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AI Based COVID-19 Awareness Chatbot

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Abstract - *Since the discovery of the Coronavirus (COVID-19), it has become a global pandemic. At the same time, it has been a great challenge to hospitals or healthcare staff to manage the flow of the high number of cases. Especially in remote areas, it is becoming more difficult to consult a medical specialist when the immediate hit of the epidemic has occurred. Thus, it becomes obvious that if effectively designed and deployed Chatbot can help patients living in remote areas by promoting preventive measures, virus updates, and reducing psychological damage caused by isolation and fear. This report presents the design of a sophisticated artificial intelligence(AI) based COVID-19 awareness Chatbot for the purpose of diagnostic evaluation and recommending immediate measures when patients are exposed to COVID-19.*

Key Words: Covid19, Chatbot, Dialogflow, Artificial intelligence, NLP.

1.INTRODUCTION

After the rise of the web and mobile apps, virtual chatbot applications are the latest inventions of digital design. These applications are well known for automatic conversational agents that run on computer programming or a kind of artificial intelligence (AI) interaction between the users and machines with the intervention of natural language processing (NLP). Chatbots are potentially referred to as the most promising and advanced form of human-machine interactions. Eventually, these virtual agents are getting involved in the main global sectors such as healthcare, banking, education, agriculture, etc.

The healthcare sector is closely associated with human interaction, and it seems counterintuitive that conversational AI applications like chatbots are more prevalent. Hospital administrators are spending their day in appointment scheduling and answering routine questions of patients. Continuing or repeating the same actions and words is neither necessary nor productive. Such jobs can be easily done with bot applications. It is obvious that patient feedback assessments are also possible by collecting user responses to maintain good patient flow. In the occurrence of serious pandemics like novel Coronavirus (COVID-19), health bots are beneficial as a supplement to personal clinical care or immediate medications.

After COVID-19 spread beyond China, it spread globally at a rapid pace and about fourty-six million cases have been confirmed. Because of continuous patient flow, it has been a great challenge for national governments to supply enough medical specialists, resources, and equipment to hospitals or healthcare centers. Therefore, we designed an "AI based COVID-19 awareness Chatbot" to ease the burden of healthcare systems by identifying infection severity. In addition, it has all the necessary preventative measures including interactions with live doctors.

1.1 Previous Work

There are some established COVID-19 virtual agents integrated with messenger applications. The World Health Organization (WHO) has launched a dedicated messenger app in seven languages to keep the public safe from coronavirus infection[1]. Likewise, the German government developed a 'fight COVID messenger bot' , the Bangladesh-based SAJIDA Foundation developed an COVID-19 information bot with a symptom checker and explanations of preventive measures[9]. While in India, the Aarogya Setu mobile app has been recently developed to create awareness of COVID-19 with the parallel connection of a chatbot[5]. However, all of these bots are serving as medical consultants of the coronavirus, and none of them highlight the issues concerning remote patients in terms of the pandemic.

1.2 Purpose

Therefore, our proposed personal health chatbot for rural patients will act as a medical consultant, and also provides simple and relevant measures of not being infected by COVID-19. Another advantage of this bot includes 24/7 accessibility and assesses the patient's condition in a more human-like way. Due to the built-in backend logic function, it will detect the virus's intensity and provide the nearby hospitals using GPS location.

2. Literature Review

WHO Health Alert brings COVID-19 facts to billions via WhatsApp, this messaging service will provide the latest news and information on coronavirus including details on symptoms and how people can protect themselves and others. WhatsApp is more limited as it does not support these rich UI elements such as buttons, cards and carousels[1].

Google Cloud partner Maven Wave, an Atos Company, helped Amedisys, a leading provider of home health, hospice and personal care, build a chatbot using Dialogflow, the conversational AI platform that powers Contact Center AI, to allow employees to self-screen and report symptoms of COVID-19 through a simple voice interface.
SPeCECA which is a smart pervasive chatbot for emergency case assistance and it is designated to interact with ordinary citizens to help them overcome an emergency situation by suggesting the accurate first aid actions to do[10].

Mandy is a chatbot that communicates with normal people using natural language in order to provide an online healthcare suggestions. COVID-19 diagnosis and prediction by Peng et al. 2020 developed an artificial intelligence method to diagnose and predict COVID-19. This method is designated for the clinical use, so that ordinary citizens could not profit from it.
CDC Coronavirus disease 2019 (COVID-19)—symptoms. Centers for Disease Control and Prevention which provides symptoms testing through chatbot[2].

