



COLLEGE OF ENGINEERING
AND COMPUTER SCIENCE

Smart Mirror

Group: K

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Project Description

This project is to design and create an interactive mirror in order to expedite the process of getting ready in the mornings. The mirror would be created using a one way mirror with an LED monitor behind it controlled by a small computer. The mirror will display information customized to the user such as their schedule for the day, weather in their current location, and custom to-do lists. Other functionality we would like to include is the ability to play music through speakers build into the mirror.

The mirror will be controllable by the user via voice commands and gesture controls. This will allow the user to talk to the mirror to tell it a song to play or to gesture to open the calendar or to-do lists for a larger view. The mirror will also include an interactive assistant that will be able to perform tasks such as adding events to the calendar or adding items to the to-do list. The mirror should be as user friendly as possible to increase quality of life in the mornings. Some other ease of use tasks it will perform is that it will use a motion sensor to detect if a user enters the room and it will turn on. It will also have a light detector to shut the mirror off once the lights go off in order to save power. The mirror will use facial recognition to allow multiple users to interface with the mirror and the widgets will be customizable per user.

It will be advised that the mirror is installed in the bedroom or closet opposed to the bathroom due to the humidity and temperature during a shower, too much heat or humidity could potentially effect the electrical components of the mirror. The mirror will also be able to be used as an effective alarm clock by starting music at the designated time and playing until it senses the users face standing in front of the mirror. This will help people who hit the snooze button over and over. The mirror should be user friendly for install and daily use and conserve power as much as possible by turning off when users walk away.

Sponsors

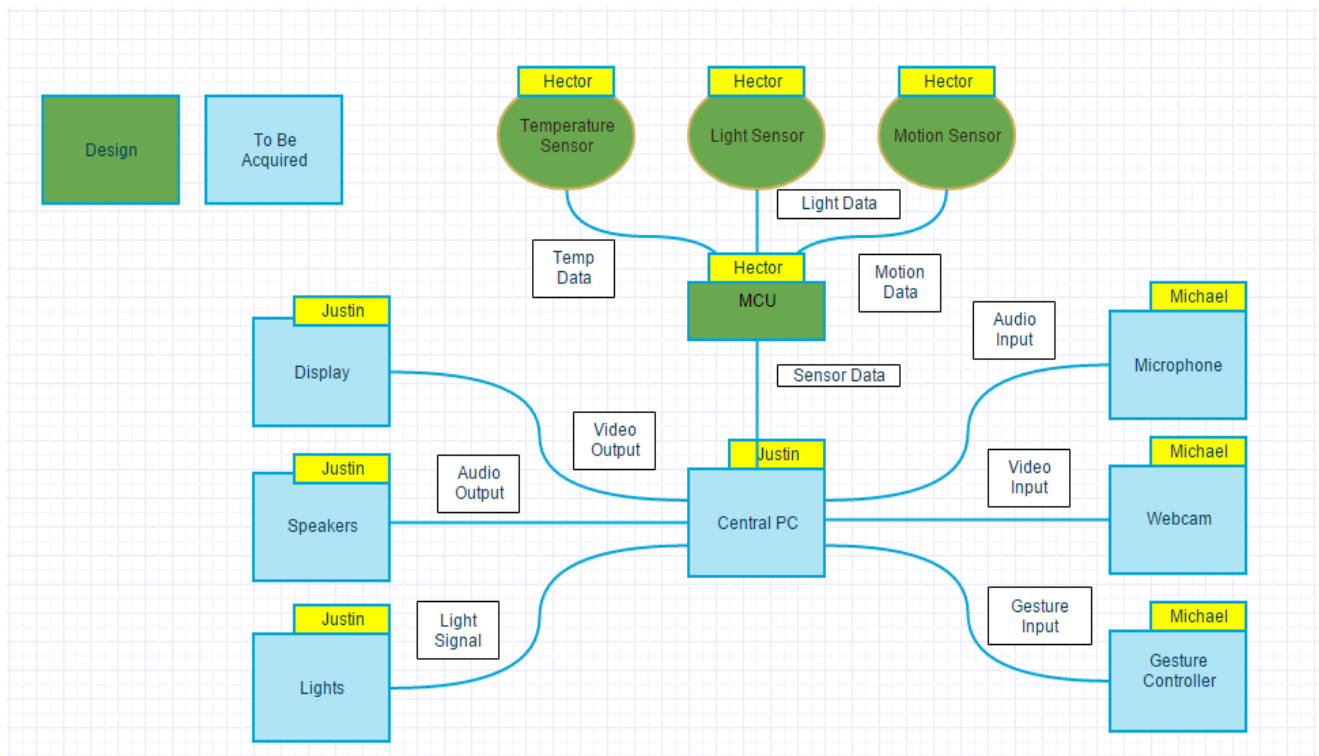
Currently there are no sponsors but we are planning to reach out to L-3 as a student in our group works there.

