iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** IX **Month of publication:** September 2021

DOI: https://doi.org/10.22214/ijraset.2021.38240

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue IX Sep 2021- Available at www.ijraset.com

Smart Medicare Chatbot Using Dialogflow and Support Vector Machine Algorithm

Sanika Dhavan
Computer Engineering Graduate, Mumbai University

Abstract: ***Chatbots or conversational user interfaces present a new way for individuals to interact with computer systems for assistance. A chatbot allows a user to simply ask questions in the same manner that they would address a human and it responds similarly. The technology at the core of the rise of chatbots is natural language processing (NLP). In medical domain, chatbots can perform prediction tasks which is possible today with advancements in AI, ML and Data Mining Techniques. As in today's world, the number of patients is increasing rapidly on daily basis with the change in lifestyle. Healthcare services face a huge challenge of supply-and-demand which can be fixed by creating chatbots. These platforms are very much necessary in order to automate medical consultations with or without the presence of a doctor accurately. Chatbots can be made using various tools such as Dialogflow, Microsoft Bot Framework, Telegram Bot API etc. Disease prediction can be done using algorithms such as KNN, CNN, ANN, SVM, Naïve Bayes, Decision tree etc. along with their respective domain specific datasets. Both can be integrated to build a conversational system to predict diseases efficiently.***
Keywords: Chatbot, healthcare services, supply and demand, automate, disease prediction, Dialogflow, SVM.

I. INTRODUCTION

After the rise of the web and mobile applications, virtual chatbot applications are the latest inventions of digital design and trending in this generation. A chatbot is basically an AI driven computer program that replicates human conversations as minutely as possible. They are also known as digital assistants that understand human capabilities by using natural language processing. Chatbots work by understanding what the user wants and links it to its relevant entities and accordingly responds back to the user. Once the analysis is done, an appropriate response is delivered to the user. Currently, chatbots are proliferating in every industry known to humans. The healthcare sector is closely associated with human interaction; hence it wouldn't seem plausible that conversational AI applications like chatbots could prove useful. However, hospital administrators spending their day in answering routine questions of patients is neither necessary nor productive. Such jobs can be easily done with chatbot applications.

Therefore, our proposed personal health system, Smart Medicare Chatbot, is used to assess the user's health status and based on the symptoms, it detects the presence or absence of heart disease. Since Heart disease is a common problem worldwide and there are many different forms of heart disease, therefore building a conversational chatbot that will be able to ask the patients their symptoms and or a report and analyze/ conclude whether or not they are suffering from heart diseases will be extremely beneficial for patients and users.

II. DESIGN METHODOLOGY

The System Working is as follows:

1) *Input Expression/Query:* The user inputs the data to the system. The data includes entries of some of the attributes of the Heart dataset like ECG, Blood Pressure, etc.
2) *Intent Matching:* For each agent, you define many intents, where your combined intents can handle a complete conversation. Dialogflow matches the end-user expression to the best intent in your agent.
3) *Webhook Request:* A Webhook is a way for an app to provide other applications with real-time information. You also need to set up a URL in your application that is accessible to you from the public web. Ngrok is server connected with the python program and is used to transfer data dynamically from python to dialogflow using ngrok server link.
4) *Data Mining Process:* This is the stage where the data is being processed inside the SVM algorithm. From the previous step with the integration of ngrok Webhook, the data coming from step 1 reaches to backend (python) and the dataset is inserted with this new incoming data for future references. The process further may include data pre- processing to filter data. Once the processing is done, the results will be given out as an integer valued either 0 (no presence of heart disease) or 1 (presence of heart disease).

©IJRASET: All Rights are Reserved

5) *Webhook Response:* This step does reverse operations as that of step 3. The output of step 4 is sent back using ngrok back to the Webhook server. The Webhook forwards this response back to dialogflow.
6) *Conversational response through Dialogflow:* Now Dialogflow has a simpler response to give back, i.e. answering whether the user is suffering from Heart Diseases or not. The chatbot is also provides information related to appointment booking and cardiologists. It can also provide heart care tips.

