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Implementation of Smart Mirror using Raspberry PI

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Abstract: *Smart appliance design that includes multimedia intelligence to deliver comfortable, convenient, and secure personal services in the home is becoming increasingly crucial in the age of information and communication technology. This research looks at the design and execution of a novel interactive multimedia mirror system called as "smart mirror." The glass that will be used is the foundation of the design of a smart mirror. Two-way glass is suggested because it allows the visuals on the display to be seen more clearly. Our way of life has evolved to the point where making the best use of one's time is critical. Based on user surveys and prototype implementation, we propose the development of an innovative appliance that incorporates interactive information services delivered via a user interface on the surface of a mirror. Our work is based on the assumption that we all check ourselves in the mirror before leaving the house, so why shouldn't the mirror be intelligent? Smart Mirrors will eventually replace regular mirrors, providing users with both mirror and computer-assisted information services as technology improves. Because of the Raspberry Pi microcontroller cards aboard, the devices can connect to the internet, download data from the internet, and show that data on the mirror. Weather data, time and location data, current event data, and user data gathered from web services using a Raspberry Pi 3 microcontroller card are all included in the designed intelligent mirror system. The mirror will light up when the user steps in front of it. When thinking about this project, phrases like Smart Mirror, Interactive services, Raspberry Pi , and Web services come to mind.*

Keywords: Smart Mirror, Interactive services, Raspberry Pi

I. INTRODUCTION

Everyone in this world wishes to live in comfort. People in today's environment require connectivity and instant access to information. Individuals must be kept informed and up to speed on global events, whether via television or the internet. The Internet of Things (IoT) is a term that refers to the internet-connected computing devices embedded in ordinary things that enable them to send and receive data. The exponential growth of the Internet of Things expands its application to people's living situations by transforming a house into a smart dwelling. A smart house is one that is connected to the internet and enables the communication of numerous digital gadgets. Our way of life has grown to the point where the primary objective is to maximize our time. Our work is predicated on the premise that we all check ourselves in the mirror before leaving the house; therefore, why should the mirror be dumb? A high-quality one-way mirror, an LCD monitor, a frame to support the glass and monitor, and a web browser running Python to give software capabilities and control the display are all components of a smart mirror. Smart mirrors are developed when a conventional mirror is transformed into an interactive information display item with unique interaction capabilities. Because we use mirrors on a daily basis, they are a perfect example of a natural interface. As a result, this device can provide visually engaging input in an unobtrusive manner. The surface of the mirror is transformed into a natural interface for presenting information in this manner, while keeping its original function. Technology has become another item on the daily to-do list for everyone. Rather than the reverse, technology should adapt to human timetables, not the other way around. That is where the notion for the smart mirror originated, with the purpose of effortlessly integrating technology into people's life through the use of hotels, where everyone's routine finally collides. The smart mirror's purpose is to boost a user's productivity by saving them time. The perceptive mirror This smart mirror is intended to

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reduce, if not completely remove, the user's need to schedule time in their regular morning or evening routines to check their PC, tablet, or Smartphone for desired information. To avoid becoming a burden, the mirror will provide information with little to no user effort. The mirror will do the user's thought process for them. It will turn on for the first time when directed by the user using a phrase such as "hello mirror" or any other word the user chooses. Then it will conduct an internet search for the user's information, such as weather updates, temperature, and so on. Speech would be utilized to communicate with users. There are no keyboards to maintain. The majority of individuals use their phones or tablets to get information such as weather, news, Twitter, and schedules. While getting ready in the morning or at night, individuals can read, ponder, and plan their days. The mirror must be equally entertaining. It will play music that users may control via voice command, eliminating the need for a mouse or keyboard. Numerous handicapped individuals utilise the mirror, which is open to the public. It can be utilised in a variety of industries, including the automobile sector and health care, to remind individuals to take their meds, among other things. This intelligent mirror can also be used for a variety of different purposes.

