Voice Based Medibot Using Natural Language Processing

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Abstract- In recent years, chatbots have become increasingly popular in healthcare, particularly in hospitals. Chatbots offer several benefits to patients and healthcare providers, including improved access to care, reduced wait times, navigating path and personalized support. In a hospital setting, patients often have questions about their medical navigation path that require immediate attention. However, due to the limited availability of medical staff, patients may experience long wait times or may not receive the necessary attention they require. Currently, hospitals rely on medical staff to respond to patient queries. This method is often time-consuming and may result in patients waiting for long periods to receive a response. Additionally, the availability of medical staff may be limited, which can lead to delays in response times. To address these issues, hospitals are increasingly turning to chatbots to provide patients with timely and personalized indoor navigation path. In this paper, we propose a medical chatbot system for hospitals that can assist patients with their medical queries and provide them with appropriate answer for their queries. The proposed system uses artificial intelligence and natural language processing techniques to understand patients' queries and provide relevant responses. The proposed medical chatbot system offers several benefits to hospitals and patients. It can provide patients with timely and personalized medical navigation path, reduce wait times, and improve access to care. The system can also assist medical staff in managing their workload, allowing them to focus on more complex cases.

Keywords- Chatbot, Artificial Intelligence, Natural Language Processing, Voice Based, Q/A Features.

I. INTRODUCTION

The use of chatbots in healthcare has been gaining popularity in recent years, particularly in hospitals where patients often require immediate medical attention. In this paper, we propose a medical chatbot system that can assist patients with their quires and provide them with appropriate solution for their queries. The proposed system uses artificial intelligence and natural language processing techniques to understand patients' queries and provide relevant responses.

The proposed system can be integrated with hospital information systems to access patients data fand medical records to provide more personalized advice to patients. The proposed medical chatbot system offers a cost-effective and efficient way to improve patient access to medical advice and reduce the workload of medical staff.

II. LITERATURE SURVEY

[1] Automated Medical Chatbot: It is provided to measure the seriousness at the diagnosis and it needed it will connect the user to a doctor available online. It provides diagnosis and remedies based on the symptoms provided to the system.

[2] Big Data Analysis and Perturbation using Data Mining Algorithm: It can be used to tackle the challenges and competition among banks for data management to segregation of customers. It has proven to be highly effective and has resulted in the production of large amount of data that is to be analyzed.

[3] A proposed system for opinion mining using machine learning, NLP and classifiers: It is used to categorize the spam/non-spam and classifying/analysing the variation of fraud/genuine to find the fake reviews.

[4] Covid-19 Risk Minimization Decision Making Strategy Using Data-Drived Model: It is used to make decision in pandemic period using the data driven model to collect more data. The role of human behavior is taken into consideration while assessing its limitations and benefits for policy making as well as individual decision making.

[5] Health Chatbots for Fighting COVID-19: a Scoping Review: Covid-19 related chatbots in health care used to identify and characterize the emerging technology during pandemics. Using health chatbots to combat Covid-19 is a practice.

[6] Chatbot for college related FAQS: Chatbot helps in enquiring the queries related to college in text based. Chatbot is a conversational representative that act together with users natural language by the help of machine learning and neural network using python. This chatbot would be developed for college students to get basic details regarding college amenities, faculty, location & their facilities. It can be operated for any college to answer FAQs for students.

III. EXISTING METHOD

Chatbot can help patients by diagnosing and recommending immediate preventives as well as safety measures for patients in covid period. The conversation has been proposed in text based for the patients. The proposed chatbot with various component namely NLU, FAQ system, Data Repository which performs assigned tasks. The chatbot gives the proper answer for the queries of the patients. Since the discovery of corona virus and its subsequent progression into a global pandemic, an enormous hurdle faced by hospitals and their healthcare staff has been to streamline, and look after the huge flow of cases. It connects with the authorized medical facilities when it progresses to a serious stage.

IV. PROPOSED METHOD

The proposed medical chatbot system for hospitals is designed to provide patients with timely and personalized medical advice through an android app that uses voice recognition. The system is also equipped with an SD card and amplifier, and a speaker for providing patients with appropriate responses. The chatbot is designed to interact with patients in a conversational manner, allowing them to ask questions about their medical navigation path from giving voice input and by getting voice output. The android app uses voice recognition technology to recognize the patient's query, which is then processed by the chatbot to provide the appropriate response. To activate dynamic answers using mp3 modules with a chat-bot, the system utilizes a mouth action with Arduino microcontroller that is connected to a servo module. The servo module monitors the connected actions, and the connected water motor can be turned on or off using a separate chatbot app that we develop. Chatbot conveys the respective answers for our questions using mouth action and speaker. The mouth action is connected to the microcontroller using a servo motor, and the speaker is connected through an MP3 SD card-based modulator. The voice recognition system would be integrated with Bluetooth module and Arduino microcontroller and driver relay circuit, which would be connected to the water pump. When a patient gives a voice command to the chatbot to provide water, the chatbot would process the command and send a signal to the driver relay circuit to activate the water pump. System also includes an LCD that allows us to monitor the status of the system and the TFT display to view the image. This proposed medical chatbot system offers several benefits to hospitals and patients. It can provide patients with timely and personalized medical navigation path, reduce wait times, and improve access to care. The system can also assist medical staff in managing their workload, allowing them to focus on more complex cases.

