

AI BASED SMART MIRROR

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Abstract - An Iot is developing tremendously. The most common use of Iot is to make our lifestyle easier and rich in technology. Smart Mirrors are not newly added terms in Iot but there are still lots of additions left in the Smart mirror module which can help the people know the importance and ease of using a Smart Mirror. Every morning our day begins by watching ourselves at least once in mirror before leaving our homes. With the smart mirror we can interact with it psychologically to find out how we look and how our attire is. This paper describes the planning of the implementation of a smart mirror which will be capable of performing crucial tasks. The main goal of the Smart Mirror will be to increase user's productivity and the mirror will provide an effortless experience that will allow the user to just command the mirror and the user will be greeted with whatever information is needed along with some advanced features which will include human interaction, machine learning, home automation etc.

Key Words: Smart Mirror, Machine Learning, Home Automation, Artificial Intelligence, Raspberry Pi.

1. Introduction

As we all know the internet has no limits. Smart mirror has never been given the importance; they are not considered as an alternative to an ordinary mirror. The main reason for this is the ease of use of a smart mirror. The mirror which we are developing solves all the complications of using a smart mirror. The mirror will start by just switching on the switch and giving a wake-up command. The mirror will be capable of performing all the tasks which will make the mirror more efficient. Alongside all of this easiness of using a mirror, we will also implement machine learning. Machine learning will help the mirror to learn frequently and adjust according to the scenario which will keep the mirror refreshed and responsive. In the working condition of our smart mirror, the smart mirror will be connected by a raspberry pi to an LCD display. The LCD display will show all the information which consists of the latest news, Time, Date, Weather. In addition to this, the AI-based smart mirror will also communicate with the user and will interact with the user based on the commands the user will provide. The audio provided by the user for the communication will be translated to text with the help of Google Speech for fast processing of data. As audio is processed slowly compared to Text. In addition to all this basic feature, the proposed mirror will also use face

recognition so whenever user stands in front of the mirror will recognize the user and starts functioning ACCORDING TO THE COMMANDS PROVIDED. Last year

Covid-19 has affected many of us in every aspect of LIFE, SO this mirror will show you the preventive measures of Covid-19 and Regularly Live Covid-19 Updates around the nation.

2. Literature Survey

We surveyed existing methods of developing a mirror. There are many researched done in this area Tejas Patil, Atharva Pawar, Sahol Yadav & Aju Palleri proposed a smart mirror that represents a simple yet attractive interface for displaying information. The main purpose of their mirror was to just interact with the user and showing basic information which includes Date, Time, Weather etc. [1] Pratibha Jha, Prashant Jha, Mufeed Khan & Kajol Mittal created a smart mirror which was having additional features compared to the earlier one. The mirror was capable of showing real time map on the display. The mirror was working on the commands given by the user. [2] Mr P. Mathivanan, Sakhtivel A, Anbarasan G & Selvam G included home automation in their smart mirror. The mirror which they created was capable of controlling Lights, Fan, Room temperature monitoring etc. The module which they created was allowing them to check status of all the home appliances on their whatsapp which was very convenient. They also included face & biometric recognition in their mirror.[3]

3. Existing System

Smart mirrors came into trend into 2016. In 2016 smart mirrors were just a mirror which were used to show date, time and weather. From 2016 till now smart mirrors technology evolved drastically. According to a report by "infoholicresearch" the smart mirror market is expected to \$1,220.3 million by 2022. Earlier smart mirrors were developed for to-do lists later it got upgraded with music player & voice recognition. Currently, the smart mirrors are combined with home automation which helps in controlling home appliances. The smart mirrors can be personalized as per the requirements.