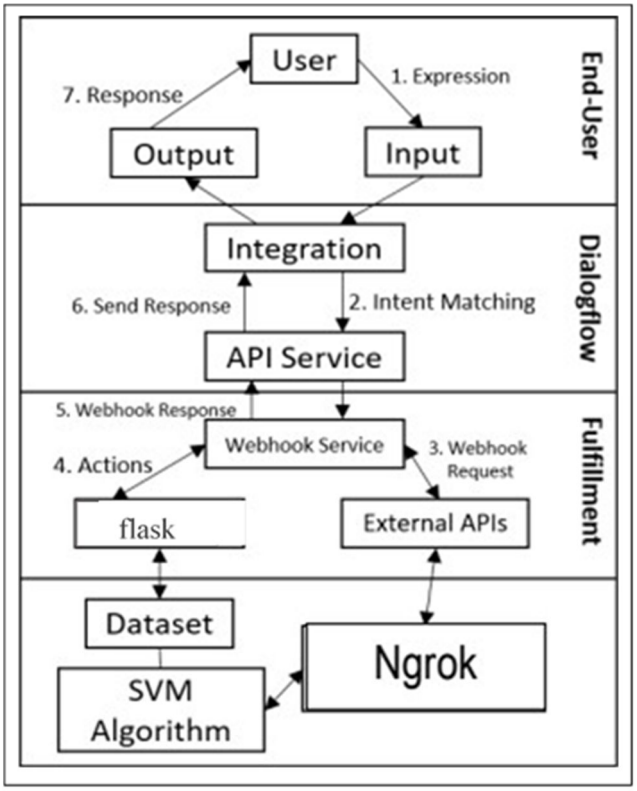


Figure 1: System Flowchart of Smart Medicare Chatbot

III. IMPLEMENTATION

The Heart Disease Dataset was referred from the UC Irvine machine learning repository. There are 9 columns in the dataset, which are described below. Here, target = 0 implies that the person is not suffering from a heart disease and target = 1 indicates that the person is suffering from a heart disease.

1) *Age:* displays the age of the individual whose record is taken.
2) *Sex:* displays the gender of the individual using the following format: 1 = male, 0 = female, 2 = other
3) Chest-pain type displays the type of chest-pain experienced by the individual using the following format:
   0 = Mild Chest Pain and slight limitation during ordinary activity
   1 = Chest pain during any activity. Comfortable only at rest
   2 = Severe Chest Pain. Experiences symptoms even while at rest
   3 = No Chest Pain
4) *Resting Blood Pressure:* Displays the resting blood pressure value of an individual in mmHg(unit)
5) *Cholesterol:* Displays the serum cholesterol in mg/dl (unit
6) *Fasting Blood Sugar:* Compares the fasting blood sugar value of an individual with standard values. If fasting blood sugar is greater than 120mg/dl then: the person will choose "true", else they'll choose "false"
7) *Resting ECG:* resting electrocardiographic results.
8) *Max Heart Rate Achieved:* Displays the max heart rate achieved.
9) *Diagnosis of Heart Disease:* Displays whether the individual is suffering from heart disease or not:

©IJRASET: All Rights are Reserved

0 = person is not suffering from a heart disease 1 = person is suffering from a heart disease

age	sex	cp	trestbps	chol	fbs	restecg	thalach	target
57	1	2	150	126	1	1	144	1
57	1	0	130	131	0	1	195	0
44	0	2	108	141	0	1	126	1
49	1	2	118	149	0	0	174	0
71	0	0	112	149	0	1	153	1
41	1	1	120	157	0	1	155	1
45	0	1	112	160	0	1	142	1
62	0	0	160	164	0	0	162	0
61	1	0	138	166	0	0	179	0
40	1	0	110	167	0	0	158	0
57	1	2	150	168	0	1	103	1
44	1	0	120	169	0	1	186	0
41	1	0	110	172	0	0	160	0

Figure 2: Dataset

A. Training the Chatbot

In Dialog flow, an agent for the project named 'Medicare Chatbot' was created and the following intents were created & used for this project.