Requirements

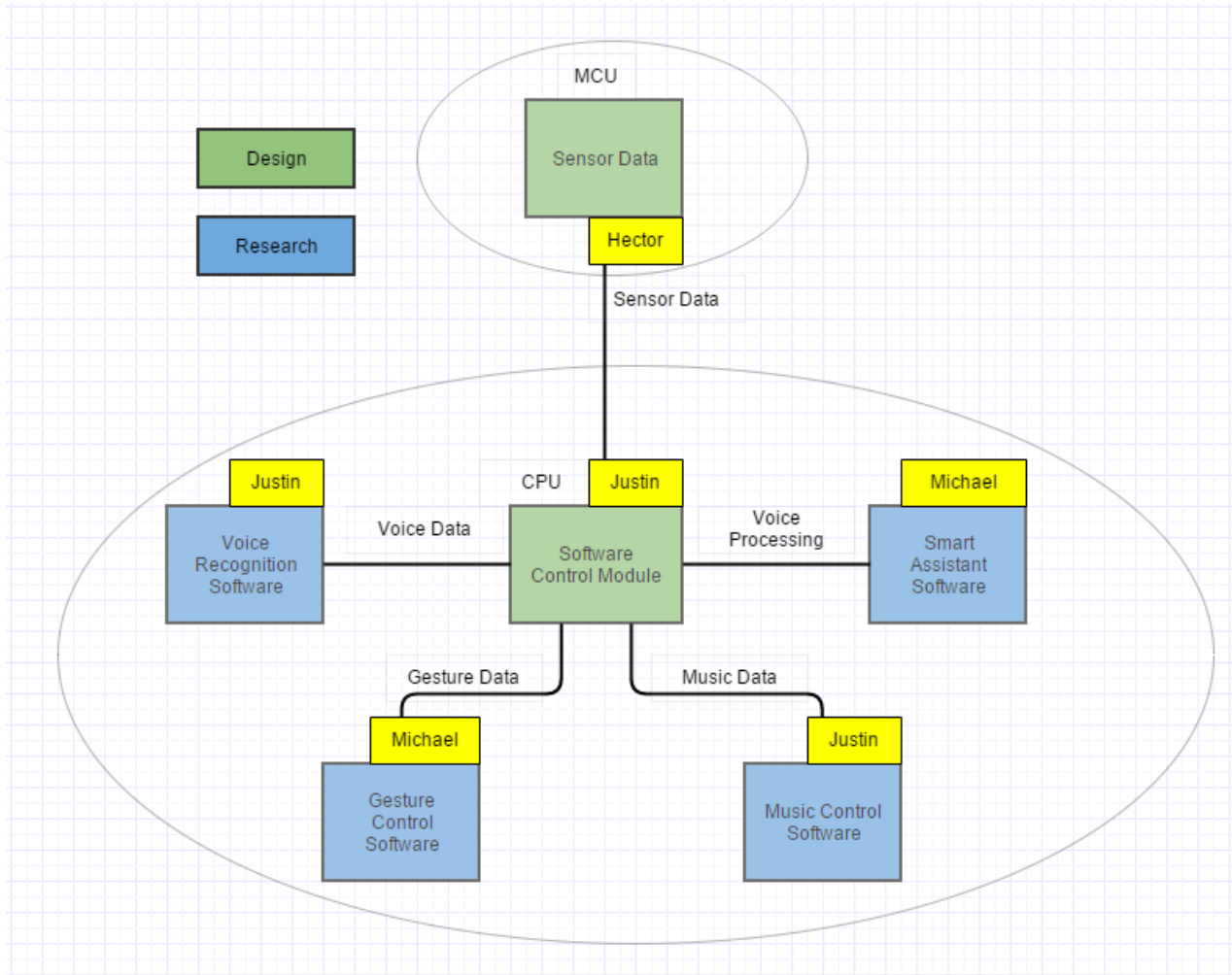
1. Voice Control
 - a. Will be implemented using an existing speech to text program.
2. Gesture Control
 - a. Will be implemented with either Leap Motion or Kinect.
3. User Profiles
 - a. The mirror will likely be coded on a Windows machine and we will use the windows profiles to manage users.
 - b. Facial recognition login will be implemented through Windows
4. Widgets – all widgets will be made to match thematically
 - a. Calendar – implemented using google or Microsoft outlook calendar

