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## An Interactive Smart Mirror based On IoT Platform

**Prasanthi Kakumani**<sup>1</sup>

Scholar  
PVP SIT

**Haritha Akkineni**<sup>2</sup>

Asst Professor  
PVP SIT

**G. Lakshmi**<sup>3</sup>

Asst Professor  
PVP SIT

**PVSLakshmi**<sup>4</sup>

Professor  
PVP SIT

### ABSTRACT

*Effective time management is an essential factor in increasing production of day-to-day life. Integration of technology into people's daily lives has made that time management possible. The use of products such as tablets, PCs, and smart phones have given people access to the tools needed to be productive. However, though successful technological products have been used to increase productivity, the use of technology has become another task on everyone's daily to-do list. Technology should mold to our schedule, not the other way around. That is where the "Smart" mirror idea originated.*

*"Smart" mirrors have been envisioned for years, part of the broader trend in imbuing everyday objects with various "smarts" to improve our lives. The smart mirror idea aimed to integrate technology seamlessly into people's lives by putting it where everyone's routine eventually collides. The goal of the smart mirror is to increase a user's productivity by saving them time. Household Smart Mirrors: In consumer applications the core function is basically twofold: Be a general informational hub, derived from viewing one's reflection as well as augmented with other useful information and provide some style and comfort benefits, in addition to mirror reflectivity and other functions. By connecting IoT to smart mirror, it is possible to implement a variety of application services. Smart mirror that has been linked with IoT platform is friendly and provides varieties of information to user. Generally the humble mirror gains such sentence in one of two ways: adding layer(s) of smart coatings, or embedding a variety of electronics: sensors, cameras and display, touch interface, lighting, and the software and processing to stitch everything together a prototype of a smart mirror is proposed which has been linked with IoT platform and the artificial intelligence features where an user can interact with the mirror and get different types of information like weather report, time, calendar, maps, compliments, browsing and much more.*

**Keywords:** *IoT , voice recognition , real-time , smart mirror , voice commands , artificial intelligence*

### INTRODUCTION

The key to effective time management involving technology is multitasking. Anyone in the business or academic world would agree that every second counts in the day. This project was formulated through inspiration seen through movies such as Iron Man and tech demos, such as Samsung's transparent LCD Smart Window, seen at the International Consumer Electronics Show in 2012. This extends as well to the continuing trend of integrating touch screens and internet-connectivity into everyday appliances such as ovens and refrigerators. The idea of a smart home is the direction lots of companies are heading and while the kitchen has been getting lots of attention, the living room has not. Besides the kitchen, it is one of the busiest rooms in the home, so it is an excellent place to expand the smart home next. Constant information and instant access to it drive the current generation. The smart mirror will show you that information with a voice command or swipe of a hand. The smart mirror is the result of brainstorming on how to solve all these issues and develop something that is functional as well as a showpiece.

The smart mirror must offer benefits of using modern technology while integrating seamlessly into the standard routines of most people. The smart mirror must be simple and as intuitive as possible. The smart mirror would be used to merge technology and the need for information into anyone's daily schedule. With

the mirror in place, the user could interact and obtain the information they want during their normal morning and night routines.

This smart mirror aims to reduce and possibly eliminate the need for the user to make time in their daily morning or nightly routine to check their PC, tablet, or Smartphone for the information they need. The mirror will provide the information with little to no effort from the user with the goal of not being a burden that he or she must maintain. The mirror will do the thinking for the user. First, it will turn on by users command with a phrase like “hello mirror” or any other phrase which user wants to add. Then, it will search info for the user with the help of internet by browsing data like weather updates, temperature etc. The information would be given to the users in form of speech. No keyboards to try to keep dry and clean. The mirror provides common information most people check their smart phones or tablets for, such as weather, news, Twitter and schedules. This allows the users to read, think, and plan their day while getting ready in the morning or night.

The mirror has to be fun as well. It will provide music playback that can be controlled by their voice so there is no need for a mouse or keyboard. The mirror is also used for many handicapped people and also it is easy to access for every individual. It can be used in automobile industries and for health services to remind the prescriptions of the patients and also much more applications can be deployed using this smart mirror.

