

COVIBOT- An intelligent WhatsApp based advising bot for Covid-19

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Abstract— during the time of the global pandemic Covid 19, entire world is having problems associated with global sickness and health care issues. It is visible that there is no accurate medicine, yet available for the disease. There is no direct method that is responsible to handle the situation when a person suffers from this disease. The paper elaborates method that is responsible for advising a person about the first aid or immediate treatment that can be taken care during this pandemic situation. Artificial intelligence and natural language processing are used for providing a system, which is integrated with the very famous, WhatsApp messenger. The paper also elaborates the functionality of the bot and construction. This bot is sufficient for providing proper advice based on the symptoms of a patient in order to seek medical attention. The bot further gives the advices and information about nearest hospitals for seeking medical care.

Keywords— *Covid-19, bot, artificial intelligence, natural language processing, bot, design, development, advising*

I. INTRODUCTION

Since the beginning of the year 2020, the global pandemic had started in various part of the globe. It has been a very difficult situation for the humanity to handle this problem. The disease called as Corona, caused by the virus Covid 19, spread across multiple parts of the world with variable speed. In certain parts of the world, the growth was very fast. In certain other parts, moderate growth was there. The World Health Organization is also struggling for providing different type of information and sharing knowledge with people over the disease. Various common symptoms that are depicted by the World Health Organization includes, fever in the human body, dry cough and cold, flu symptoms, and tiredness [1]. These are one of the most journals symptoms that are occurring inside the body, which is more likely to be infected by Covid 19 virus. There are certain more symptoms such as, pain, sore throat, diarrhea, conjunctivitis, headache, loss of smell and taste to name a few [2]. All these symptoms are usually occurring in the patients depending on their body immunity. However, there is no certain restriction that a particular symptom will be cause for any specific patient.

The identification of the problem occurs when a person suffers acute symptoms and requires medical attention, which is very strong and depends on various factors. There is no direct remedy for the problem until date. Various researchers and scientists are trying to find out the solution. However, the direct vaccination for the disease is not yet available. A large number of people have suffered

their lives. There has been a very strong decline in the economies of the global scenario. A large number of people have lost their jobs and problems have grown up like anything. The entire situation will be in difficulty unless and until a proper cure is identified. During the past months of survival, doctors and healthcare professionals have identified the routine of providing proper medication to the victims. All the subjects undergoing the situation are given certain specific type of treatment to recover from the ailment. There are various units, which are trying to develop vaccines to overcome the issue. Large number of people are waiting for identification of the remedy at the global level. Nevertheless, eventually there will arrive a vaccine for the problem. However still there is no direct mechanism that can identify whether the patient is suffering from this disease or not.

II. PROBLEM IDENTIFICATION

A. COVID-19 VIRUS DETECTION

As per the current situation that is going on, millions of people have been a victim of the virus. There is no straightforward mechanism that is able to detect whether the person is suffering from the disease or not. However, various tests like antibody test, RT-PCR tests are able to identify the sickness inside the human body [3]. The symptoms that are identified in the disease are more or less similar to the symptoms of general common flu. These symptoms are extended with various other problems associated with them. The symptoms of flu differ in certain sequences as compared to the symptoms of the Covid 19 disease. The most important problem that is associated with the symptoms. Is that correct identification and detection.

B. PROBLEM IN DETECTION AND CONFUSION WITH FLU SYMPTOMS

As per the present scenario of the disease, initially, if a person suffers with the contamination and infection the symptoms appear similar to be like that of flu. The victim, who is suffering from the infection considers it general flu and did not take attention. However, certain symptoms like tiredness, chest pain, difficulty in breathing, loss of taste, loss of smell etc. are not similar to those that of the flu. The common person who is working from day until night does not consider these symptoms more dangerous as expected. It becomes difficult for the situation to be handled based on the symptoms of the person. Identified symptoms are similar, yet differ in various different type of occurrences. The most important part of the treatment in this particular disease is the

identification of the symptoms and providing proper medication on time.

C. HEALTHCARE CONSIDERATIONS IN SYMPTOMS

The healthcare and the doctors recommends that the proper treatment should start as per the required time stamp so that the person will recover very quickly without putting the life and health in danger. However, if the symptoms are overridden and not considered, the situation can be worsened [4]. A major challenge in front of the humanity is how to identify whether or not the symptoms are correlated with Covid 19 virus. This becomes the basic of the research, which is presented in this paper. The proper identification of the symptoms is the most important first step for getting relief from the ailment. This type of ailment can be very difficult at times when negligence is done. Improper diagnosis and loss of time in the early stages of the disease can be very harmful for the health of the victim. Sometimes it becomes more difficult for any hospital or medical Centre to track and recover the person from the disease in the later part of the diagnosis. If the diagnosis is done very late, it might be very difficult for the person to survive with acute conditions of the disease. These conditions can lead to the lowering of the oxygen level in the body [5]. Finally, the collapse of the respiratory system leads to the mortal death of the patient. Delay in the identification can provide a major hurdle in the path of rectification of the problem in this worst-case scenario.