4. Requirements

raspbian OS, python ide, geany

Hardware:-

raspberry pi, Display, Webcam, Speaker

Languages used:-

Java
 Script, python, css

Software:-

5. Implementation

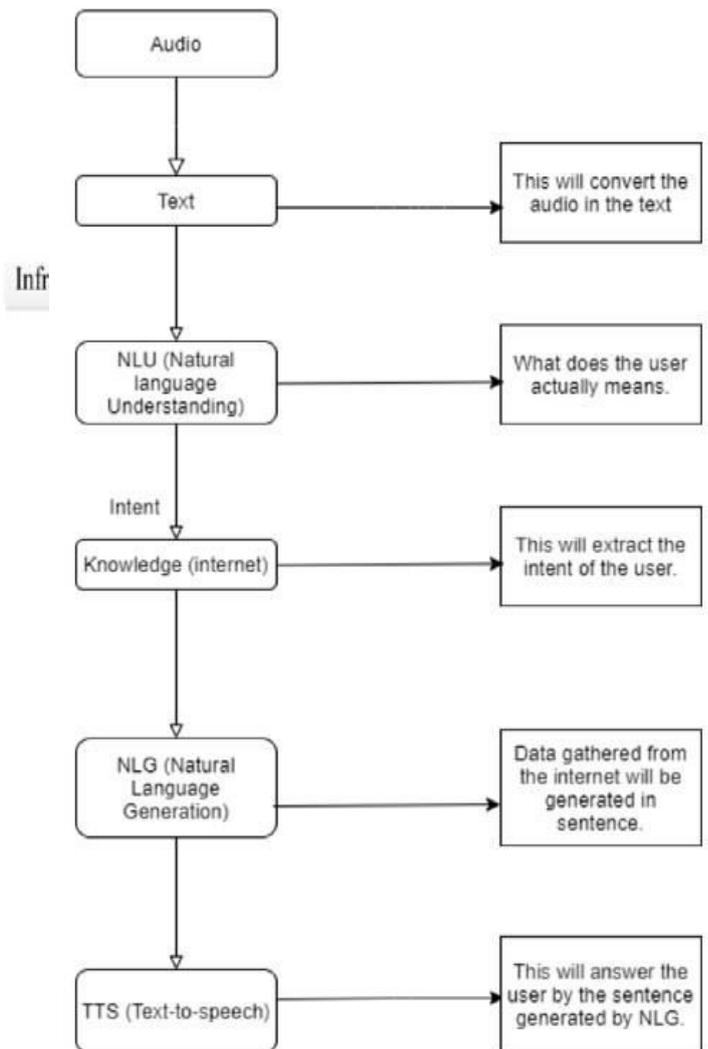
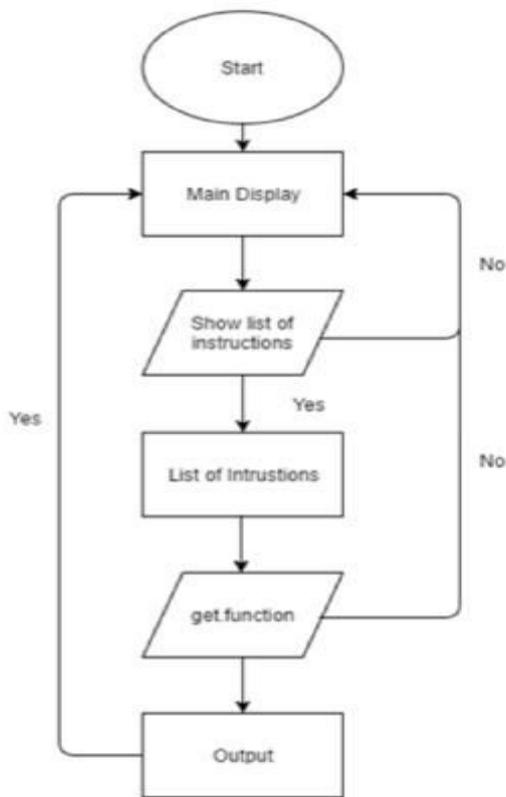


Fig-3: Internal Working

6. Algorithms

6.1 NLU

Natural language understanding (NLU) is a branch of artificial intelligence (AI) that uses computer software to understand input made in the form of sentences in text or speech format. NLU directly enables human-computer interaction (HCI). ... NLU uses algorithms to reduce human speech into a structured ontology.

6.2 NLP

NLP, explained. When you take AI and focus it on human linguistics, you get NLP. “NLP makes it possible for humans to talk to machines:” This branch of AI enables computers to understand, interpret, and manipulate human language. Like machine learning or deep learning, NLP is a subset of AI.

7. Development

Final output of all our modules combined.



6.3 TTS (Text to speech)

Text-to-speech (TTS) is a type of assistive technology that reads digital text aloud. It's sometimes called “read aloud” technology. With a click of a button or the touch of a finger, TTS can take words on a computer or other digital device and convert them into audio.

Stepwise Procedure:

1. Consider X be the entire system & let us assume $X = A+B+C$
 2. Where, A= user, B= AI, C= mirror
 3. Let us assume Natural Language Understanding as NLU, Natural language Generation as NLG, & Text-to-speech as TTS.
 4. X performs the processing of the system i.e., input->process>output.
 - Where input is set of instructions asked by the user(A).
 - Processing is the AI & ML which responds on the instructions and look into the trained datasets.
 - Output is the visual which appears on the mirror after the processing of the input given by the user.
 5. Whenever A(user) interacts with C(mirror) with any sets of instructions then C will firstly execute NLU and will understand the instruction after that B(AI) will execute the output of NLU and send the output to the NLG & later the NLG will perform TTS to give output to C(mirror) to display the output to the user.
 6. Step 5 will repeat till the user asks for STOP
- Mathematical equation for the above is

Whenever $A \Rightarrow C$ then $C = NLU + AI + NLG + TTS + C$
this will repeat till the user does not asks for any other instructions.

8. Advantages

It is really hard to imagine how useful a smart mirror can be until you use one. The big advantage is the ability to display useful information without needing to open apps or do anything. Besides our homes smart mirrors can be also used in various business-like clothing shops.

9. Conclusion & Future Scope

9.1 Conclusion

As per the studies smart mirrors are having great potential & future scope for designing advanced smart home. The main focus of this paper is to develop a mirror which will be working seamlessly and stays updated every time with the help of machine learning algorithms. Not only this we will be implementing several modules to make this mirror best in every aspect a user wants his mirror to be. The mirror will be using API's so that all the information coming from the mirror is updated and accurate.

9.2 Future Scope

The future scope of smart mirror is not limited to an individual use. Till now smart mirrors are used only for home automation or only for IDS. But in the near future all these modules can be combined in one and can make a mirror which will be capable of IDS along with home automation which will be powered by AI and machine learning. We will also work on to

connect our smartphone with the mirror so that we can control the mirror with our mobile phone which will help us in switching on/off the light switches with our mobile phones, and can get all the calls, reminders, notifications on to the mirror.

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