

# Overview

## Introduction

With the growth of the Internet of Things, as well as the release of Google Home, the market for smart appliances is growing quickly. One of the classics in this category is the smart mirror. Although people have made their own smart mirrors, our goal is a mirror that trades bulky designs for hand gestures, voice control, and more functionality.

## Our Exact Project

We plan to build an initial smart mirror along with a mobile app that controls the content on the mirror. We are building the mirror off of a disassembled television using a raspberry pi. We will also be using Android Studios to program the mobile app. The mobile app will include options on which features to display and how to display them. From this initial mirror, we hope to add functionality towards a further application, time permitting.

## Features and Applications

Although we don't have a strict set of features that our mirror will fulfill, we hope to include the basics such as the time and the weather, as well as media such as music and videos. We hope that it can display reminders as well as track your health. We hope to also include activities for children, such as a game for brushing your teeth. We have set aside features that will be completed as well as applications that are more optional than basic.

## Risks

By leaving our functionality open, we lower our risk of not completing the project to our standards. However, we raise the risk of completing a boring project. Our focus will be on making progress as quickly as possible to create the best product. We will also have to find a way to pay for the materials, including the 2-way mirrored acrylic which can be expensive. We definitely have to have the assembly planned well to lower costs.

## Feasibility

We have a very good chance of completing this project in time. The real question is whether or not we can get all of the features we want by research days. As long as we continue making progress each week, we should finish all of the features listed in the use cases below by research days.

# Use Cases

The following features will be accomplished in three different ways. First, the user could initiate the display using a voice command. Second, the user could initiate the display using a hand gesture. Lastly, the user could initiate the display using the mobile app. Further, the app will allow the user to rearrange the features on the screen.

## Time

The mirror will display the current time and give options for additional times in differing time zones. This will have the option for standard time or military time. This will also account for daylight savings time.

### Weather

The mirror will display the current weather as an actual temperature, a “feels like” temperature, and a visual of the weather. For instance, on a sunny day, there would be a visual of the sun. On a cloudy day, there could be clouds. Typical weather app stuff here.

### Schedule

The mirror will display the users’ schedule. Additionally, the user can add and delete items to their schedule using any of the three interaction methods. The schedule will include times and be a layout of the following 12 hours.

### Reminders

The mirror will display reminders. The user can add and delete reminders using any of the three interaction methods. The mobile app will also allow the user to decide which reminders are visible on the mirror at what times.

### Pictures

The mirror will display pictures from your phone via the mobile app. This app will also allow you to choose where to place the image and how big it appears on the screen.

### Lists

The mirror will display lists that the user can create using any of the interaction methods. The lists can be color coded and the user can choose which ones to display.

### Music

The mirror will allow for the user to play music from their library of music. Further, it can go to the next song, restart the current song, and control the volume. Additionally, the mirror may also include a display for videos.

## Applications

The following are possible applications for the smart mirror project and additional routes we can take if we complete our project early.

### Google Home

Google Home allows for users to hook up their smart devices. The use of a google home could connect the smart mirror with other devices as well as take care of the heavy lifting for voice control. This would also allow us to connect multiple smart mirrors and sync their data.

## Dementia Patients

Dementia patients could benefit from technology if they only knew how to use it. With a mirror, an easily identifiable object, in combination with the mobile app that families or caregivers could use to run the mirror, dementia patients could use their smart mirror as a tool for remembering medications, seeing pictures of their family, and easily checking the date.

## Better Whiteboards

Smart mirrors are also a window into more interactive whiteboard. You could work on the board while displaying information or even playing a demonstration video in the background. You could even add a calculator display, although you would need a means for interacting with the calculator, such as a touch screen.

## Hygiene Games for Kids

Another possible application for the smart mirror is motivating kids for good hygiene. A fun game could get a kid to brush their teeth, comb their hair, or get ready for bed in a timely manner. It could also display notes or reminders from the parent via the mobile app.

## Track Health Stats

Tracking health stats such as your heart rate, weight, height, and so forth could be made easy using a smart mirror. Normally, when we are concerned with how we look and feel we resort to a mirror, so where better to store that information?

# Summary

## Goals

Our goals focus on a convenient display that allows the user to benefit from the mirror without feeling like they are tied to another screen. The idea is that the user can multi-task, better plan, and entertain themselves using the smart mirror. By letting the user pick and choose what the mirror displays and how it is arranged, we allow the user versatility to better suit their unique needs.

## Concerns

The mirror will be a slim design that focuses on simplicity and versatility. Additionally, it will have to guarantee privacy and data integrity. Some of the applications raise more concerns than others. For instance, the use of the smart mirror for dementia patients could not be used by hospitals without privacy and dependability standards. Further, the use of the mirror with Google Home would require permissions. Additional concerns include hardware issues, longevity of parts, and having proper ventilation and the ability to work on the hardware without having to disassemble the whole mirror.