### Existing Similar Products and Projects

The projects and products similar to our smart mirror project cover a large spectrum of functionality and purposes. There were significantly more projects than actual products. Some blame can be put on the fact that the smart home is still an emerging market and is limited by the cost of manufacturing keeping the products out of reach from the everyday consumer. The fact that there were more projects shows the interest in developing a more affordable and functional smart mirror. Although, the actual products developed by a company delivered on features, they were either still in a development phase or already priced too high to be considered a viable competitor.

The following projects showed how the smart mirror can be designed in so many various ways. Each brought unique ideas and features to the term “smart”. Not all of these projects were designed and built in the same year, so there is a noticeable difference in terms of use of available technology. Our smart mirror project has overlapping ideas with each of these projects but none of them are exactly the same. The projects researched are found below.

Interactive mirror is a touch and gesture functional mirror created by Alpay Kasal and Sam Ewen of Lit Studios [1]. The user touches the mirror, which has a built in touchscreen, to interact with it. Unlike our smart mirror project, only one point of touch is recognized because it is emulating a mouse. Also, this mirror is less about data and more about artsy visuals. Users in the demo video show off different types of drawing and 2D games that are displayed using a projector. The fact that it emulates a mouse is nice because of the expandability and the range of functions capable. Yet, this still differs from our smart mirror since it isn't made to solve anything, only entertain.

The HUD mirror was designed by five students for a course at the Chalmers University of Technology in Sweden [2]. They used a two-way mirror to allow the LEDs they mounted behind to illuminate information through the mirror similar to how the smart mirror will display information. This mirror was made for the bathroom and displayed time, weather, outside temperature, and a toothbrush timer by use of the LEDs. The toothbrush timer is actually a useful feature that our smart mirror project should consider. Also, instead of using a touchscreen for interaction, they used light dependent resistors (LDRs) as buttons behind the mirror. When “touched”, the light changes and can perform a function specified in the arduino software. Despite being simpler, the HUD mirror has a lot of the same ideas as the smart mirror.

The magic mirror was developed by the New York Times Research and Development Lab [3]. It uses a TV with a mirror finish and uses a Microsoft Kinect to track movement and take in voice recognition. Also, it integrated a RFID reader to identify certain bathroom products. The whole system is run from a Windows PC just as the smart mirror will. The fact it can keep track of prescriptions and use the Kinect to “virtually” put

clothes on the user are very inspiring features that given more time we'd love to integrate into the smart mirror. The magic mirror also allows the ability to check email, calendars, and social media, which confirms that our smart mirror will offer features that users are expecting.

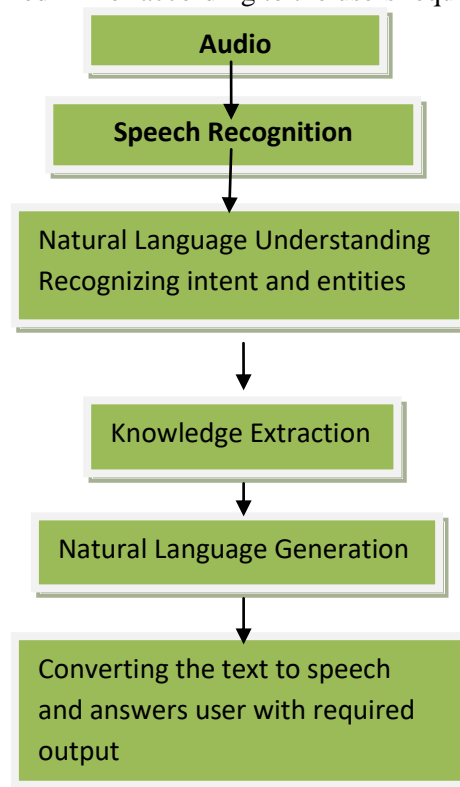
The smart mirror is definitely not a true consumer product yet. There are very few truly manufactured and ready for sale smart mirrors in the market. Those that are there are very different in terms of functionality, development, and price. It is certainly going to take a large smart home company to get behind this product and make it main stream to the consumer. Each product did have a common feature, which was health management such as weight. This is something our smart mirror doesn't have a direct focus on and maybe would be something to change in the design if our project were to go public.

