

## Smart Interactive Mirror System

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**Abstract**— Technology should mould to our schedule, not the other way around. That is where the smart mirror idea originated. This paper describes the designing and implementation of a Smart Interactive Mirror, called “Smart Mirror”. It is a device that can function both as a mirror and an interactive display displaying multimedia contents such as time, date, weather and news simultaneously. Our proposed system consists of various functionalities like real time data and information updates, voice commands, face detection/recognition using LCD monitor, microphone and webcam. We have used the Raspberry Pi controller with Harcascade algorithm using web cam.

**Keywords**— *Smart mirrors, smart assistants, interactive mirror.*

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### I. INTRODUCTION

Smart mirrors arise from the transformation of a conventional mirror into an interactive information display element with special interaction capabilities. The mirror surface is an appropriate example of a natural interface because it takes part in our everyday life. Therefore, visual feedback interaction can be obtained non-intrusively through this object. In this sense, maintaining its initial functionality, the surface of the mirror is converted into a natural interface used for the visualization of information. The use of technology has become another task on everyone’s daily to do list. The smart mirror idea aimed to integrate technology seamlessly into people’s lives by putting it where everyone’s routine eventually collides, the hotel. The goal of the smart mirror is to increase a user’s productivity by saving there time. The smart mirror provides a near effortless experience that allows the user to just walk up and be greeted with information.

The Future of Mirrors is here Smart mirror is basically a one-way mirror. Made —smartl by a simple LCD display which sits behind the mirror and displays white UI elements with a black background. When the display is on, we can see both our reflection and the white elements, allowing software to present relevant information while you get ready for the day. Beyond taping our handsets to our bathroom mirror, are there any smart mirrors out there. The short answer is not quite yet. There are a lot of concepts and prototypes being built but so far there’s not a lot out there for the everyday consumer.

The constantly increasing usage of smart interconnected devices on a global level, led to a growtof smart homes as smart technology ecosystems, whose purpose is to coordinate and optimize our daily activities. Recently there has been a new development of smart mirrors which became part of the smarthomes. This is mainly used for controlling energy usage,organizing daily human routines, navigating, monitoring of buildings, entertainment etc. One of the most important applications of the proposed smart mirror is the ability to track health status over time. The aggregated data can be further used to detect health issues patterns, i.e. repetition of health problems during specific periods, and make lifestyle recommendations. Smart mirrors arise from the transformation of a conven-tional mirror into an interactive information display element with special interaction capabilities. The mirror surface is an appropriate example of a natural interface because it takes part in our everyday life.

### II. MOTIVATION

The Smart Mirror will merge technology with a mirror to provide users information while they use their mirror. The primary motivation behind the smart mirror is to improve quality of life. Providing information to users in the most convenient way possible is a driving motivation behind the majority of technological development for Smartphone’s and tablets. The smart mirror will provide convenient information to users on their mirror every day. Allowing the user to multitask by consuming media while preparing for

the day will save people time nationwide. The goal of the mirror is to provide people with information they may require in the morning while getting ready for the day or at night before going to bed. This will save users time every day and help to ensure they are aware of important details for their day. A user will be able to check their email for any upcoming events, peek at the weather forecast, and not to mention, consult the mirror for traditional personal appearance adjustments.

### III. LITERATURE SURVEY

A. Paper Name: Smart Mirror E-health Assistant – Posture Analyze.

Abstract — Today there exist many different types of smart assistants and devices, such as virtual assistants, smartphones and wearables, which have a purpose to coordinate and optimize the daily activities of the people worldwide. The smart assistants' focus is mainly on basic human needs, e.g. browsing, scheduling, navigating and other similar activities. However, not many smart assistants are concerned with the human health overall. In this paper, we focus on the possibility of using a smart mirror to detect health issues. A new Smart health Mirror model is proposed, that consists of a smart mirror which works on its own algorithm and behaves as smart assistant. This proposed model uses face recognition authentication, posture problem detection, and proper posture guidance, followed with suggestions for preventive healthcare. The algorithm identifies the person's posture and carefully analyses the posture and body changes over time. The obtained results from the analysis satisfied our expectations by improving the upright posture of the tested individual by considerable rate. The benefit of the proposed smart algorithm is proven by the evaluation results, which improved with each new individual analysis.