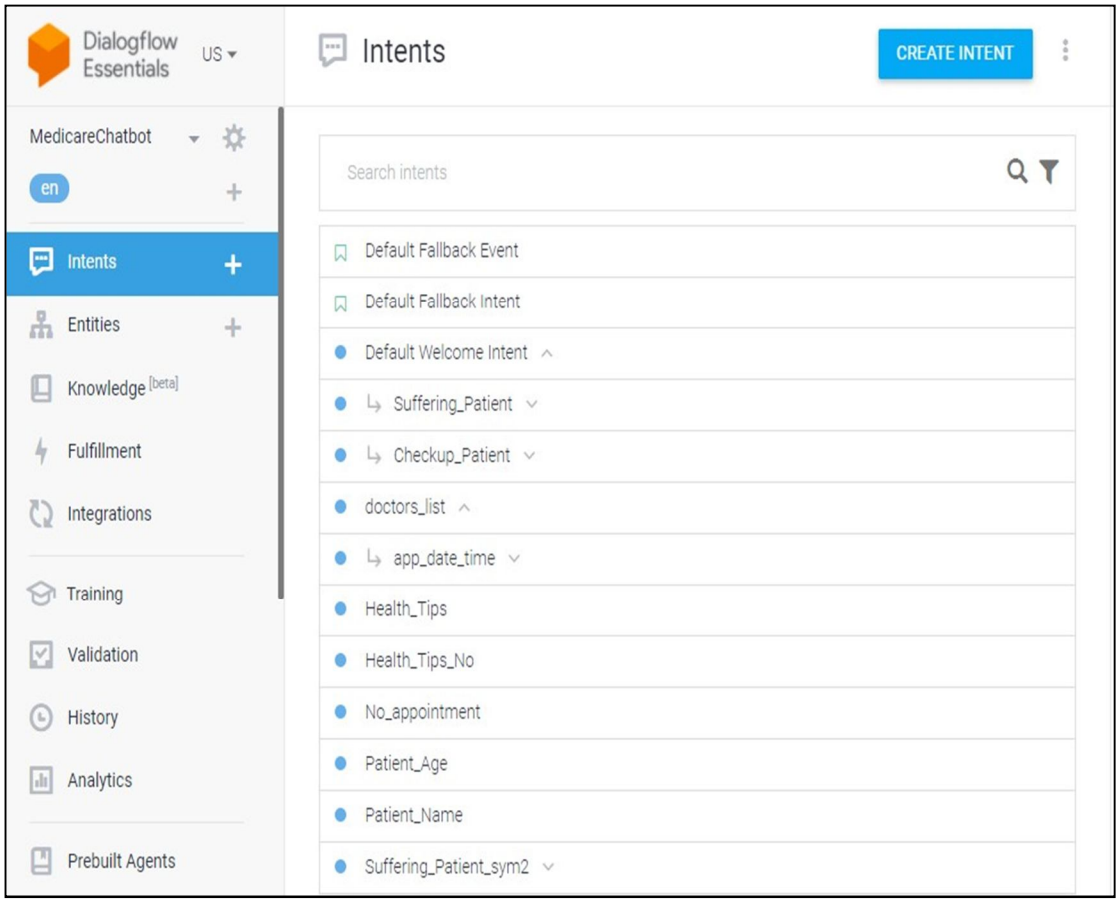


Figure 3: Dialogflow Intents

©IJRASET: All Rights are Reserved

For every Intent, there consists of Contexts, Training Phrases, Actions & Parameters, and Responses. The flow of a conversation is controlled by the context. Contexts for an intent can be configured by setting input and output contexts, which are identified by string names.

Figure 4: Dialogflow Contexts

Training phrases are example phrases for what end-users might type or say, referred to as end- user expressions.

