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Design an Innovative Approach of an Interactive Virtual Companion

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Abstract - This research has been done for those who are introvert and suffering from anthrophobia, which is extreme level of shyness and fear of people. Maya would be able to talk easily with a person who want a companion. In this research, we introduce an Interactive Virtual Companion, which has developed with the help of Raspberry Pi.

I. INTRODUCTION

Interactive Virtual Companion based on Artificial Intelligence. Maya will be acting as a motivator companion for its user, the user who is suffering from anthrophobia. This companion allows you to share your feeling with her. The feeling that can't be expressed to another person, the user can easily share his/her feeling with this companion without any hesitation. Interactive Virtual Companion has been developed with the help of Raspberry Pi. Raspberry Pi is an external operating system that can be manipulate through Linux. This companion is an intelligent companion because it can communicate with you as a person. This companion has been developed with the technology of Natural Language Processing. It means that the companion can understand your question and answer accordingly to it.

II. NATURAL LANGUAGE PROCESSING

A. SPEECH TO TEXT

Interactive Virtual Companion uses speech to text functions to understand the human language. It can respond the user after analyzing the question ask by the user. The problem is that it can't understand the whole question ask by the user. So there are some keyword that are extract from that question with the help of algorithms so the system can easily understand what the user is asking from her.

B. TEXT TO SPEECH

After analyzing the question the system understand that questions through keyword and generate the best answer according to that question, but the problem is that the answer Generated by the system is in the format of text, to overcome this problem there are algorithm that convert that answer from text form in to speech, so that answer generated by the companion should by audible to the user. The process of speech to text and text to process repeats until the user cannot quit the conversation with companion.

III.   MEDIUM OF COMMUNICATION

To communicate with the system, the system should have microphone to take the input from user to process that input and give the optimal output to the user. The output should be audible to user through head phones or external speakers. These two equipment are mandatory for communication between the system and the user. The circuit diagram of audio/video module has been shown in figure below:
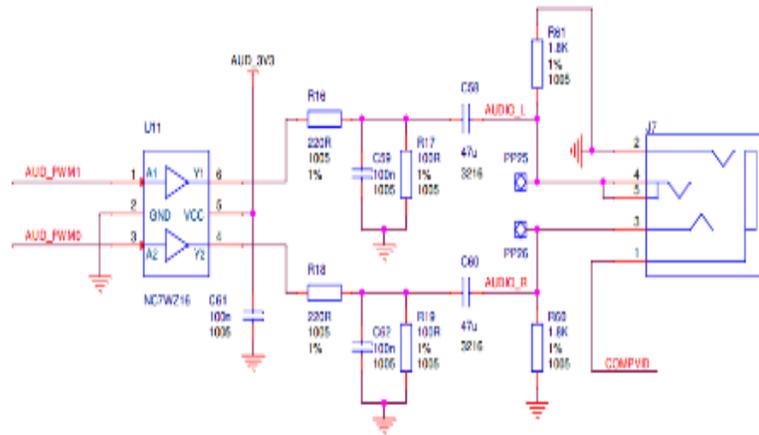
Fig.1. Audio/Video module

IV.   RECOGNIZE THE USER

The major part of this paper is that the system can recognize the user by his face. As the companion can use by multiple users, it is necessary to store the data of multiple users in database, and it is also necessary that user can only access his data from the system. And to overcome that problem the module of face recognition is involved in this companion so the user can only access his personal data or communicate with his identity with the system. As this process of face recognition can be done through coding or multiple algorithm but the face can be recognize with the help of external camera which has integrated with Raspberry Pi. The most prevalent role 2 –dimensional software based artificial companion is an information source **[1]**. Perhaps the most famous is Microsoft paperclips. Such companions are increasingly common guides and assistant The circuit diagram of that camera has been given below.
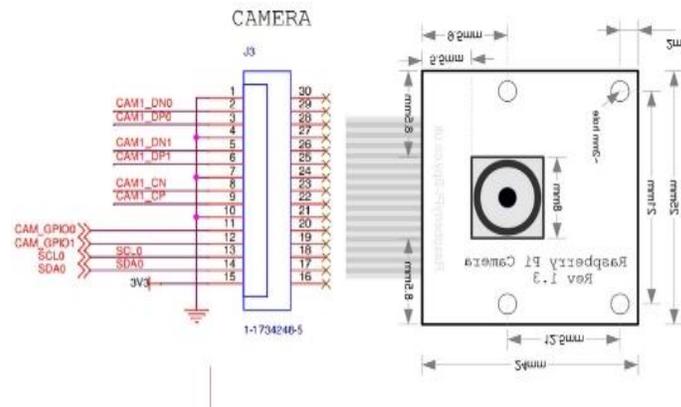
Fig.2. RPI Camera Circuit Diagram

V.   INTELLIGENT COMPANION

The partner ought to have the capacity to store new data. The Long/Here and now Memory Calculation to handle this issue.