### METHODOLOGIES

The prototype we built mainly focus on natural language understanding so that the user do not need to remember any of the commands to use the mirror. It makes the mirror easy for the user to use. The voice and speech recognition system helps us to achieve the goal of our project. Second thing we need to focus in our project is our GUI as it may be similar to many of the diy projects in the internet, We took only few icons like weather, holidays, date, time , news , compliments on the screen for now.

The basic process of our prototype can be seen in the block diagram ( see Figure 1) The main precaution we need to take is to check that internet connection is good because the data the user ask should be retrieved from the internet and should process the information and give it to the user. Since we are using a raspberry pi 3 it may be slow sometimes to give the information because of bad internet connection. Main advantage of this is we can built a smart mirror with our MAC or any other PC supporting linux environment. It makes easy for anyone to built a smart mirror themselves simply with less cost rather than buying one with huge cost.

The prototype we built can be developed by adding much more hardware and making simple changes in the software we can create a customized mirror according to the users requirements.



**Fig 1: Block Diagram of Voice Recognition**



**RESULTS:**



**Fig 2: Calander, Date , Time and Upcoming Holidays**



**Fig 3: Compliments**



**Fig 4: Weather Forecast**

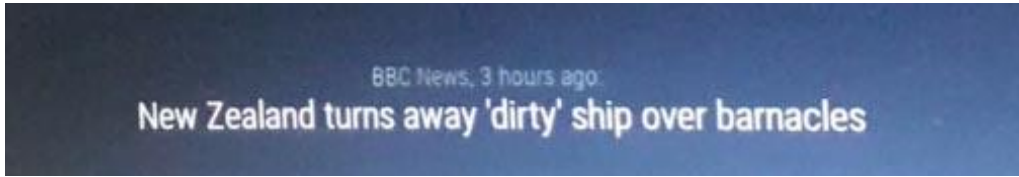


Fig 5 : BBC News scolling

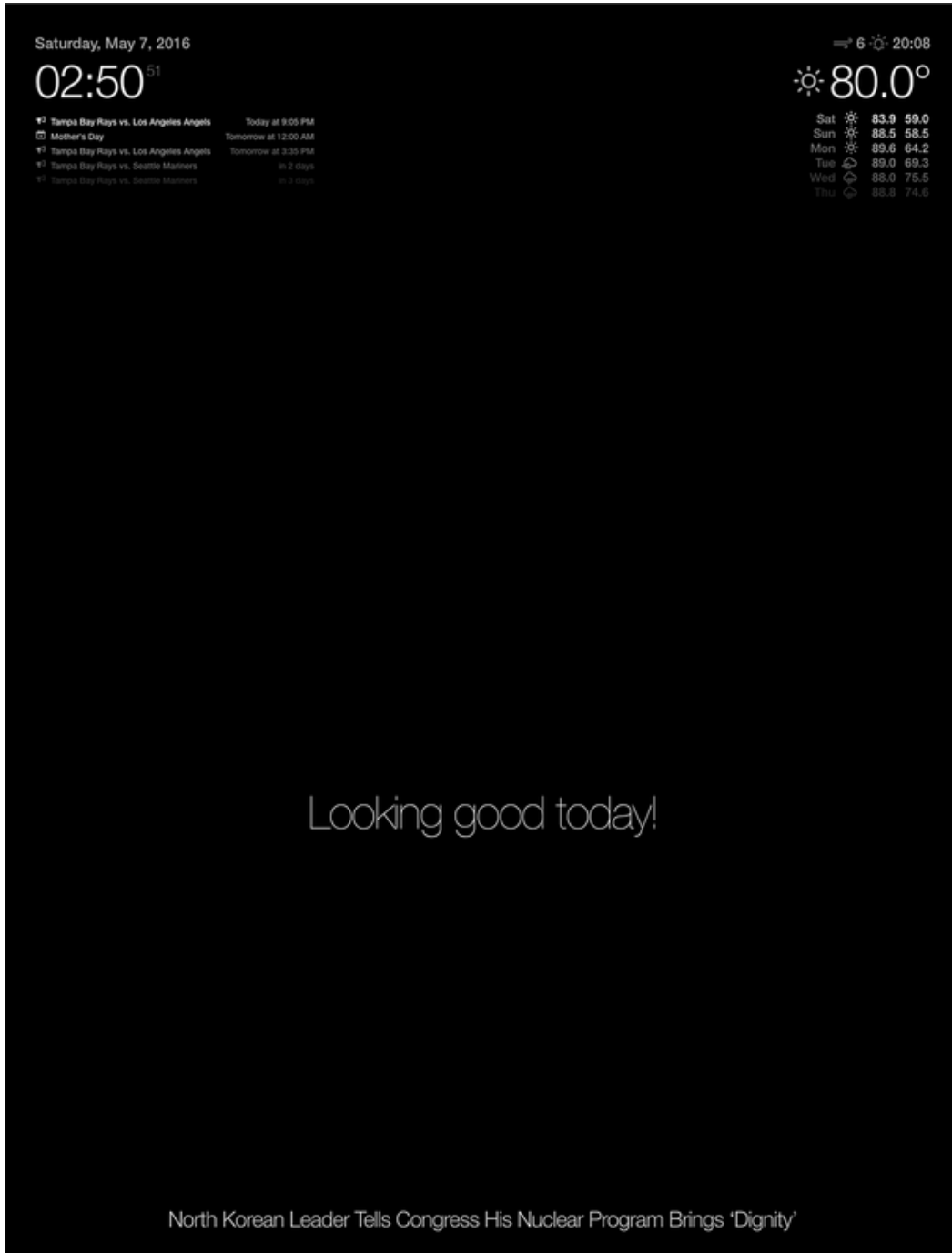


Fig 5: Full Screen of the mirror



### SCOPE FOR FURTHER DEVELOPMENT

Based on the encouraging results from Smart Mirror project and its benefits. We gather the information about other services needed for the user. We gather the requirement information from users and try to much more modules to the project in future. The modules may include attaching social networking sites to the mirror and logging into the respective accounts by recognizing users face. We also gather information regarding different dressing styles and add it to the mirror so that it can predict which type of dress suits the user better.