ADVANTAGES

- Improved access to care,
- Reduced wait times,
- Personalized support,
- Workload management for medical staff,
- Medical navigation path.

V. METHODOLOGY

The proposed Medical Chatbot for hospital using android app for voice recognition with Natural Language Processing (NLP) methodology consists of several components that work together to provide personalized medical navigation path and assistance to patients. Develop a Natural Language Processing (NLP) model - To enable voice recognition, an NLP model needs to be developed that can accurately interpret patient queries and generate appropriate responses. The NLP model can be trained on a dataset of medical terminology, questions and answers to improve its accuracy. Integrate the NLP model with the chatbot - Once the NLP model is developed it needs to be integrated with the chatbot software to provide patients with personalized medical advice. The chatbot will use the NLP model to interpret patient queries and generate appropriate responses. Develop a dynamic answer system - To activate dynamic answers using SD card modules with a chatbot, a mouth action with Arduino microcontroller connected to a servo module is used. The connected water motor can be turned on or off using a separate chatbot app that is developed separately. Connect the water pump and driver relay circuit - A driver relay circuit and water pump are connected to the chatbot system to enable patients to request water using voice commands. When a patient gives a voice command to the chatbot to provide water, the chatbot would process the command and send a signal to the driver relay circuit to activate the water pump. Monitor the system status - To ensure the system is working correctly, an LCD can be integrated to monitor the status of the chatbot and water pump system and the TFT display is included to view the image . Test and refine the system - The final step in the methodology involves testing the system and refining it to improve its accuracy and performance. The system can be tested with real patients and normal peoples to ensure that it is user-friendly and meets their needs.
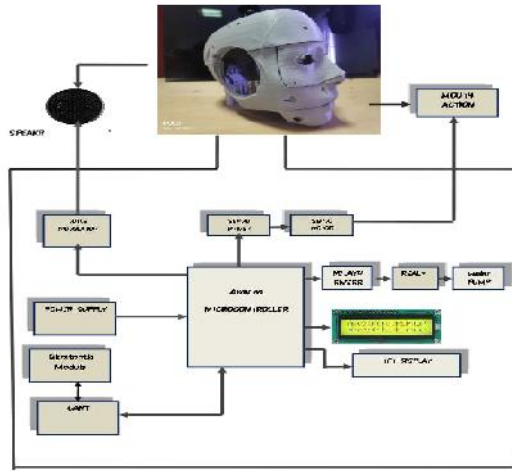
VI. BLOCK DIAGRAM

Fig 1.Block Diagram

VII. HARDWARE DESCRIPTION

A. ARDUINO MICROCONTROLLER

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cables.
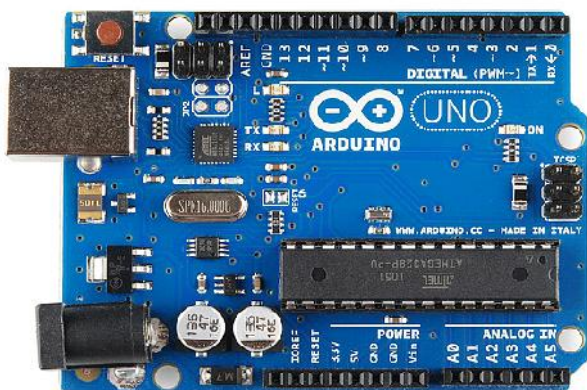

Fig 2. Arduino Microcontroller

B. BLUETOOH MODULE

Bluetooth Module is a technology that acts as an interface that aids the wireless Bluetooth Low energy connection of any two devices and establishes a protocol for the communication of data between the devices. Bluetooth low energy module's mediated data communication range is usually an average of tens of meters and data is communicated in specified frequency bands. There are various brands, types, models and classifications of Bluetooth modules. Bluetooth Modules' diversity in application makes them one of the most widely-accepted Internet of things (IoT) connectivity protocols.
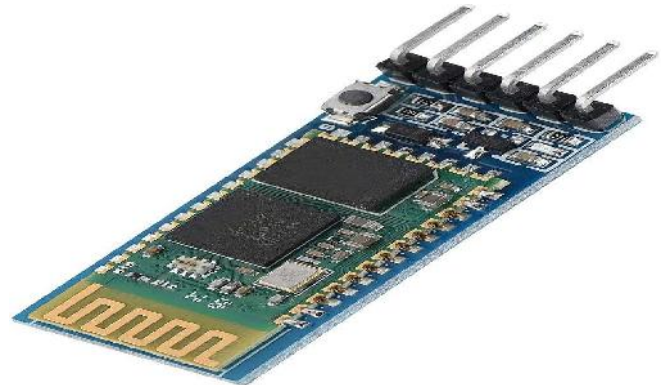