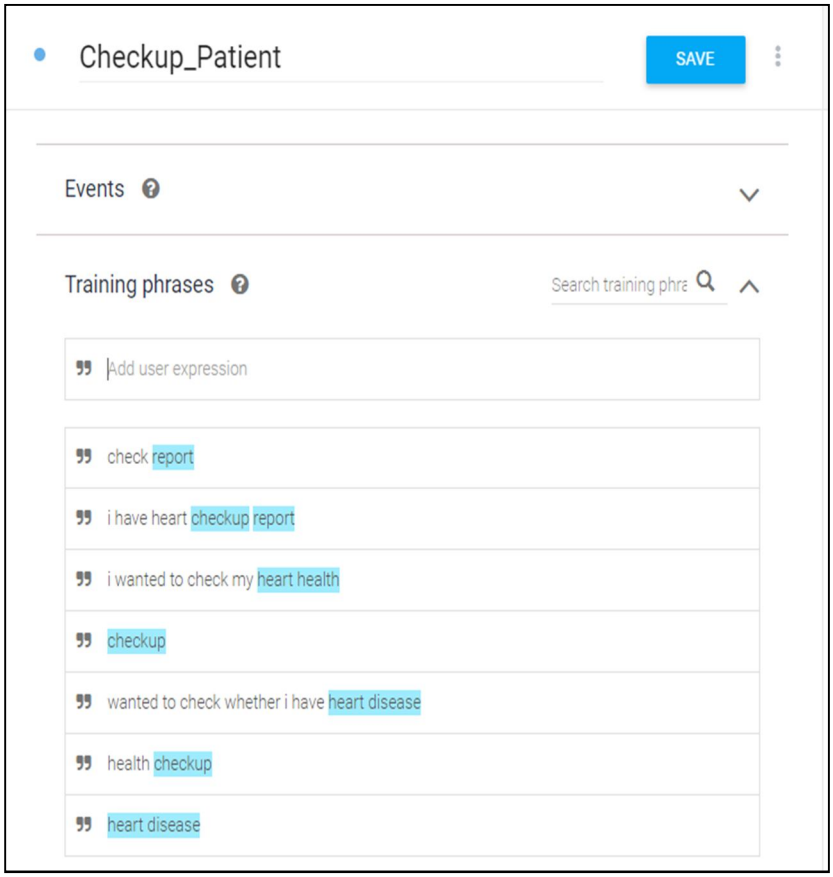


Figure 5: Training Phrases

©IJRASET: All Rights are Reserved

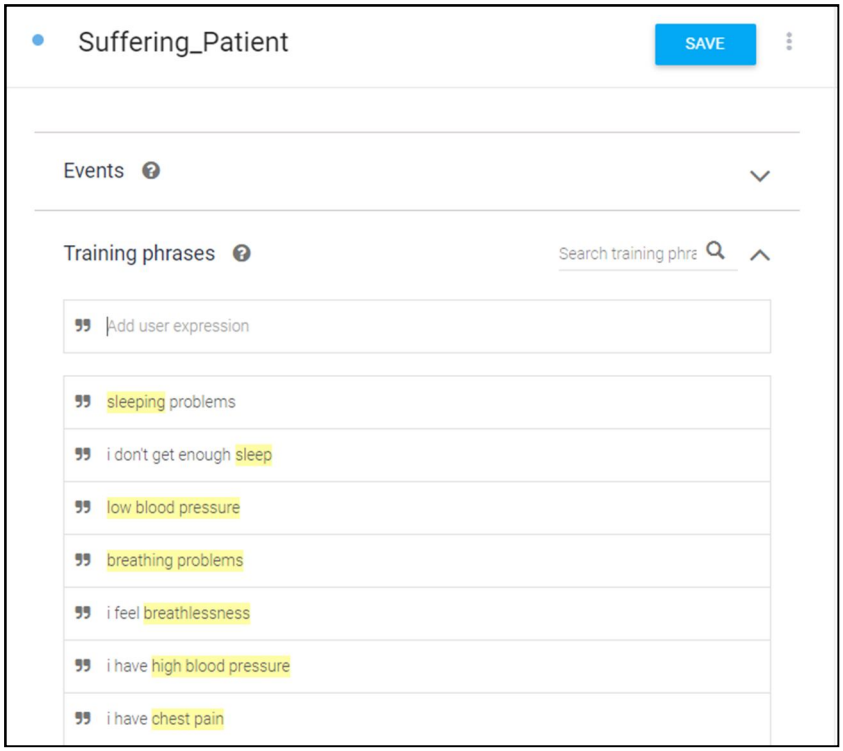


Figure 6: Patient Training Phrases

Intents have a built-in response handler that can return responses after the intent is matched. In cases where your code needs