D. PRESENT SITUATION AND PROBLEM

It is further identified that various government of different parts of the world has designed a large number of dashboards [6], but these dashboards are providing the information for the total number of Covid 19 cases that have occurred in the country until present time. None of the Covid dashboard is providing a proper mechanism that is responsible and helpful enough to the patient for identification of the symptoms and diseases. This study focus on providing a mechanism which will be able to provide the victims or the patients some remedy using artificial intelligence and natural language processing to identify the symptoms and advise them the next stages. The paper focuses on the development of a system that will be capable enough to take input all the symptoms that the user is facing at present stage from his side. The input given by the user based on which analysis will be done on his particular health condition. The condition of the health after identification will be able to provide a suitable feedback. This feedback can act as an advice to the patient for seeking medical attention or not. The system will be capable enough for identifying what a patient gives as input and process it as an advice to seek medical attention.

E. POST IDENTIFICATION AND PRE IDENTIFICATION ISSUES

The medical attention is available at the nearest hospital or health care clinic. The system will be capable for providing the information about the address and location of the nearest health Centre to facilitate the user. During emergencies, the system will be very helpful for identification of critical stages in which the patient should take necessary steps for going ahead in the healthcare dimension. However, if the conditions are not critical and general issues are identified, then the patient need not to seek

urgent medical help. Thus, in both the cases, the facilitation can be done to the user based on his inputs of the symptoms. The application will be capable enough for identifying the inputs or symptoms of the user through an interface. Artificial intelligence will be implemented and will identify with the help of natural language processing what type of situation can arise under such health conditions given by the user. The decision-making system depends on the natural language processing. The processing engine will try to get the results from a user based on which the artificial intelligence powered NLP will be applied. This is going to identify whether the user is facing the problem requires necessary medical attention or not.

III. ANALYSIS AND DESIGN CONSIDERATIONS

A. DESIGN CONSIDERATIONS

As per the previous section, it has been identified that the application needs to be very trendy and helpful for common user. During the analysis of the solution set, the research finds that the application that is responsible for the identification of symptoms and providing a proper advice should be very trendy and helpful in terms of usage. Several web based systems where utilized and checked for the applicability. However, the web-based systems were difficult to remember and memorize for various causes. It was then identified that the most commonly used messaging units are WhatsApp messenger , Facebook messenger, IMO messenger, Telegram messenger, Google meetings, Skype, WebEx, and many more [7]. However, there are number of messaging units, which are not very common in all the countries. Since the problem of the pandemic is global in nature thus, the solution should also be global. It was identified in the research that the most commonly used system around the globe for messaging is WhatsApp [8]. In order to use the power of WhatsApp integrated with artificial intelligence engine and powered by natural language processing, a system can be designed using WhatsApp API.

B. DEVELOPMENT PLATFORM IDENTIFICATION

This type of system that is proposed is not available around. The natural language processing bots are replacing the customer care and helpline system very quickly [9]. The research connected the power of artificial intelligence, using natural language processing with the availability of WhatsApp API [10] to create a system and design a bot that will be capable to fulfil the above problem definition. A generic messaging system powered by the capability of NLP and bot architecture is proposed as the solution. The paper focuses mainly on the development of such a system that will be carefully handling the inputs given by user in the local languages and providing advices for seeking medical attention at various levels.

C. ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING

The power of artificial intelligence, along with natural language processing empowers the bot to take the input from the user and provide the necessary output based on his texts. Any type of input text that is given by the user is connected to an authentication module. The natural language processing engine integrated with the API tries to understand the system and the queries given by the user. The keywords that are written by the user are available in the form of key value pair

inside the database of the natural line with processing engine [11]. All the keywords are identified in the database and once the keyword is located, necessary action will be taken depending on the requirement of the user in the form of a response. The user may however do any kind of mistake while typing the texts. The natural language processing engine needs to be very strong, to identify the errors and minimize the typo errors during the identification of the complete modules. The personal query response that is given by the user is given back in the messaging unit as the solution. The user can continue with the further modules or can exit the situation. During the availability of an improper input, the user will be responded and redirected towards a generic menu that reports to re-enter the required information. The context that is separable from the text given by as input will be taken care by the bot and queries will be answered.