Fig 3. Bluetooth Module

C. POWER SUPPLY

A power supply is an electrical device that supplies electric power to an electrical load. The main purpose of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load.
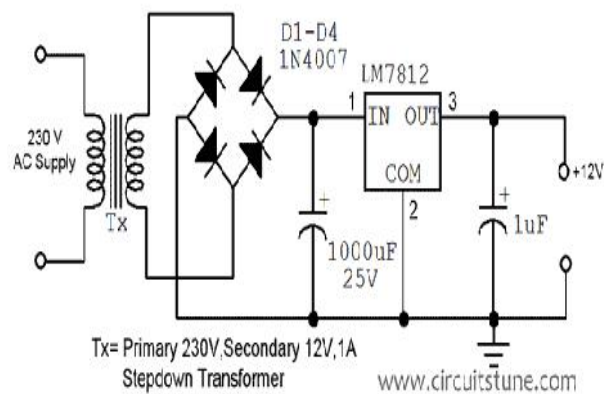

Fig 4. Power supply circuit

D. USB to UART

A USB to UART converter is an integrated circuit used to send or receive serial data from a USB port into serial data that can be received or sent by a UART interface. This is a small device that plugs into your USB port and has at least ground, Rx and Tx outputs.
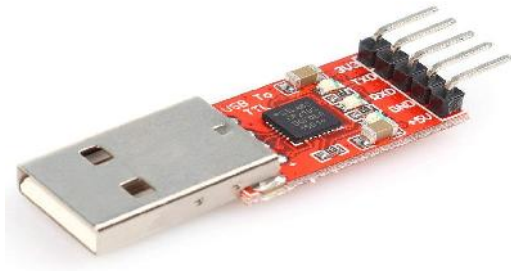

Fig 5. USB to UART

E. RELAY DRIVER

In a low power circuit or an output from a Microprocessor is very low. It is sufficient for a LED to glow but to drive a high load you will need a Relay (Electromagnet Switch), and to give proper voltage or current to a relay you will need a relay driver.

Fig 6. Relay Driver

F. BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke.

Fig 7. Buzzer

VIII. SOFTWARE DESCRIPTION

Embedded C is a set of language extensions for the C Programming Language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Embedded C programming typically requires nonstandard extensions to the C language in order to support enhanced microprocessor features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations. The C Standards Committee produced a Technical Report, most recently revised in 2008 and reviewed in 2013, providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as fixed-point arithmetic, named address spaces and basic I/O hardware addressing. Arduino sketch is the name that Arduino uses for a program. It's the unit of code that is uploaded to, and run on an Arduino board. A basic Arduino sketch consists of two functions: setup(),loop()

The purpose of these functions will be explained later in the tutorial.For now, open the Arduino IDE and click on the File tab. Then, click on New (or press Control + N on your keyboard) to have a look at the two functions.

IX. CONCLUSION

The use of a medical chatbot system in hospitals can bring significant benefits to both patients and healthcare providers. By providing patients with immediate access to medical advice and support, the system can reduce wait times, improve access to care, and increase patient satisfaction and the navigation path. Additionally, the osystem can assist medical staff in managing their workload, improving efficiency and allowing them to focus on more complex cases. The use of artificial intelligence and natural language processing techniques ensures that patients receive personalized responses. Overall, implementing a medical chatbot system in hospitals can be a cost-effective and efficient solution to the challenges faced by healthcare providers in providing timely and personalized medical navigating path to patients and the outcomers to hospitals.

X. FUTURE SCOPE

Chatbots can be integrated with EHRs to provide patients with real-time access to their medical records, such as lab results, medication lists, and allergies. Chatbots can be programmed to support multiple languages to improve accessibility and cater to diverse patient populations. Chatbots can be programmed to learn from patients' interactions and provide personalized recommendations and advice. Chatbots can be integrated with telemedicine platforms to provide remote medical consultations, which can be especially useful

for patients in rural or underserved areas. Mental Health Chatbots can be programmed to provide mental health support and counseling, which can help alleviate the burden on mental health professionals and improve access to care. Chatbots can be integrated with other healthcare providers, such as pharmacists, to provide patients with a comprehensive and seamless healthcare experience.

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