to take some action or build a more dynamic response.

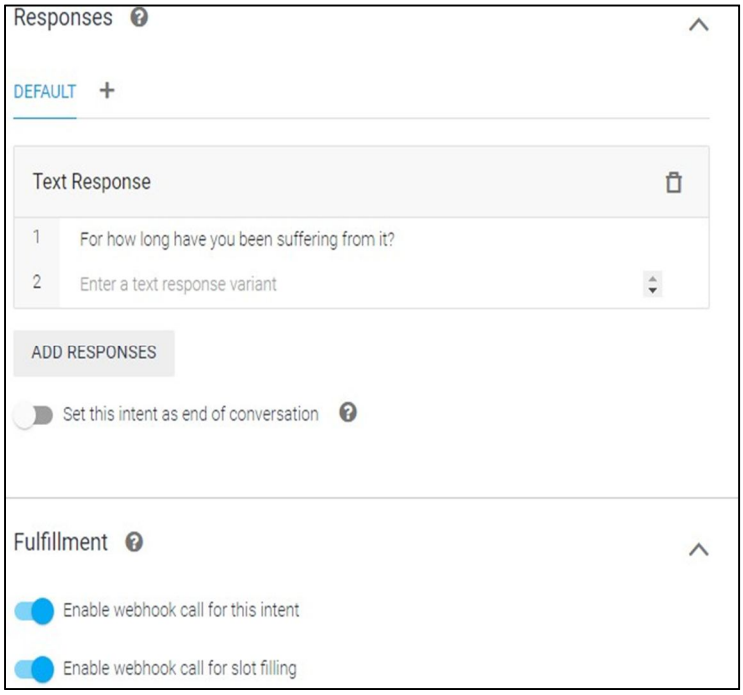


Figure 7: Text Responses and Fulfillment Enabled for the Intent

©IJRASET: All Rights are Reserved

Each intent parameter has an entity type which dictates exactly how data from an end-user expression is extracted.

