good relationship during the process of building the wood frame in the machine shop.

Lastly, for the very last system integrating stage, we came up with some difficulties. However, by working as a team we conquest the problem and find an alternative solution. During the process, I obtained the skill of working as a team as well as individually. Furthermore, besides of the functions, the appearance is as important in order to have a good sale.

Nick Zhu – Product Manager

This course has no academic difficulties but more about how difficult I want to give to myself. I am taught that even the simplest thought can destroy the sweet night. Facing unknowns is the scarcest part. For realizing our idea, there is no quick path to achieve the goal but to discover the answer in fog. Searching, attempting and asking. Internet has abundant sources also means hard to find the exact answer that I want. Arduino is a component that we used; online guiders all saying that Arduino is easy to use and very user-friendly. When I was trying to program this board, I still can not use any I've leant to functionalize the simplest inner connection between Arduino and a sensor. Although once I did some quick research and realize this connection is simple to make, I believe the self-

directed studying is more impressed. Facing unknowns is the main purpose of this course but the biggest challenges for every group. Before term starts, due to lack of the cognition of the difficulty level. We had many argues about how hard should our project be. However, after term starts, we realized that our design is expected to be potentially accepted by economic market. Then I understood that I need to treat our design as a real product and need to promote it to buyers in the future. I learnt that we need to think more comprehensively. I tried to communicate with team members, with someone who is not studying in technical fields. I leant to listen the feedback and included them into our design. I have become more objective although the discussion result did match my opinion. I felt the importance of team sprits when the design process was forced to stop when technical problems happen. It was necessary to cheer up team members and to attempt until success. In terms of technical knowledge, I may say without the course, I will not know how powerful that Arduino is. I may even want to try to program for Arduino. I felt like I was really doing something that is visualized and functionalized. Team project requires regular team meeting and communication. I used to cooperate with at most 2 members for normal academic projects. However, playing a role in five members team is totally different. I firs time experienced the power of team work and the worst arguing. The group acts like a small company, so I learnt why do we need a leader, and how to manager a team.

Last but not least, I learnt that everything happens must have some reasons, and we can not wish everything goes as smooth as we want. The emergency will occur at the last minute but we have to face it trying to reduce the loss. Complain and angers can not do anything for error fixing.

So, be fully prepared before doing anything is what I really learnt after these four months.

Appendix

Meeting Minutes

Time: January 2nd, 2016 at 11:30-12:30

Location: Jenny's Home

Purpose of Meeting: Topic Brainstorming

Points for Discussion:

1. Deny the following topics
    a. Home security: control via phone app
    b. Turn off switches by using GPS
    c. Cloth set: automatically scan all clothes in the cloth set and store into the data base; thought the cell phone, users can simulate styling
2. Possible topics:
    a. Feedback fridge: shows the remaining food in the fridge via a cellphone app
    b. Decide whether the feedback fridge executable and what else functions it could have
    c. Table feedback (or feedback bracelet): cellphone notification via table surface or bracelet.

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Time: January 8th, 2016 at 11:30 am-13:30 pm and 15:30pm-17:30pm

Location: Library

Purpose of Meeting: Further Topic Brainstorming

Points for Discussion:

Morning

1. Deny Feedback fridge as it is not too practical and it is something people use often so it may be excessive to use this
2. Parallel parking system for cars: but have algorithm difficulties
3. Mirror: screen and double sided mirror combined. In return, the mirror should be able to show the users some information such as weather, date, time, news etc.

Afternoon

1. Discuss whether do Mirror or the feedback table
2. Progress: combine the mirror idea with table – possibly make a SmartTable (screen on the surface, central system controlled lifting lamp and file box)
3. SmartTable possible structure configuration designed and drawn

Time: January 18th, 2016 at 11:30am-13:30pm

Location: Library

Purpose of Meeting: Decide the responsibility for each person and Proposal parts divided among members

Points for Discussion:

1. Major Components that needed to be purchased for the project and the theoretic size:
    a. 27-inches monitor
    b. Raspberry PI
    c. Two-way mirror
2. Initial Duties Assigned:
    a. Setup PHP – Aaron & Terrence
    b. Connect Raspberry Pi with screen – Tony, Nick & Jenny
3. Work Division for proposal
    a. Intro + Conclusion (Nick)
    b. Overview (Terrence + Tony)
    c. Logo (Terrence)
    d. Market Research + Budget (Aaron)
    e. Planning (Jenny)
    f. Letter + Content (Tony)
4. Company profile needed from everyone for the proposal and the position of each member within the company is discussed and assigned:
    - Tony (CEO)
    - Jenny(CFO)
    - Nick (Product Manager)
    - Aaron (Chief Software Officer)
    - Terrence (Chief Designer Officer)

Time: January 22th, 2016 at 11:30am-12:30pm

Location: Library

Purpose of Meeting: web application set up, parts ordering, collaboration of proposal

Points of Meeting:

1. Most parts ordering completed including ultrasonic distance sensor, raspberry Pi, Arduino UNO, jumper wires. Screen is not purchased yet as the price can be very high for a 27-inch monitor
2. For software, Aaron has setup PHP environment for the web application and our system. Possible HTML code can be generated to display our information.
3. Proposal is being discussed and talked about regarding what we still need to improve and what needs to be added:
    a. Introduction needs modification and more detailed analysis
    b. Types of sensor we are using needs to be justified and specified
    c. Picture of the product need to be created to demonstrate the general system

