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Medical Assistant Chat-Bot for Health Care Application

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ABSTRACT

IoT revolution is re-designing modern health care with high technological, economic, and social prospects. Artificial intelligence (AI) aims to substitute human cognitive functions. It gives a paradigm shift to healthcare, powered by increasing availability of healthcare data and rapid progress of analytics techniques. The internet of things has lots of applications in healthcare, from remote monitoring to smart sensors and medical device integration. It has the ability to not only keep patients safe and healthy but to improve how physicians deliver care as well. Healthcare IoT can also boost patient engagement and satisfaction by allowing patients to spend more time interacting with their doctors. With the combination of both IoT & AI technologies, it can apply chatbots for medical assistance in healthcare. An IoT based monitoring system & AI based analytics system with an interactive chat-robots is the more outstanding application in healthcare. The Medical Assistant recognizes the user voice input and converts the speech into text. Here we concentrate on the different type of fevers, like chickenpox, malaria, septicemia, viral fever etc. Each fever has different symptoms. we finalize the fever by using symptoms. After that text mining, those phrases would be split as a noun and medical terms. From term analysis, the assistant will answer the query from users. It also analyzes the sensor data (body temp, heartbeat) from the cloud and expresses the user health condition.

Keywords : Artificial Intelligence, Internet of things, Chat-bot.

I. INTRODUCTION

In all industry assistance is very important for full fill their task .now a days google assistance wide spreading.[6]Google Assistant is also part of the Google Home voice-activated assistant, Android Wear watches and the Google Allo messaging app.[9]That latter is a way for i-phone users to get Google Assistant. In health care, medical assistance involvement performs a crucial role in completing up to date work. In this paper developed by medical assistance for patients.[2]A Medical Assistant, also known as a healthcare assistant, that supports the work of physicians and other health professionals.[3]Medical Assistant is certified through an officially recognized program offered by a

communitycollege.[4]Medical Assistants perform routine tasks and procedures such as rooming and preparing patients, documenting patient medical history and current complaint or reason they are seeking medical attention. They measure patients' vital signs and assist healthcare provider by monitoring surgery preparations, and many other in office tests based on the specialty of the medical practice. Lab testing can be done in the home, but most frequently, the specimens are collected and prepared and packaged for outside lab testing. Vaccines and therapeutic injections, keep an accurate record of the

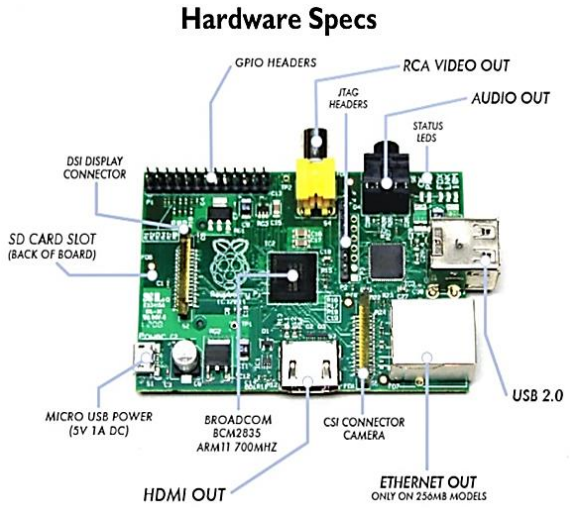
patient visit, phone, and other communications, quite often, using Electronic Medical Record (EMR) Software .also sensing different body parameter are controlled remotely by using IoT technology. Each word extracted using machine learning.