The scope of the services includes personalized services and reminders which reminds the users regarding the medical prescriptions they have. There is also scope for other kind of entertaining modules which can play videos, music etc. In future we can also add gesture controls and temperature sensors which predict the temperature of room and also control lights and fans in the room. There is no end for creativity and advancement in the technology. Sky is the limit for IoT.

### CONCLUSION

The Interactive smart mirror is the new development in IoT. We are making efforts to design an efficient system which is used for effective time management and productivity for the user. This system basically works on voice commands which can help the users interact with the system easily without remembering commands because it accepts the natural language used by the user.

Through this the user can easily communicate with the living room environment around him which is the major concept of IoT. So the user don't have to check his mobile phones everytime he/she need any information, he/she can just ask the system about the data needed and there you go the user will have the answer within few min with less effort and more comfort. In future there may be much more advancement in this concept and we can see it in our smart home

### REFERENCES

- [1] Alpay Kasal and Sam Ewen . 2008 A project of interactive mirror with artsy visuals in Lit Studios
- [2] Chalmers University of Technology in Sweden . 2009 Two-way mirror to allow the LEDs and to display information on screen
- [3] New York Times Research and Development Lab. 2011 A Magic mirror using Microsoft Kinect to track movements
- [4] [http://www.eecs.ucf.edu/seniordesign/fa2013sp2014/g10/docs/SmartMirror\\_EEL4915\\_Documentation.pdf](http://www.eecs.ucf.edu/seniordesign/fa2013sp2014/g10/docs/SmartMirror_EEL4915_Documentation.pdf)
- [5] <https://docs.smart-mirror.io/docs/hardware.html>
- [6] <https://hackaday.io/project/13466-raspberry-pi-smart-mirror>
- [7] <https://github.com/HackerHouseYT/AI-Smart-Mirror>
- [8] <http://www.cyber-omelette.com/2017/01/alexa-run-script.html>
- [9] [https://docs.smart-mirror.io/setting\\_up\\_smart-mirror\\_to\\_run\\_on\\_boot.html](https://docs.smart-mirror.io/setting_up_smart-mirror_to_run_on_boot.html)
- [10] <https://www.youtube.com/watch?v=y06VbVvHoYQ>