D. FINAL IDEA FOR THE SOLUTION OF BOT DESIGN

The idea of integration of machine learning along with natural language processing makes it possible for the bot to identify the text given by the user as input and processor to give a proper output. The input given by the user are the symptoms, which will be asked by the bot itself. Based on the symptoms communicated to the bot. The natural language processing engine is going to identify whether or not an advice exist for the user. In case the symptoms match is the symptom for a Covid 19 positive user, the bot advises immediate attention and provides the nearest hospital or healthcare unit address. In case of situation when bot does not identify any issues with the health conditions, the user is advised to quarantine himself at house as an isolated entity and keep himself in observation for a period of seven days or more. Thus, in both the cases the bot is able to give a proper suggestion without misguiding or misleading the user.

IV. DEVELOPMENT OF THE BOT

A. WHATSAPP API ACTIVATION

Recently, Facebook have released the [WhatsApp API](#) that can be utilised for the creation of bot and use natural language processing for the production of an environment in which an interactive bot design can be generated using the natural language processing engine. The business API for WhatsApp is capable enough for providing the capability of artificial intelligence for natural language processing. A large number of system can be designed with the help of the bot system to identify user requirement and provide output based on the text input by the user [12]. This process does not seem to be very simple because of the activation issue of the WhatsApp number that will be used for the promotion of the information and creating the bot. Thus, it is required by the business contender to activate the WhatsApp business API corresponding to a particular mobile number. Following steps should be taken care during the activation of the business API [13]:

Step 1: Set Up Your WhatsApp Account

Step 2: Set Up Your WhatsApp Business API Client

Step 3: Registration

Step 4: Update Your Settings

Step 5: Send A Test Message

B. BOT DEVELOPMENT USING API

Once the activation of the API is completed, it becomes easy for the bot to be created using the API. At the present stage, not all the WhatsApp API are coming up with the SDK kit from Facebook. However, there are certain vendors and resellers who are being given the SDK for business demands. The collaboration with certain vendors like this will be helpful enough for the development of the bot. Resellers of the business API like Twilio, are providing various services at a very reasonable price. Personal API are not free for development stage. However, the launching of the bot can be done in association with the reseller or the vendor. A generic web interface is available for different vending sites that will be making use of the WhatsApp web API activated for a particular business account.

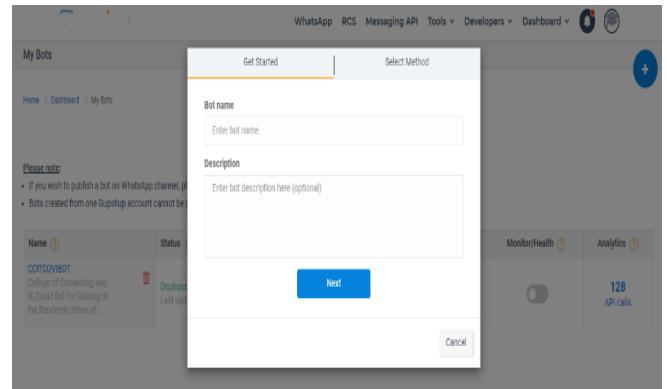


Fig. 1 Creation of a new Bot on the Activated WhatsApp Business Number

C. CREATING BOT FLOWS

Once the bot have been created, the second most important step is to create the flow is based on the input given by the user. The natural language processing engine of the WhatsApp business API makes it possible and easy for the bot developer to manage the input and output texts. There are various methods for designing and developing a bot flow. The graphical user interface called as the flow manager can be used for the development of the bot with various conditions. Several other techniques, such as the integrated development environment is also available for hard-core programming with the help of key value pairs. All the key value players can be hard coded and integrated with the bot without the customization for the flow. However, this is sometimes a little tricky and may cause problems. It is advisable that the development of the flow of the bot can be done more easily with the graphical user interface using the flow manager.

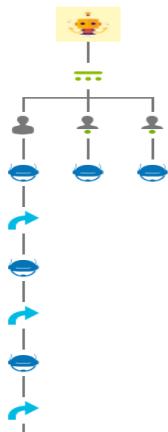


Fig. 2 depicting a general Bot Flow Design in the Flow Manager

All the service provider and the vendor's gives the service of flow management with the GUI as expected. The flow manager comprises of three important sections:

- BOT: bot is used to identify the questions and provide different type of solutions and results. This intelligent system is capable for answering the user request by providing it to the natural image-processing engine integrated with artificial intelligence. This engine text input from the bot and gives the output to the bot for further display.
- User: the user is responsible to give input based on the baht responses as well as the instructions given by the baht for the utilization of the service. The response of the user is most important because natural language processing works on providing proper spelling and format of the input texts. Any issues or mistakes with the input text may lead to a very big change. The proper identification and results given by the bot based on the inputs given by the user.
- Conditions: most important of the complete system is the conditional flow management, which includes the user input, as well as process with the natural language processing engine. The conditional statements are sure that the bot is going to give a proper result after processing the input.