Time: January 25th, 2016 at 11:30am-1:30pm

Location: Library

Purpose of Meeting: Possible improvement for the project and change of idea, detailed the functions of the shopping mirror and how everything will work out. Job being distributed among members according to strengths and weaknesses

Points of Meeting:

1. Decide the responsibility for each person in the project
    a. Software (Aaron)
    b. Hardware (Nick)
    c. Mechanical (Tony)
    d. System (Terrence)
    e. Finance, Scheduling & Parts Ordering (Jenny).
2. We improved the idea of home use mirror to a shopping mirror that can be placed inside a clothing store with functions to provide self checkout and providing information such as price and color to users. Possible optional function would be advertising where we display the mirror as an advertisement when no one uses mirror.
3. For the mirror to work, we would have a distance sensor that is pointing towards the space infront of the mirror, so that when there is an object standing in front of the mirror, the sensor will sense the object and turn on the monitor behind the mirror. Then we would use LEAP RealSense Camera as the way to control the mouse.
4. Key board can probably be added to the system for typing possible useful information such as the credit card number.

Time: January 29th, 2016 at 11:30am-12:30pm

Location: Library

Purpose of Meeting: Discussed about the UI of the system and how everything would look like approximately. Talked about how to divide the work of functional specification and how we should approach the functional specification.

Points of Meeting:

1. UI discussion: Everybody on the team gathered together for making decision on how the UI should look
2. Functional specification is divided into the parts below and spread among the team members:
    a. Software: Aaron
    b. Mechanical+Hardware: Nick
    c. System: Terrence
    d. Safety+Letter+Summary: Tony
    e. Intro+Conclusion: Jenny

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Time: February 12th, 2016 at 11:30am-12:30pm

Location: Library

Purpose of Meeting: Highlighted the talks that are finished and what still needs to be accomplished

Points of Meeting:

1. Collaboration of functional specification, we discussed about how to write functional specification and what needs to be covered within our document
2. Ordered QRcode scanner and monitor online, the monitor is ordered to be a 15”
3. 2nd hand monitor is looked up first online so that it can be used for testing. Our theoretical size of the monitor would be 27”. However, we think smaller monitor needs to be used for testing by using Arduino to control. If it works, we can then switch to a monitor of a larger size.
4. For our initial testing, all the small components are bought for ease of access and easy fix. If large and expensive components are used, they may be inefficient as they rise our budge and potential error could cause the component malfunction.

Time: February 26th, 2016 at 11:30am-12:30pm

Location: Library

Purpose of Meeting: Highlighted the talks that are finished and what still needs to be accomplished

Points of Meeting:

1. PHP web design (IU design needs a little change; in general, the UI is divided into following functions):
    a. Welcome page where barcode is asked by the users to scan to the web page

2. More parts ordering such as ordering 1 more Arduino for possible additional function to the product, double-sided mirror

3. Leap Motion RealSense Camera is configured and ready to use to perform the function of a mouse

4. Barcode scanner connection (QRcode scanner connection is checked to make sure it can get powered by PC successfully)

5. Proposal needs to be updated some new additional features for the project:
    a. Ambient light on the mirror in order to adjust the brightness of the room, but the market research needs to keep going
    b. Discussion regarding the exact sensor position, frame design and the light source connecting to the frame

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Time: March 7th, 2016 at 11:30am-12:30pm

Location: Library

Purpose of Meeting: UI design is finalized. Everything seems to work perfectly with possible bugs within the system.

Points of Meeting:

1. First page: have the company logo being displayed and at the same time the welcome page displays “PLEASE SCAN YOUR ITEM USING THE SCANNER TO DISPLAY CLOTH DETAILS”
2. Second page: links to the item detail page. The item information is being displayed that contains the price, sizes available in store, different color options for cloth and the number we have in stock. On this page, you can click HOME to scan another item or ADD TO CART to add the item to the shopping cart.
3. Third page: If inside the shopping cart page, the item you added to cart will be displayed and a CHECKOUT option can be selected for generating a QR payment code.
4. Fourth page: a QR payment code is generated that allow user to scan and pay through phone apps.

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Time: March 21st, 2016 at 11:30am-12:30pm

Location: Library

Purpose of Meeting: design the of the frame detailed such as the dimensions and the exact positions of the components. Also specific positions of components are located and tried to perfect the details. At the same time make the whole frame look smooth and has good appearance. Lastly, progress report is divided into equal parts for team members to work on.

Points of Meeting:

1. Design detailed which includes the following section:
    a. Dimension of the monitor detailed
    b. Position of the monitor detailed
    c. Dimension of the components detailed
    d. Position of the monitor detailed
    e. Power chord position detailed
    f. Sealing of the mirror considered
    g. Overheating solution provided (possible ventilation)
2. Progress report divided into the following parts
    a. Intro/background/conclusion/remediation -- Terrence
    b. Hardware & mechanical progress -- Nick
    c. Software progress -- Aaron
    d. Schedule & finance -- Jenny
    e. Remediation & summing up -- Tony