

Smart Mirror: An Interactive Reflector

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Abstract: A smart mirror is a device that functions as a mirror as well as additional features such as displaying text, images, videos and other multimedia data. This device allows users to access information such as news, weather and personal feeds and some other pragmatic details. The main features of Smart Mirror are: (1) It is lightweight, modular and extendable; (2) Useful for multitasking; (3) It supports many plugins written in multiple programming languages; and (4) Can be used as personal assistant. In this paper, we describe the design and implementation of Smart Mirror. We also discuss the potential uses and applications of smart mirrors with respect to new capabilities.

Keywords: smart mirror, raspberry pi.

1. Introduction

Everyone knows mirror, it is found in everyone's homes. Mirror is used to see reflections. But if we combine mirror with technology, it will give rise to smart mirror and this device is beyond an ordinary mirror. It has a screen inside that a user will be able to interact with it by using voice commands, hand gestures and facial recognition. Smart mirrors are straight from science fiction. They are part of a future optimistic vision. The major appeal of a smart mirror is its physical design that changes an ordinary mirror into a smart mirror which can be integrated seamlessly into a home or any working environment. Requirements for building a smart mirror is to use a two-way mirror, a monitor, a frame to hold mirror and monitor, and Raspberry Pi to provide the software features and drive the display. In smart mirror, Plugin system exist but requires javascript knowledge to enable, disable, or configure plugins. They use server-side solutions for RESTful (Representational State Transfer) API (Application Programming Interface). Only javascript is supported, no other solution exists for supporting other programming languages.

A web browser is a necessary feature for displaying information, as it supports all multiple media formats such as text, videos, and images. The information presented can be made interactive with the help of javascript and customizable with CSS.

2. Objective

The main goal of the smart mirror is to develop a mirror which looks like a regular mirror but would have screen inside and user can interact with it using voice command and gestures to receive all the information that could affect how they prepare

for the day. By building these features into a mirror, which people are already using in their morning routine, it is possible to present this information to them in such a way that this information will blend seamlessly together with the task of morning grooming

3. Motivation

The main motivation of this device is to effective time management involving technology in day to day multitasking and provide necessary capabilities onto visually appealing mirror.

4. Literature survey

- *Fitmirror:* In this paper, the concept of a smart mirror for healthier living. Many people have serious problems to get up after sleeping, to get motivated for the day, or are tired and in a bad mood in the morning. The goal of FitMirror is to positively affect the user's feelings by increasing his/her motivation, mood and feeling of fitness. While concepts for these isolated problems exist, none of these combine them into one system. FitMirror is implemented to combine them and evaluate them in a study. It consists of a monitor with spy-foil, a Microsoft Kinect v2 and a Wii Balance Board and can recognize users and their gestures with these elements. Several hypotheses about the system regarding motivation, fun, difficulty and getting awake were investigated. Participants were grouped by the factors sportspersons and morning persons to investigate the effect based on these aspects. Results show that FitMirror can help users get awake in the morning, raise their motivation to do sports and motivate them for the day.
- *Interactive mirror for smart home:* This paper describes the design and development of "Interactive Mirror" for smart home users. This paper explains the state of the art technologies for building the intelligent mirror. It identifies the user using facial recognition technique and provides services such as recognizing emotions, progress representation of measured health parameters, height identification, identify garments, suggest garments with suitable color, and reminds important events. The prototype is developed, and demonstrated in ubiquitous computing laboratory. The

algorithms are being tested in the deployed environment and the results are discussed in detail in this paper. Initial user studies indicated a high appeal of the Interactive Mirror features.

- *Development of smart mirror using raspberry pi:* This project which would collect real world machine data and data would be transmitted from the machine and managed by the raspberry pi board. This project is used by raspberry pi3 version model-b. This smart mirror is latest version of raspberry pi. this mirror is developed by multimedia futuristic smart mirror. the mirror is implemented as a personalized digital device with peripherals such as raspberry pi, microphone, speaker, led monitor with reflected one-way mirror provides most basic common such as weather of city, updates of news and headlines corresponding to location. the mirror is implemented as a personalized monitor with reflected one-way mirror provides most basic common such as weather of the city, updates of news and headlines corresponding to locations. the mirror is implemented as a personalized digital device with peripherals such as raspberry pi microphone, speaker, and led monitor with reflected one-way mirror provides most basic common such as weather of the city, updates of news and headlines corresponding to locations. this mirror is ability to display date and time the current weather condition outside temperature. this feature of the mirror will be scraped from the internet and implemented using Raspberry Pi board.

- *An interactive smart mirror platform for work place health promotion:*

This paper presents the design and implementation of a multi-user smart mirror system conceived to promote wellness and healthier lifestyles in the work environment through persuasive strategies. By means of a RFID reader, the interactive mirror recognizes different users through their personal corporate ID card, which allows them to have access to their personalized user-interface. The smart mirror provides workplace's indoor environmental conditions personal physical exercise data obtained from wearable devices and general purpose information (e.g. weather and daily news). Additionally, motivational advice related to physical performance is supplied through request by applying speech-based recognition techniques. End-users can also inquire the mirror about their ranking position in a fair-daily competition that gives social recognition to the most-active-user. The implemented mirror has been evaluated in a one-week study conducted in the wild in the workplace premises. The quantitative data gathered throughout the study, as well as the qualitative users' feedback obtained in a post-trial focus group, provided promising findings for

the acceptance and convenience of such a persuasive device in the work environment. Furthermore, valuable design-insights were obtained for future iterations of the smart mirror that encourages workers towards healthier lifestyles.

5. System architecture

The mirror interface is decorated with lots of widgets. It is a simple window frame containing an embedded browser. Unlike window, it does not overlap nor do they contain complex interface elements. The mirror interface contains two categories of widgets, one that enables remote device control (e.g. light off/on, and temperature control), and other information services (e.g. news feeds, weather updates, personal notification). A webcam placed behind the mirror is used to recognize the user standing in front of the mirror. By recognizing the person, the mirror then knows how to interact.

The output of user recognition then triggers the display of the interface. The interface allows a user to view Rich Site Summary(RSS)feeds of social media and mails, have access to services such as maps, news, calendar, weather and time. Voice recognizing command is given to the mirror to interact with it.

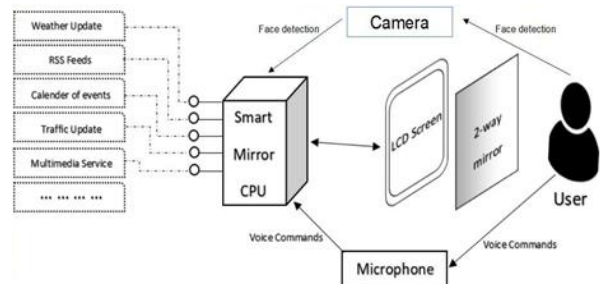


Fig. 1. System architecture

A. Advantages

- Interactive Mirror
- Fast Access
- Saves Time
- Customized user base with facial recognition
- Controlled with voice commands

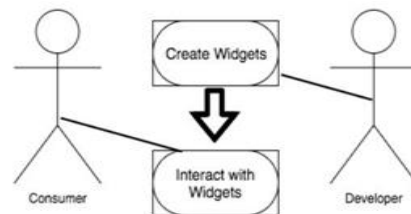


Fig. 2. Consumer to developer

6. Conclusion

We have designed a futuristic Smart Mirror that provides natural interaction between users and the ambient home services. The mirror displays all the necessary information and

services which is useful for the user such as Maps and videos via YouTube.

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