D. DEPLOYMENT OF BOT

The deployment of the bot that is finally constructed with the web API can be done with the help of the deployment manager in the script designed. The script designer makes sure that the flow, which is generated for the bot by the developer, is without any errors and warnings. Once the errors and warnings are removed and the flow is continuous, the deployment can be done. Once, when the deployment is done for the bot. The complete script gets loaded in the web server integrated with the natural language processing.

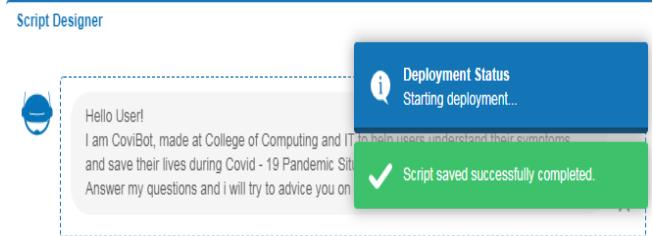


Fig. 3 Deployment of the Bot in the WhatsApp Business API Environment

The deployment status is returned as an output parameter when the deployment is called from the flow manager. This flow manager is responsible for assuring that. Once the deployment status is set done, the bot is ready to be deployed on the channel of the WhatsApp. Once the channel on the WhatsApp is activated for the business number connected with the Facebook business API, it becomes easy for the deployment of the bot to be made ready for the customer use.

E. TESTING THE BOT ON WHATSAPP CHANNEL

After the deployment is done for the bot, the channel that is connected to the WhatsApp business API can be activated. The bot that is ready to be deployed on the channel is now connected to the part of the WhatsApp number that have the capability of business API activated.

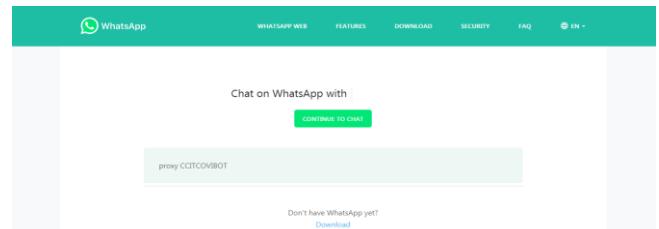


Fig. 4 Connecting the BOT from the deployed channel to the flow manager

F. PUBLISHING TO CHANNEL

Once, when the activation is completed successfully and the bot is published to the channel for the WhatsApp business number, it becomes simple for starting the communication and testing the bot for its applicability and results.



Fig. 5 Deployment and testing of the BOT on the WhatsApp channel

The bot that is developed with the help of this technology in this paper provides three basic functionalities that are very important, as per the current situation of global pandemic. This bot is capable for asking certain questions to the user based on his symptoms. The user is supposed to reply to all the answers and provide his input. Based on the feedback that is given as a text with the user inputs. The flow manager makes it processed with the natural language processing

engine and tries to provide a suitable solution or advice to the user.

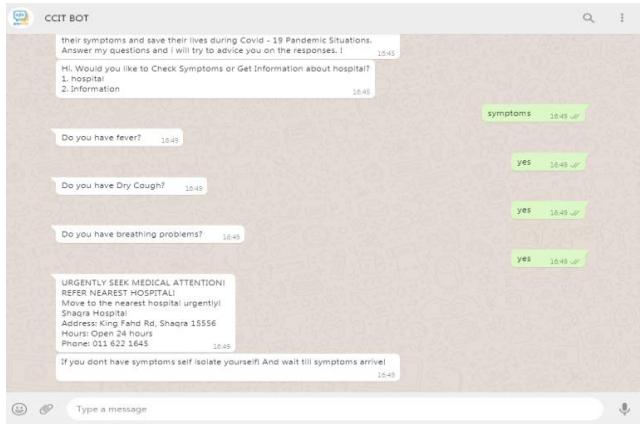


Fig 6. Responses from the Bot after the deployment and publishing to the WhatsApp channel

Based on the location of the user, the bot is able to decide the nearest healthcare facility for him and redirects him towards the address or locality. It is really necessary in this problem of global pandemic that a user can identify his or her symptoms and based on this can make the necessary first aid or initial response to save his life.

V. CONCLUSION

The creation of the bot that is depicted in the paper is done by a view keeping in mind to help the humanity and provide a mechanism that is sufficient to advise a common person without any financial obligation about his health. This initial idea can be generalized for a large number of diseases using the natural language processing engine and the power of artificial intelligence, along with WhatsApp business API. It is very important to make use of technology in Association with the healthcare so that the first aid and the first response on symptoms arising for any problem can save someone's life. It is very easy to collaborate for making various bot flows over different situations and difficult diseases that usually we deny and do not care of. A general person can use this WhatsApp based API bot and identify his ailments. This is just the beginning phase of the big system that can be generated for dozens of diseases around. For some common diseases, even the medical prescription or names of

medicines can be prescribed with the help of bots under medical supervision

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