- b. Clock – a basic clock widget will be created
 - c. Weather – a weather widget will be created with the days Hi, Low, and chance of rain
 - d. Music – implemented using Spotify
 - 5. Personal Assistant
 - a. Implemented using Cortana or Google Now
 - 6. Motion Sensor
 - a. A PCB will be designed to sense motion in the room and turn the mirror on
 - 7. Light Sensor
 - a. A PCB will be designed to sense light in the room and turn the mirror off if it is dark
 - 8. Temperature Sensor
 - a. A PCB will be designed to track the temperature within the mirror and turn a small computer fan on or off at a given temperature threshold.
 - 9. Adjustable Lighting
 - a. The brightness of the GUI on the mirror will be adjustable

Hardware Block Diagram



Software Block Diagram



Budget

Item	Price
LED Monitor	\$200
CPU	\$150
Gesture Controller	\$100
Webcam	\$100
Microphone	\$50
Speakers	\$50
Mirror Assembly	\$200
PCB Printing	\$50
PCB Components	\$50
Total:	\$950

Project Milestones

Task Name	Duration	Start	Finish
Display Research	1 week	Mon 2/8/16	Fri 2/12/16
Voice Recognition Software Research	2 weeks	Mon 2/8/16	Fri 2/19/16
Webcam Research	2 weeks	Mon 2/8/16	Fri 2/19/16
Two-way mirror Research	2 weeks	Mon 2/15/16	Fri 2/26/16
Application Control Program Research	2 weeks	Mon 2/15/16	Fri 2/26/16
PC Component Research	2 weeks	Mon 2/22/16	Fri 3/4/16
Temperature, Light & Motion PCB Research	4 weeks	Mon 2/29/16	Fri 3/25/16
GUI Research	3 weeks	Mon 2/29/16	Fri 3/19/16
Application Control Program Design	6 weeks	Mon 3/7/16	Fri 4/15/16
Temperature, Light & Motion PCB Design	5 weeks	Mon 3/14/16	Fri 4/15/16
Lighting Control System Research	2 weeks	Mon 3/14/16	Fri 3/25/16
Voice Software & Webcam Design	6 weeks	Mon 3/21/16	Fri 4/29/16
Frame & Housing Research	2 weeks	Mon 3/21/16	Fri 4/1/16
GUI Design	7 weeks	Mon 3/21/16	Fri 4/29/16
Lighting Control System Design and Prototyping	4 weeks	Mon 3/28/16	Fri 4/22/16
Display and Mirror Design	2 weeks	Mon 3/28/16	4/8/16
Temperature, Light & Motion Processing Design	4 weeks	Mon 4/4/16	Fri 4/29/16
Order PC Parts and other components	1 week	Mon 8/22/16	Fri 8/26/16
Voice Software & Webcam Prototyping	3 weeks	Mon 8/22/16	Fri 9/9/16
Display and Mirror Prototyping	2 weeks	Mon 8/29/16	Fri 9/16/16

Temperature, Light & Motion Processing Prototyping	4 weeks	Mon 8/29/16	Fri 9/23/16
PCB Prototyping	4 weeks	Mon 9/5/16	Fri 9/30/16
Housing & Frame Prototyping	2 weeks	Mon 9/5/16	Fri 9/16/16
Application Control Program Prototyping	6 weeks	Mon 9/12/16	Fri 10/21/16
Order PCB	1 week	Mon 9/12/16	Fri 9/16/16
PCB Testing	2 weeks	Mon 9/26/16	Fri 10/7/16
Mirror construction complete	1 week	Mon 10/3/16	Fri 10/7/16
Mirror debugging	10 weeks	Mon 10/3/16	Fri 12/9/16