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A MULTIFUNCTIONAL VOICE-CONTROLLED SMART MIRROR FOR HOME AUTOMATION WITH ENHANCED SECURITY

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ABSTRACT

Imagine a home that adapts to your every need - convenient, secure, comfortable, and efficient. This paper proposes a "smart mirror" solution, seamlessly blending a traditional mirror with advanced technology. It displays personalized information within your reflection, from weather updates to calendar events, all controlled by voice commands. An integrated security system and essential item tracking add peace of mind. Testing confirms the model's effectiveness, paving the way for a smarter, more personalized living experience.

I.INTRODUCTION

Imagine a mirror that transcends its reflective surface, transforming into a personalized hub for information, convenience, and well-being. This vision, inspired by science fiction and fuelled by advancements in transparent display technology, the Internet of Things, and the maker movement, has materialized in the form of the “smart mirror”. These interactive marvels seamlessly blend functionality with aesthetics, offering personalized displays that go beyond traditional mirrors. Integrating with smart home ecosystems, they empower users with voice or touch control over lighting, thermostats, and other connected devices. Fitness enthusiasts can access workout plans, track progress, and receive real-time feedback, while healthcare

applications leverage the mirror's display for patient monitoring and education. Customization reigns supreme, allowing users to curate their experience by selecting preferred apps and information. Voice assistants like Google Assistant or Amazon Alexa unlock hands-free interaction, further enhancing convenience. Security and privacy are addressed through features like facial recognition or biometric verification, ensuring authorized access only.

II.LITERATURE SURVEY

P. Maheshwari, M.J. Kaur, S. Anand, “Smart mirror: a reflective interface to maximize productivity”, International journal of computer applications, vol.166, no.9, pp 30-35, May-2017.

There is 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. This paper depicts the design and development of a smart mirror that represents an elegant interface for glancing information for multiple people in a home

environment. Face-recognition based authentication is used to detect the user. It provides a webpage based interface to access data feeds and other services. The data feeds use web service based communication to extract data packets available through various APIs offered by websites. All the computing required for this project is done by a Raspberry Pi 3 computer along with a webcam used for face detection and a LCD panel placed behind the mirror to display the interface. This research 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. Our research is exploring a new way to use technologies to be more informed. The state of innovation currently is to provide more information, but less interaction to get it. The device that has been researched and designed is called "Smart Mirror". It is a wall mounted mirror which displays relevant items to the user such as weather, scheduling, messages and other fields of interest. The mirror will solve the problems that many people experience every day, getting information without distraction. Before going to bed, the user may want to know whether it will snow the next morning so that they can plan their commute. The aim of this research project is to explore the impeding shift in how people receive information. We see wall mounted clocks, which provided people with access to the time at a glance. We have displays in airports to show the timetable so that passengers can see the information. We also see massive tickers and advertisements. We have tried to personalize this concept and bring it to the home. The Smart Mirror lets people use their device less, while being presented with more. This is a major step in the evolution of being informed. This is the moment technology is starting to get out of the way. Heads will be up, hands will be set free. The rest of the paper is organized as below. In Section II, we present some related projects. Section III presents the overview of key hardware and software components of the Smart Mirror. Section IV discusses the design and architecture of the system. Section V concludes the paper with some discussion on future work.

J. Jose, R. Chakravarthy, J. Jacob, M.M.Ali, S.M. Dsouza, "Homeautomated smart mirror as an internet of things (IoT) implementation - Survey Paper",International Journal of Advanced Research in Computer and Communication Engineering, vol. 6, no. 2, pp.126-128, Feb2017.