[10]Iot is the abbreviation of internet of things. IoT is defined as the “Sensors and actuators embedded in electrical or physical objects are linked through wired and wireless networks, often using the same Internet Protocol that connects the Internet”.This information is gathered from some of the literature surveys, [1] Wang, Haolin, et al. "Social Media–based Conversational Agents for Health Management and Interventions." Computer51.8 (2018): 26-33 et al in it has a drawback in accuracy of output.[2]Baby, Cyril Joe, Faizan Ayyub Khan, and J. N. Swathi. "Home automation using IoT and a chatbot using natural language processing." Power and Advanced Computing Technologies (i-PACT), 2017 Innovations in. IEEE, 2017 et al in process 98% accuracy but it has a limited language..[3] Madhu, Divya, "A novel approach for medical assistance using trained chatbot." 2017 International Conference on Inventive Communication and Computational Technologies (ICICCT). IEEE, 2017 et al in assist the basics for this project.[4] Keoh, Sye Loong, Sandeep S. Kumar, and Hannes Tschofenig. "Securing the internet of things: A standardization perspective." IEEE Internet of things Journal 1.3 (2014): 265-275 et al in gives security in the standardized form . [5]Oh, Kyo-Joong, et al. "A chatbot for psychiatric counseling in mental healthcare service based on emotional dialogue analysis and sentence generation." Mobile Data Management (MDM), 2017 18th IEEE International Conference on. IEEE, 2017 et al in works with the help NLP.[6]Hussain, Shafquat, and Ginige Athula. "Extending a conventional chatbot knowledge base to external knowledge source and introducing user based sessions for diabetes education." 2018 32nd International Conference on Advanced Information Networking and Applications Workshops (WAINA). IEEE, 2018 et al in.[7]Pérez-Soler, Sara, Esther Guerra, and Juan de Lara. "Collaborative Modeling and Group Decision Making Using Chatbots in Social Networks." IEEE Software 35.6 (2018): 48-54 et al in.[8]Albayrak, Naz, Aydeniz Özdemir, and Engin Zeydan. "An overview of artificial intelligence based chatbots and an example chatbot application." 2018 26th Signal Processing and Communications Applications Conference (SIU) et al in. IEEE, 2018.[9]Kumar, M. Naveen, et al. "Android based educational Chatbot for visually impaired people." Computational Intelligence and Computing Research (ICCIC), 2016 IEEE International Conference on. IEEE, 2016 et al in.[10] Sano, Albert Verasius Dian, et al. "The Application of AGNES Algorithm to Optimize Knowledge Base for Tourism Chatbot." 2018 International Conference on Information Management and Technology (ICIMTech). IEEE, 2018.

II. METHODS AND MATERIAL

A. RASPBERRY PI:

Raspberry Pi is debit-card sized computer that is connected to a monitor, and uses a standard keyboard and mouse. It is a little device that allows people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. The Raspberry Pi device looks like a motherboard, with the chips mounted on it and ports exposed (something you can expect to see only if you opened up your computer and looked at its internal boards), but it contains all the components you need to connect input, output, and storage devices and start computing.



Here are the various components on the Raspberry Pi board:

ARM CPU/GPU -- A Broadcom BCM2835 System is made up of an ARM central processing unit and a Videocore 4 graphics processing unit. Handles all the computations that make a computer to progress (taking input, generates calculations and producing output), and the GPU handles graphics output.

GPIO -- These are exposed general-purpose input/output connection points that allow the real hardware hobbyists the opportunity to tinker.

RCA -- RCA jack allows connection of analog TVs and other similar output devices.
Audio out -- A standard 3.55-millimeter jack for connection of audio output devices such as headphones or speakers.

LEDs -- Light-emitting diodes, semiconductor light source that emits light for all of your indicators.
USB -- This is a connection port for peripheral devices of all types (including your mouse and keyboard).Can use a USB hub to expand the number of ports or plug the mouse into a keyboard if it has its own USB port.

HDMI -- This connector allows you to plug up a high-definition television or other compatible device using an HDMI cable.
Power -- 5v Micro USB power connector which can be plugged into compatible power supply.

SD card slot -- An SD card with an operating system (OS) installed is required for booting the device. Available for purchase from the manufacturers, but also the OS can be downloaded and saved it into the card if it is a Linux machine.
Ethernet -- Allows for wired network access which is only available on the Model B.
Hardware improves from Pi 3 to Pi 3 B+

Faster CPU
The Pi 3 Model B+ is based on the quad-core, 64-bit processor, as the Pi 3 Model B. Like the Model B, the B+'s is based on an Arm Cortex A53 architecture.
However, the B+ ups the speed of the CPU to 1.4GHz from 1.2GHz in the original Model B, an increase of 16.7%.

Faster Wi-Fi
While the original Model B only supported 2.4GHz Wi-Fi, the Model B+ has a dual-band wireless antenna, supporting 2.4GHz and 5GHz 802.11 b/g/n/ac Wi-Fi.
The 5GHz 802.11ac Wi-Fi has been found to be capable of about 100 Mb/s throughput in testing, more than double that of the 2.4GHz 802.11n Wi-Fi found on the Pi 3 Model B.
The B+ offers support for Bluetooth 4.2, a which is an advance of 4.1 support found in the Pi 3 Model B.