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B. Paper Name: Building a Smart Mirror

Abstract: This project has been developed within the context of a time where every day we see more and more connected devices. The Internet transformed our lives by connecting us more easily to information and other people in the virtual world. Mobile phones then became smartphones and since then this concept has erupted and morphed into the Internet of Things, things which connect us to everyday objects. There are no end of objects that could be made — smarter, some being more suited to this than others. Mirrors, for example, provide a large surface ideal for displaying information and interacting with. Most people have mirrors at home so the concept of a smart mirror that you can interact with is attractive and has been fantasized in many futuristic movies

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### IV. SYSTEM ARCHITECTURE

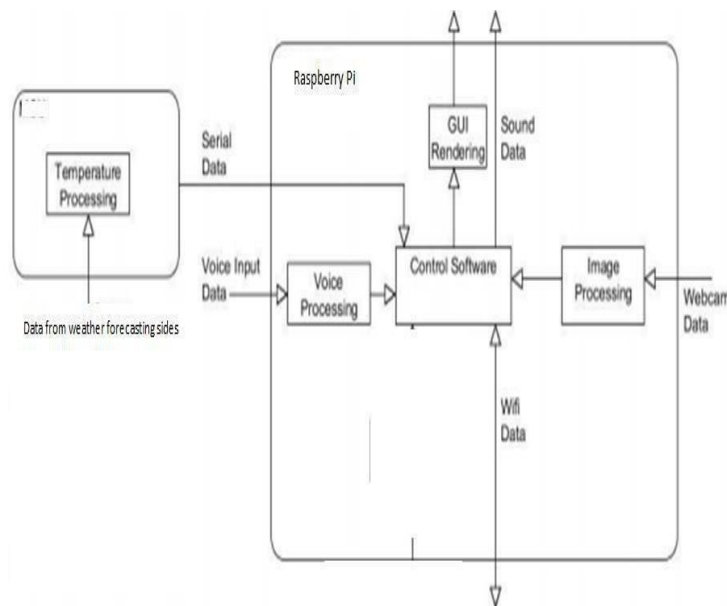


Fig. System Architecture Of Smart Mirror

### V. HARDWARE AND SOFTWARE REQUIREMENTS

System Processors	: Core2Duo, Raspberry Pi
Hardware	: Screen, desktop, IR Sensor
Speed	: 2.4 GHz
Hard Disk	: 150 GB
Operating system	: 64bit Windows 7 and on words
Coding Language	: Python

### VI. ALGORITHM

#### 1. Face Detection using Haar Cascades

Object Detection utilizing Haar feature-based cascade classifiers is a viable object detection method proposed by Paul Viola and Michael Jones in their paper, "Rapid Object Detection using a Boosted Cascade of Simple Features" in 2001. It is a machine learning based methodology where a course work is prepared from a great deal of positive and negative images. It is then used to recognize objects in other images.

we apply every single component on all the preparation images. For each element, it finds the best threshold which will order the appearances to positive and negative. Be that as it may, clearly, there will be errors or misclassifications. We select the highlights with least mistake rate, which implies they are the highlights that best orders the face and non-face images. (The procedure isn't as basic as this. Each image is given an equivalent load before all else. After every order, loads of misclassified images are expanded. Of course same procedure is finished. New blunder rates are determined. Likewise new loads. The procedure is

proceeded until required accuracy or error rate is accomplished or required number of highlights are found).

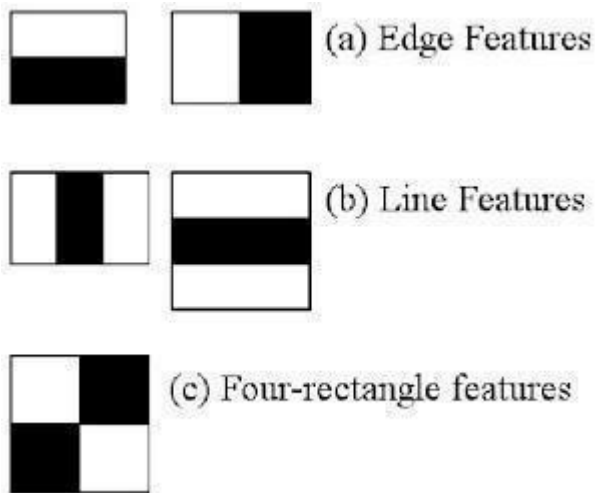


Fig .Haar Cascade Algorithm

VII. HAAR CASCADE DETECTION USING OpenCV  
OpenCV comes with a trainer as well as detector. If you want to train your own classifier for any object like car, planes etc. you can use OpenCV to create one. Its full details are given here: Cascade Classifier Training. Here we will deal with detection. OpenCV already contains many pre-trained classifiers for face, eyes, smile etc. Those XML files are stored in `opencv/data/haarcascades/` folder. Let's create face and eye detector with OpenCV.