II. Existing System

Similar projects and products to our smart mirror project span a wide range of capabilities and applications. There were much more projects than finished items. Some of the blame can be attributed to the fact that the smart home is still a developing market with production costs that keep the gadgets out of reach of the average user. The fact that there were more projects demonstrates that there is a need to create a smart mirror that is more affordable and functional. Although a company's real products delivered on characteristics, they were either still in development or were already too expensive to be deemed a potential rival. Several attempts have been made to add specific capabilities to mirrors, including both commercial and research-based approaches. However, due to the high amount of space required, such systems are typically infeasible to build.

III. Problem Statement

The suggested smart mirror system seeks to give consumers with an interactive interface in the comfort of their own homes for simplified and personalised services. It's a clever and user-friendly solution in the shape of a mirror that also serves as a portal to interactive services, particularly those of an informational nature, such as multimedia and news feed. As a result, the proposed system allows users to access customizable services while doing other things (i.e. grooming). As a result, it is a helpful time-saver.

IV. Literature Survey

Biljana Cvetkoska, Ninoslav Marina,Dijana Capeska Bogatinoska, “Smart Mirror E-health Assistant – Posture Analyze”[1],Presented as, Many different types of smart assistants and technologies, such as virtual assistants, smartphones, and wearables, exist today with the goal of coordinating and optimising people's daily activities all over the world. The primary focus of smart assistants is on basic human requirements, such as browsing, scheduling, navigating, and other comparable tasks. However, few intelligent assistants are concerned in human health in general. The idea of employing a smart mirror to detect health issues is the topic of this paper. A new Smart Health Mirror model is offered, which includes a smart mirror that operates on its own algorithm and acts as a smart assistant. Face recognition identification, posture problem detection, and good posture advice are used in this proposed paradigm, which is followed by preventive healthcare recommendations. The program analyses the posture and body changes over time after identifying the person's posture. The analyses' results exceeded our expectations, with the tested individual's upright posture improving at a significant rate. The assessment results, which improved with each subsequent individual study, demonstrate the benefit of the proposed smart algorithm.

Vaibhav Khanna,Yash Vardhan, Dhruv Nair, Preeti Pannu, “design and development of a smart mirror using raspberry pi 1”[4],Presented as, This paper discusses the design and development of an interactive multimedia futuristic Smart Mirror with artificial intelligence for usage in the home as well as business applications in a variety of industries. The Raspberry Pi will be used to capture real-world machine data, which will be transferred from the machine and

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controlled by the Raspberry Pi. The Smart Mirror, which is a personalised digital device with peripherals such as a Raspberry PI, microphone, speakers, and an LED Monitor covered in a sheet of reflective one-way mirror, provides one of the most basic common amenities such as city weather, latest news and headlines, and local time for the location. The Smart Mirror communicates with the user through verbal commands, functions, and listens to the user's questions and reacts appropriately using speech processing algorithms.

Piyush Maheshwari ,Maninder Jeet Kaur, Sarthak Anand,“ Smart Mirror: A Reflective Interface to Maximize Productivity”[5], There are a plethora of objects that could be made "smarter," with some being better suited than others. Mirrors, for example, offer a huge surface on which to show information and interact. The design and development of a smart mirror is depicted in this study, which serves as an elegant interface for glancing information for numerous persons in a household context. To identify the user, face-recognition based authentication is employed. It allows users to access data feeds and other services through a web-based interface. To extract data packets available through various APIs offered by websites, the data feeds use web service-based communication. A Raspberry Pi 3 computer, together with a webcam for face identification and an LCD panel positioned behind the mirror to show the interface, handles all of the computing for this project.