3. Requirement Analysis

This section provides a clear analysis for the potential solution, to outline and breakdown the necessary requirements to implement the chatbot.

This includes:
- Functional requirements
- Non-functional requirements

3.1 Functional Requirements

The Chatbot should be able to:
- Help people understand and accept the coronavirus quarantine in order to limit the quickly spread of the viral disease
- Raise awareness but also share reassuring messages to take the required precaution actions
- Collect user's data (non-confidential information) to use it in machine learning later.
- Tell both uninfected and infected people what to do to protect themselves and their entourage from more infections.
- Answer all queries/FAQ related to COVID-19.
- Show statistics worldwide, Country wise, Indian State.
- Give helpline number regarding COVID-19.
- Give news, Government Announcements.
- Show videos related to COVID-19.

3.2 Non-functional Requirements

• **Reliability** :- The reliability of the overall program depends on the reliability of the separate components.
• **Availability** :- The system should be available at all times, meaning the user can access it using a web browser, only restricted by the down time of the server on which the system runs.
• **Security** :- Passwords will be saved encrypted in the database in order to ensure the user's privacy.
• **Maintainability** :- MongoDB is used for maintaining the database. In case of a failure, a re-initialization of the program is recommended.

4. Project Design

4.1 How a chatbot works?

Chatbot is a software application which simulates human like thinking and is capable of interacting with human beings just like humans interact with other human beings.

When user ask their questions to chatbot, chatbot is connected to the database. The database is utilized to sustain the chatbot and provide appropriate responses to every user. NLP can translate human language into data information with a blend of text and patterns that can be useful to discover applicable responses.

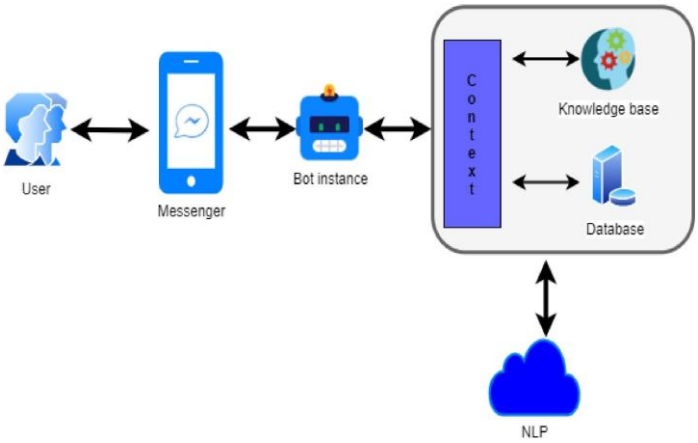

Fig -1: How a chatbot works?

4.2 COVID-19 Chatbot Design

This chatbot developed using Dialoglow, Python/Flask, MongoDB and deployed on Telegram.

Chatbot Architecture :

In the architecture of the chatbot, you can make out three major components viz. The Google Dialogflow console basically used for creation and maintenance of chatbot. The second one being the webhook call and web API where actual coding is done to add functionalities to the bot. And finally the third component is the Telegram app which provides user interface through which user can interact with chatbot.