Faster wired Ethernet
On top of the Wi-Fi upgrade, the wired internet also has a speed bump, courtesy of the board's new Gigabit Ethernet over USB 2.0 bridge, which ups the maximum throughput to about 300Mbps. Another advantage of the Pi with a wired Ethernet connection is the inclusion of support for a Power Over Ethernet [POE] Hardware Attached on Top [HAT] of the board,

which will increase the ability for the Ethernet cable to power the board.

B. BODYTEMPERATURE SENSOR (LM 35) :

The LM35 series Temperature Sensor is precision integrated-circuit temperature devices with an output voltage linearly proportional to the Centigrade temperature.

The device has a plus on linear temperature sensors which are calibrated into Kelvin, as the user does not subtract a large constant voltage from the output to get Centigrade scaling. The LM35 device does not require any external calibration to provide accuracy of ±¼°C at room temperature and ±¾°C over –55°C to 150°C temperature range.

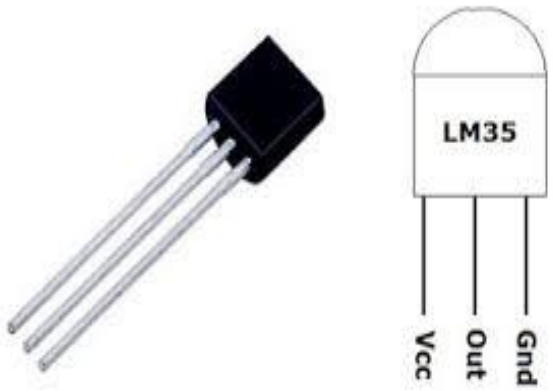


Figure1 : LM 35 sensor

C. ULSE SENSORS

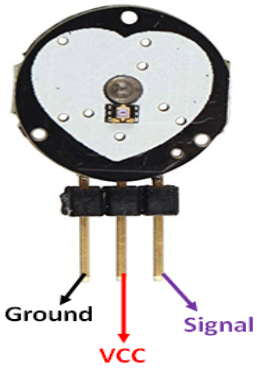


Figure 2. Heartbeat sensor

Working of the Pulse/Heartbeat sensor is really simple. The sensor has two sides, on one side the LED is placed along with an ambient light sensor and on the other side, we have some circuitry. This circuitry is responsible for the amplification and noise cancellation work. The LED on the front side of the sensor is placed over a vein in the human body. This can either be your Fingertip or your ear tips, but it should be placed directly on top of a vein.

Now the LED emits light which falls on the vein directly. The veins will have blood flow inside when the heart pumps, so if we monitor the flow of blood we can monitor the heart beats as well. If the flow of blood is detected then the ambient light sensor will pick up more light since they will be reflected by the blood, this minor change in received light is analyses over time to determine our heartbeat.

Table 1: Pin Configurations

Pin Number	Pin Name	Wire Colour	Description
1	Ground	Black	Connected to the ground of the system
2	Vcc	Red	Connect to +5V or +3.3V supply voltage
3	Signal	Purple	Pulsating output signal.

Using the pulse sensor is easy, but placing it in the right way matters. Since all the electronics parts on the sensor are directly exposed it is also recommended to cover the sensor with vinyl tape or other non-conductive materials. Using in wet hands will damage the sensor. The flat side of the sensor should be placed on top of the vein and a slight press should be applied on it, normally Velcro tapes are used to attain this pressure.

To operate the sensor simply power it using the Vcc and ground pins, the sensor can operate both at +5V or 3.3V system. Once the power is given to the Signal pin to the ADC pin of the microcontroller to monitor the change in output voltage.