Like most RNNs (Recurrent neural network) a LSTM (Long short-term memory) organize is general as in sufficiently given system units it can figure anything an ordinary PC can process, if it has the correct weight matrix, which might be seen as its program. Dissimilar to RNNs, a LSTM network is appropriate to gain more experience to classify, process and anticipate time arrangement when there are time slacks of obscure size and bound between important occasions. In the future, it is hoped that Nadine, and other robots like her, will play an important caretaking role in helping people with autism by interacting with them **[2]**. Relative insensitivity to gap models and other sequence learning methods in numerous applications. Among other successes, LSTM achieved the best-known results in natural language text compression.

VI.   ARTIFICIAL COMPANION

AI is the area of computer science focusing on creating machines that can engage on behaviors that humans consider intelligent [3].There are companions in the 3D immersive worlds of virtual reality of mobile and online games. Artificial companions, which are commercially available, tend to fall under none of four categories of function: educational, informative or medical [4]. They come as 2-dimesional software character, 3D animated screen-based characters or true 3-dimensional embodied products. They range greatly in price and sophistication.

This research is based on artificial virtual companion, which is used for assisting the people with respect to caring companion, educational companion or informative companion depending on the user. Roboticists have been trying to develop more realistic and life-like machines, such as Bina 48, which has been given the biography and identity of a real person, allowing it to answer questions and even argue in a similar way to humans [5].

VII.   EDUCATIONAL COMPANION

Stroman describes a number of educational toy companions including Barney the Dinosaur who appears in various other media such as TV, Books, CD- ROM. The intention is to teach the companion to express emotions, such as happiness and sadness and then respond according to it [6]. The children respond well to the companion referring to it as a friend, perhaps the most obvious example of a companion.

This companion is able to communicate with children like their best friend. Helping in their studies and resolving their queries.

VIII.   INFORMATIVE COMPANION

The intention is that for this companion is to become informative as much as possible for the length gives an advantage to LSTM over alternative RNNs and hidden Markov.

IX.   RASPBERRY PI 3

The Raspberry Pi 3 Model B is the latest version of the $35 Raspberry Pi computer. The Pi is not like your typical machine, in its cheapest form it does not have a case, and is simply a credit-card sized electronic board -- of the type you might find inside a PC or laptop but much smaller [7]. The only hardware which is involve for developing this companion is Raspberry Pi 3 involving (mic, camera and external storage) in it.

The Raspberry Pi is a progression of little single-board PCs created in the United Kingdom by the Raspberry Pi Foundation to advance the educating of fundamental software engineering in schools and in Developing nations. The Features of Raspberry Pi 3 are Broadcom framework on a chip (SoC), which incorporates an ARM CPU and an on-chip Graphics Processing unit (GPU). CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3 and on board memory run from 256 MB to 1 GB RAM. Secure Digital (SD) cards are utilized to store the OS and program memory in either the SDHC or MicroSDHC sizes. Most RPI have from one to four USB spaces.

X.   LANGUAGE USED IN RASPBERRY PI 3

The Raspberry Pi Foundation suggests the utilization of Raspbian, a Debian-based Linux OS. Other third party OS are accessible on the official site which are Ubuntu MATE, Smart Ubuntu Center, Windows 10 IoT Core, RISC OS and particular disseminations for the Kodi media center and classroom management user becoming informative companion for the user. The text to speech service make this companion more realistic retrieving information almost according to the user question.

The example of informative companion is from the defunct company Boo.com who used a female character to guide user through the process to buy the clothes and answer the queries. A considerable number of programming languages have been adapted for the Raspberry Pi, either by the creator of the language or by users of the language who wanted to see their language of choice available on the Raspberry Pi [8].

Python, C, C++, Java, Scratch, and Ruby all come installed by default on the Raspberry Pi.

XI.   HARDWARE INVOLVED IN RASPBERRY PI

The Raspberry Pi equipment has advanced through a few forms those element varieties in memory limit and peripheral-device support.
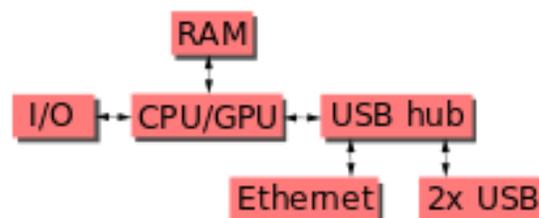
Fig.3. Raspberry Pi Block Diagram

This block diagram depicts Models A, B, A+, and B+. Model A, A+ and the Pi Zero do not have the Ethernet and USB hub. In Model A, A+, and the Pi Zero, the USB port is directly connected on a chip (SoC). On the Pi 1 Model B+ and later models, the USB/Ethernet chip contains five-point USB connections, of which four ports are accessible, while the Pi 1 Model B just gives two. On the Pi Zero, the USB port is additionally associated straightforwardly to the SoC; however, it utilizes a micro USB (OTG) port.

XII.   CARING COMPANION

The role of a medical or care assistant is another type of companion. This companion has the ability to act as a caring companion by reminding user for their medicine as per doctor schedule becoming this companion the caring companion.

XIII.   CONCLUSION

In this paper, the interactive virtual companion is proposed. This companion is an innovative and enhance technology for any person who need a companion or who is introvert or who required a personal assistant. As this is a research paper so at the time of implementation some physical or logical changes can be occur.

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