Fig.Haar Cascade Algorithm using OpenCV

### VIII. ADVANTAGES AND DISADVANTAGES

#### ADVANTAGES

1. The system act as an interactive mirror interface.
2. Distinguish between all users and provide the corresponding customized services.
3. Allow for custom user profile management where the user creates his/her own profile that is to be stored on the database server of the proposed system.
4. The Magic Mirror dashboard shows the weather, calendar you choose, current time by using python tools.
5. This product would be useful for busy individuals that want to multitask and stay informed while on the go.

#### IX. DISADVANTAGES

1. The constraint is that the app ecosystem community is right now little ,the glass could be increasingly intelligent however it very well may be effectively changed swipe motions are once in a while untrustworthy .
2. The equipment and software more decoupled on the grounds that present the sensors and microphones are fixing to the software and it tends to be hard to make the OS work with various equipment

### X. MODULES

1. GUI
2. Face Detection
3. Time and Date
4. News

### XI. SCREENSHOTS

#### 1. GUI

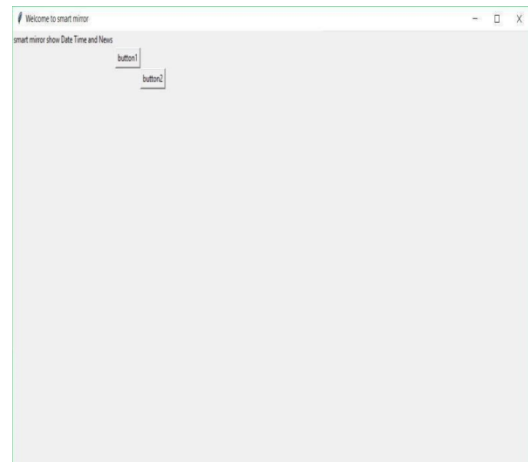
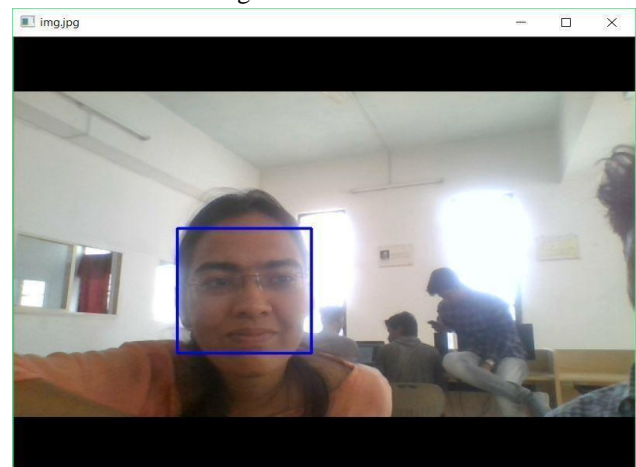
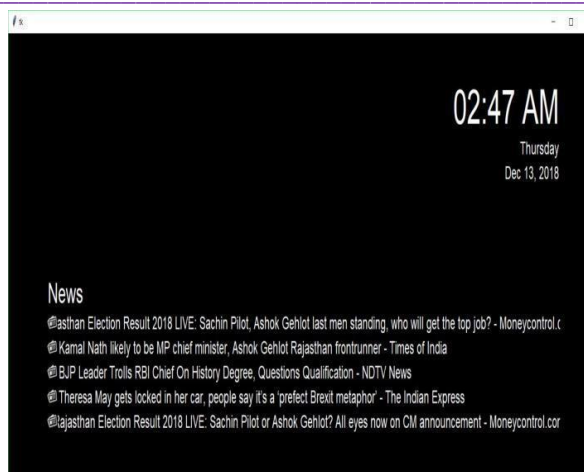


Fig.GUI of the Smart Mirror

#### 2.Face Detection Using Haar Cascade.



#### 3. Time Date and News



## XII. FUTURE SCOPE

Mirrors has been creating for long time, and the organization Perseus Mirrors has offered the smart item, that will almost certainly not just demonstrate the climate, time, and occasions from the logbook, however will keep in contact, go out in informal communities, read the news source, play video and sound records, see spilling video and take images of yourself.

Advertising Purpose.

Feedback from customer (Microsoft )

Suggestion for Healthcare

## XIII. CONCLUSION

Thus it is a smart and user friendly solution presented in the form of a mirror that also acts as a gateway to interactive services, particularly those of information oriented nature, such as multimedia and news feed among others.

Multiple tasks can be displayed at a time simultaneously. So, it will be User Friendly.

## XIV. ACKNOWLEDGEMENT

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