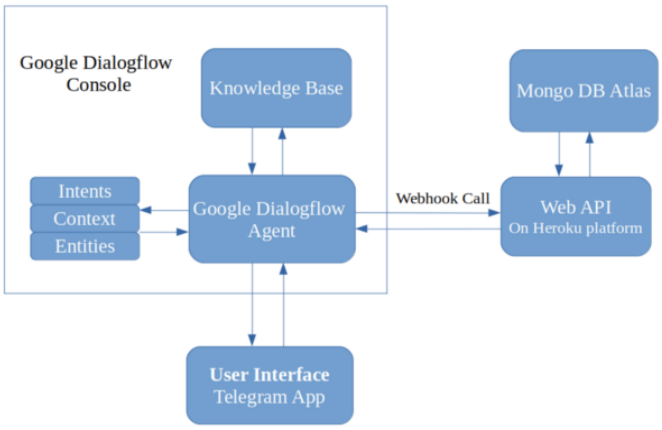

Fig -2: Chatbot architecture

5. Design Implementation

5.1 Chatbot Flow

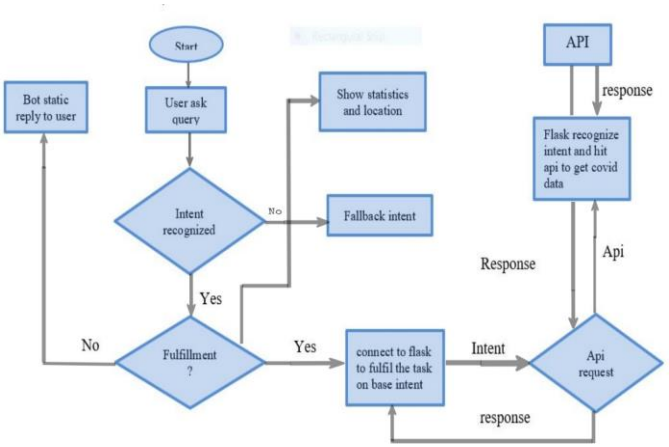

Fig -3: Chatbot flow

5.1 Chatbot Work

A user sends a text message to bot and bot transfers the message to Dialogflow. The message is categorized and matched to a corresponding intent (Intents are defined manually in Dialogflow). We define actions for each intent in the fulfilment (Webhook). When a certain intent is found by Dialogflow, the webhook will use external APIs to find a response in external data bases.

When connecting an API to a project or application, you must have an API key to authenticate your request. Creating an app within RapidAPI or MapAPI generates an API key specific to that application. You can view analytics based on the API calls you make using this app key. Integrate this api with dialogflow and python flask. When statistics or nearby location is called in dialogflow then this api will be access through python flask. Python flask access data from those api and return back required information to the webhook. Webhook sends formatted response to the intent. Intent generates actionable data according to different channels. The actionable data go to output chat window. The user gets a text/image/video response.

6. Technologies Used

In this section we will be discussing about the technologies that we will use while developing this Chatbot. The technologies of the chatbot consists of three major components viz. The Google Dialogflow console basically used for creation and maintenance of chatbot. The second one being the Python Flask and rapid API where actual coding is done to add functionalities to the bot. And finally the third component is the Telegram app which provides user interface through which user can interact with chatbot.

6.1 Software Interfaces

Dialogflow
Python/Flask
Database System :- MongoDB
Text editor :- Pycharm editor
Database :- serialized database
Heroku CLI
Telegram app
Chrome

6.2 Hardware Interfaces

Operating System :- Windows platforms
Hardware :- Intel Core i7
Internet connection

7. Results

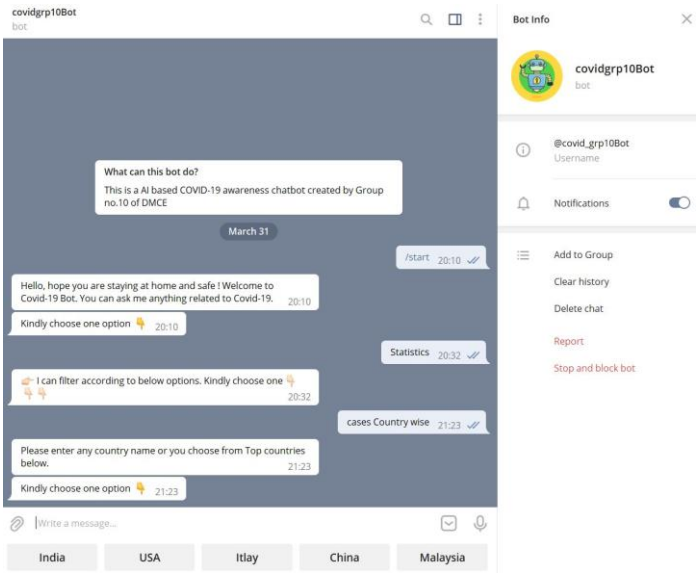

Fig -4: Telegram Chat-1

8. CONCLUSION & Future Scope

8.1 Conclusion

We are developing "AI based COVID-19 awareness Chatbot" using DialogFlow, MongoDB, Flask API, Telegram for user efficiency.
The Idea behind this project is to spread awareness among the people and help them during this pandemic situation. This COVID-19 Chatbot will have large impact on patients' life during this pandemic.
This bot includes FAQ, total numbers of COVID cases, video recommendation, latest news and announcement.

8.2 Future Scope

Chatbots now finding their way into workflow automation projects across healthcare, their capabilities will naturally evolve. Every new implementation and software update improves the performance and user experience. Advances in machine learning and AI will continue to make bots smarter and proactive. Our future work will be NLP/voice communication where patients have the option to "talk" to the bots.

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