V. SYSTEM ARCHITECTURE

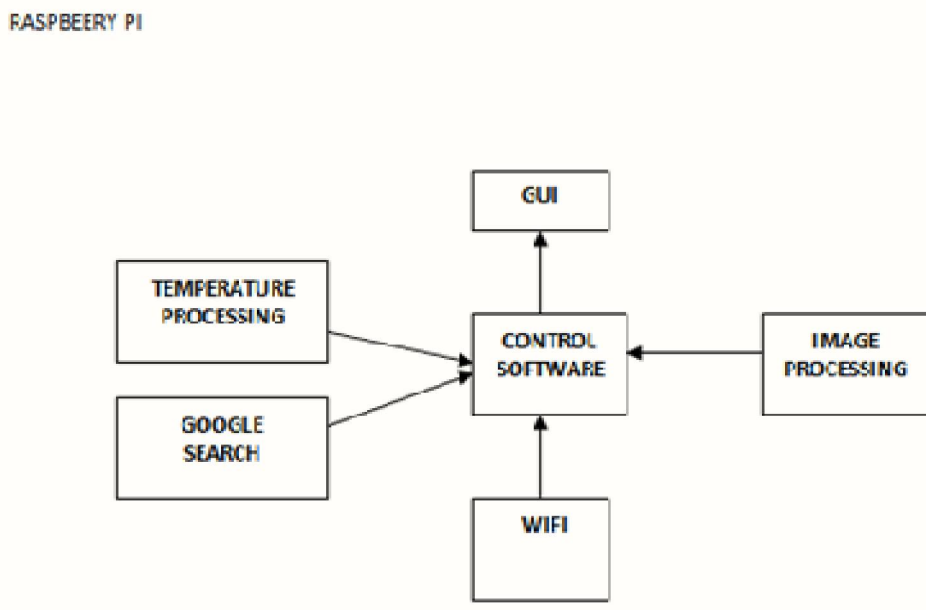

Figure: System Architecture

5.1 Explanation

The architecture of utility pattern mining is depicted in Figure The data section depicts the vast amount of data that has to be processed. Every day, a large amount of data is generated in industrial sectors. User purchasing data and numerous patterns; these patterns contain information about the user's behavior. Data management obtains usable information that is beneficial to the business and will be beneficial to the enterprise. Internal and exterior utilities are examples of utilities. The utilities patterns in the table are generated and updated. Sliding window for finding up-to-date pattern information over data streams in the suggested system. A sliding window approach separates stream data into many batches and only uses the most recent batches for pattern mining. The suggested system primarily employs a sliding window methodology to build efficient frequent utility patterns and update the support. Because it can avoid the development of candidate patterns, it uses a lot of computer resources to check candidate patterns. We can find high

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utility patterns and generate candidate patterns through mining. Reports are generated and then returned to the user based on the results.

VI. ALGORITHM

6.1 Haar Cascade

- Steps for Creating a Haar-like Classifier:
- Collecting positive and negative training photos
- Using objectmarker.exe or Image Clipper tools to mark positive images
- Utilising createsamples.exe to generate a.vec (vector) file based on positive marked pictures • Using haartraining.exe to train the classifier
- Using cvHaarDetectObjects to run the classifier ()

STEP 1: COMPILE AN IMAGE DATABASE (c)
STEP 2: Negative Image Arranging (c) Crop and Mark Positive Images in
STEP 3. (d)
STEP 4: Generate a vector of positive images
Step:5(e) Haar-Training is the fifth step.
(f) STEP 6: XML File Creation

6.2 Neural Network with Convolution:

1. CNNs are a type of deep neural network.
2. Visual vision analysis is the most prevalent use.
3. CNNs employ a type of multi-layer perceptron that requires very little preprocessing.
4. Due to its shared-weight architecture and translation invariance qualities, they are also known as shift invariant or space invariant artificial neural networks (SIANN).

VII. METHODOLOGY

(A) Smart Mirror in the Role of a Mirror With the use of a one-way mirror with a high concentration of aluminium content, we may see our vision as we would in a real mirror when looking and grooming.

(B) Smart Mirror As A System Of Information Time, date, weather information, and news are all retrieved from the internet using a predefined URL. News is gathered from websites such as CCN, BBC, and others. The humidity and temperature details are obtained using a DHT22 –digital sensor. Jumpers are used to connect the DHT22 to the Raspberry Pi board's GPIO pins.