. In this paper, we present a prototype Smart Mirror that creates an interactive seamless access to internet services and displays real time information from IoT devices. The features of Smart Mirror are – it displays news and other relevant information, real time IoT data, controls devices in a smart home system, communicates with multiple devices simultaneously and can work flexibly based on the availability of internet. Additionally, the smart mirror can also work with a health monitoring device. It provides all these features with a minimum amount of user intervention. As a case study, to show the seamless interaction of the Smart Mirror, we have connected health monitoring device for tracking user's health status. Instead of tracking and displaying the vital health parameters of the user, Smart Mirror uses data

analytics algorithms to provide suggestions for health improvements. In today's world there is often a need to lookup various information from multiple devices. Though there exist different technologies, usage of devices like computer or mobile may distract the user in other media from looking up basic information such as weather, news, mails etc. To address this issue, Smart Mirror, an emerging concept in the technology world, allows the user to engage in time-efficient bathroom routines without the need for spending separate time to check for personal or official news/notifications.

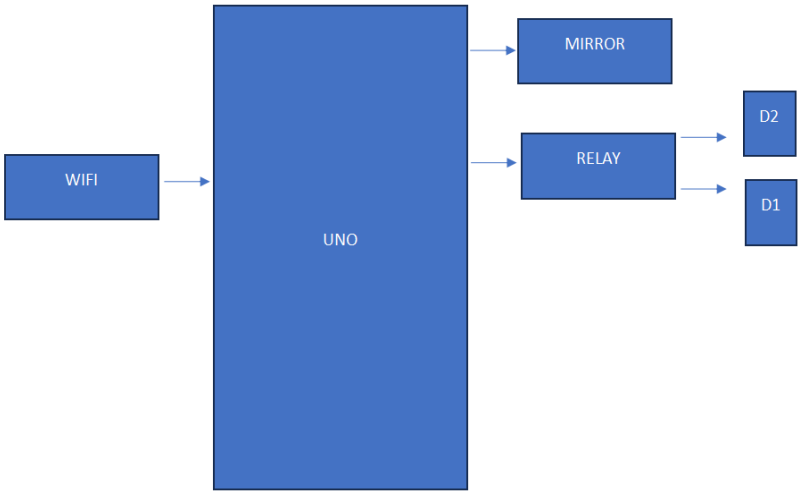
III.EXISTING SYSTEM

Piyush Maheshwari et al [1] introduced the concept of a smart mirror to maximize productivity. Blended reflective surfaces with digital technology to display personalized information like weather, schedule, news, and traffic updates. Vaibhav Khanna et al [2] utilized Raspberry Pi 3 or 4 to construct a smart mirror. Emphasized the choice of acrylic mirror, frame, and a flat-panel LED monitor for construction. Mittal et al [3] conducted a comparative study of existing smart mirrors. Proposed a new model, emphasizing criteria such as hardware, software, user interface, customization, and user experience. Lakshmi et al [4] surveyed existing research on IoT. They explored IoT technologies like Raspberry Pi, sensors, cameras, and networking in smart mirror projects. They addressed privacy, security, power consumption, and user acceptance concerns. Abdullahi Kafi et al [5] explored the integration of Raspberry Pi 3 with IoT in smart mirrors. Highlighted the flexibility of displaying information and user-friendly interfaces through touch-screen or voice commands[1

IV.PROPOSED SYSTEM

The Smart Mirror redefines the traditional mirror, emerging as an indispensable component of modern smart homes. Offering convenience, personalization, efficiency, and heightened security, it transforms daily routines, enriching the lives of users in various aspects.

Block diagram



V.CONCLUSION

This study proposes innovative functionalities for smart mirrors, enriching their role in home automation. The developed prototype successfully demonstrates real-time updates, easy voice control, and personalized information for enhanced convenience. Integrating Google News and an inventory management system further expands its usefulness, delivering an engaging experience that simplifies daily life. Future advancements for the smart mirror include enhanced connectivity with 5G, augmented reality integration for immersive experiences, and personalized health monitoring. Artificial intelligence algorithms could offer tailored recommendations, while expanded home automation features centralize control of IoT devices. Energy efficiency optimizations and interactive advertising opportunities could further improve functionality. Privacy enhancements like facial recognition and biometric authentication ensure data security. These developments promise to enrich user experience and expand the smart mirror's utility in modern households.

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