III. WORKING:

We propose a question and answering system where the user can ask questions and get the remedy for that problem. In the approach, three major steps are introduced: pre-processing, token identification and answer extraction.[7] Natural language processing, pre-processing, feature extraction is used in different stages.IPAs in ubiquitous environments in the IoT context. IoT technology will enable the creation of ubiquitous communication scenarios, where almost all the devices in the environment will be able to communicate.[5] A standard protocol for enabling communication in IoT networks would ease the creation of more ubiquitous communication solutions. The inclusion of new types of devices in the network, such as devices with embedded sensor units, will increase the heterogeneity of the network, increasing the generated traffic as well. Where machines interact with humans in a smart and fully aware environment may not be as far away as it is thought. Chat-bot system is assisted to detect the different type of fever through their symptoms. And also check the temperature and pulse rate rather than fever.Voice-based input is converted to text. The pre-processing of text can also be done by using the concept of local mining.[3]Three basic steps are involved in local mining: 1) Noun phrase extraction: In this stage, all the nouns are extracted from the given input. 2) Medical term Identifier: This phase includes extraction of all medical terms. 3) Normalization: In this phase, the terms are normalized to medical concepts.[3]NLP(Natural Language Process) can be defined as the ability of a machine to analyze, understand, and generate human speech. These languages were developed to communicate instructions to machines

[3]NLP is used to extract the sentence in the speech and in chat-bot have already stored some information regarding about fever. NLP as to check the word wise and spelling wise from each speech. And comparing all the word with stored words in the chatbot. if sufficient data do not get, chatbot started some question answering, from that it gives the remedy of fever.

The user will provide a voice input to the device. Consider for example: ”I have a headache since three days”. Now, with the help of the tool, the voice input is converted into text. This text is given to the system as input. Now, the given sentence is tokenized with the help of Stanford Part-of-Speech Tagger.

[6]Only the disease and its duration are mentioned in our input statement. So in our data structure, these entities will be marked as one, but since the severity is not mentioned so the system will generate a question for such entities. Here, we are using Question-set under which all the possible questions related to each entity is stored. When the user enters all the fields and then the system will check whether the medical terms from the pre-processing system are the same as that of symptoms and it’s to give the solution of their symptoms.

A. Module 1:

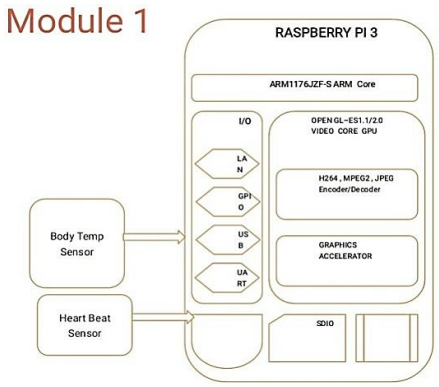


Figure 3 : Block diagram1

B. Module 2:

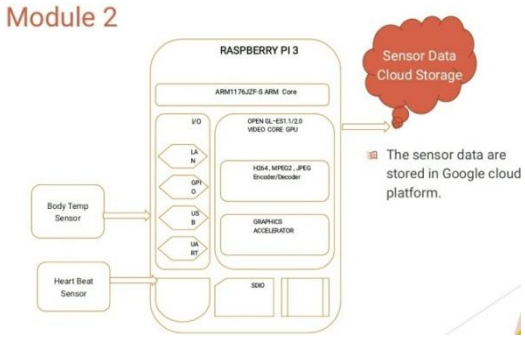


Figure 4 : Block diagram2

C. Module 3:

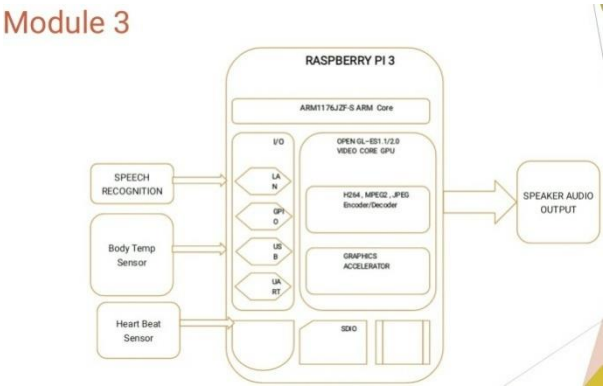


Figure 5 : Block diagram3

IV. CONCLUSION

IPAs in ubiquitous environments in the IoT context. IoT technology will enable the creation of ubiquitous communication scenarios, where almost all the devices in the environment will be able to communicate. A standard protocol for enabling communication in IoT networks would ease the creation of more ubiquitous communication solutions. The inclusion of new types of devices in the network, such as devices with embedded sensor units, will increase the heterogeneity of the network, increasing the generated traffic as well. Where machines interact with humans in a smart and fully aware environment may not be as far away as it is thought. Chat-bot system is assisted to detect the different type of fever through their symptoms. And also check the temperature and pulse rate rather than fever.

V. REFERENCES

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