(C) A Security System Using a Smart Mirror When no one is at home, the security system can be activated by using VNC viewer to detect human presence. When someone enters the room, a PIR sensor will detect the person's movement as he passes by the mirror, capturing the image and saving it to a drop box. In this way, the smart mirror system may also be utilized as a security system.

1. The Raspberry Pi will be used to design the Smart Mirror Application system.
2. It's a two-way communication system between the user and the hardware. The user will be able to communicate in a user-friendly manner as a result of this.
3. The user will get a suitable result from Smart Mirror System by applying the Naive Baiys algorithm.

VIII. CONCLUSION

As a result, it is a clever and user-friendly solution offered in the shape of a mirror that also serves as a portal to interactive services, particularly those of an informational nature, such as multimedia and news feed. At the same time, many tasks can be displayed. As a result, it'll be user-friendly. A futuristic smart mirror system that displays information such as the time, date, accurate temperature and humidity, and the latest news while grooming in front of the mirror, as well as assisting in thief detection.

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REFERENCES

[1] Biljana Cvetkoskal,Ninoslav Marinal , Dijana Capeska Bogatinoska,Zhanko Mitreskil ,Smart Mirror E-health Assistant Posture Analyze Algorithm,IEEE EUROCON 2017
[2] B.Oihane Gomez-Carmona,Diego Casado-Mansilla Deusto Tech,University of Deusto Avda Universidades, SmiWork:AN Interactive Smart Mirror Platform for Workplace Health Promotion.
[3] Joseph Cumeras I khan Grauen Multimedia Tutor :Raymond Langonigro Vic ,juny,Bulding a Smart Mirror",June 2016.
[4] Vaibhav Khanna,Yash Vardhan,Dhruv Nair,Preeti Pannu,Design And Development Of Smart Mirror Using Raspberry Pi,International Journal Of Electrical And DataCOmmuncation,ISSN:2320-2084 Volume-5,Issue-1,Jan-2017.
[5] Piyush Maheshwari,Maninder jeet Kaur And Sarthak.Smart Mirror: A Refective Interface TO Maximize Productivity,International Journal Of Computer Applications 166(9):30-35,May 2015.
[6] C.Sethukkarasi ,V.S.HariKrishana ,K.PalAmutha and R.Pitchian ,Interactive Mirror For Smart Home" , International Journal On Advances In Intelligent Systems,Vol.9 no 1 & 2,2016.
[7] D. Besserer , Fit Mirror: A Smart Mirror For Positive Affect In Everyday User Morning Routines, Proceedings of the Workshop on Multimodal Analyses Enabling Artificial In Human Machine Interaction, November 2016.
[8] S.Colantonio ,A Smart Mirror TO Promote A Healthy Lifestyle,Biosystem Engineering vol.138,pp 33-43,October 2015.
[9] Y.Andreu Cabedo ,Mirror On the Wall..An Intelligent Multisensory Mirror For Well being Self Assessment, IEEE International Conference On Multimedia And Expo(ICME),July 2015.
[10] D.Morberg and M.Ekstrom,Master thesis , Sensor System For Spinal Injury Risk Reduction ,Malardalen University, June 2016.
[11] Suryansh Chandel ,Ashay Mandwarya ,S.Ushasukhanya ,Implementation Of Magic Mirror Using Raspberry Pi 3,International Journa Of Pure And Applied Mathematics .Vol 118 no. 22 ,2018,451-455 ISSN:1314-3395.
[12] Mayur Wani, Prashant Ahire,Smart Mirror System Using Internet On Things,January 2019,IJAERD.
[13] Prajakata Gavare,Prashant Ahire, Big Data Classification Of User Navigation And Behavior Using Web Server Logs, 10.1109/ICCUBEA.2018.8697606.
[14] Swati.C.Dandekar, Prashant Ahire, Jyoti Rao, Improved Secret Information Hiding Using SHA-256 AND Invisible ASCII Character Replacement Technology. /0.1109/ICCUBEA.2018.8697764.