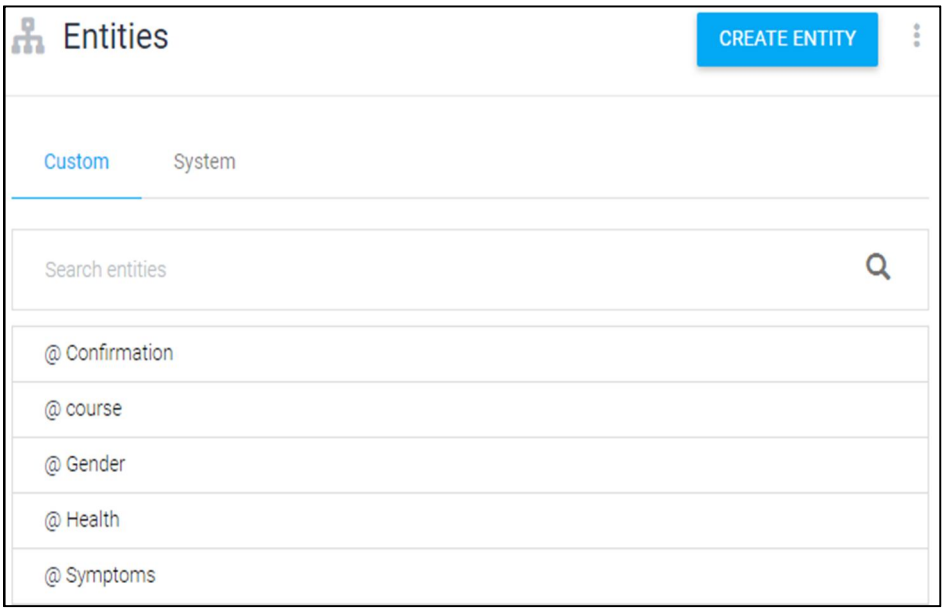


Figure 8: Dialogflow Entities

Dialogflow integrates with many popular conversation platforms like Google Assistant, Slack, and Facebook Messenger. Dialogflow Messenger provides a simple text chat user interface for your agent. The Auto Generated code is to be pasted in the HTML file (Chatbot.html).

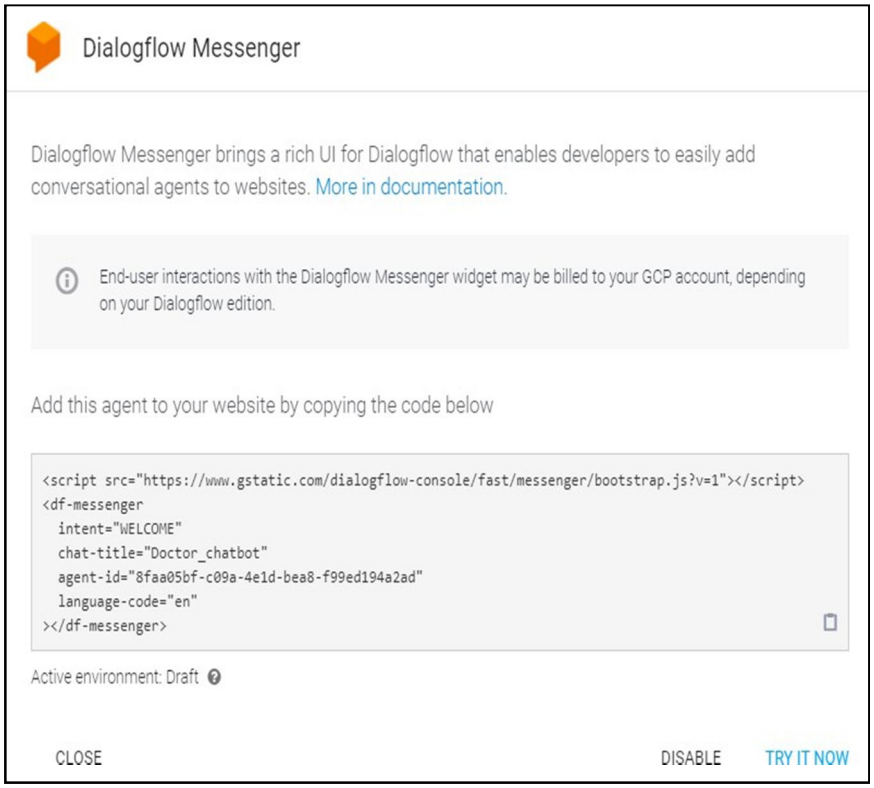


Figure 9: Integration of Dialogflow on Webpage

©IJRASET: All Rights are Reserved

IV. RESULTS

Dialogflow medicare agent is trained for all the required intents and integrated on the web page to provide 24/7 online heart consultancy to the users. This chatbot is mainly designed to predict if the person is suffering from a heart disease or not and to generate a report based on the symptoms of that individual.

In this project, we have divided the data into a 7:3 ratio. That is, the training size is 70% and testing size is 30% of the whole data. In order to do this, we first have to split the target (attribute) set from the rest of the dataset attributes so that we can build Training & Test sets. The classification models such as SVM, Naïve Bayes, KNN and Decision Tree were used to compare the accuracy using the heart disease dataset and the SVM model was chosen as it provided the best accuracy. We were able to evaluate the performance of our classification model using the following performance evaluation metrics and these were the results obtained:

Accuracy: 0.824

Precision: 0.843

Recall: 0.843

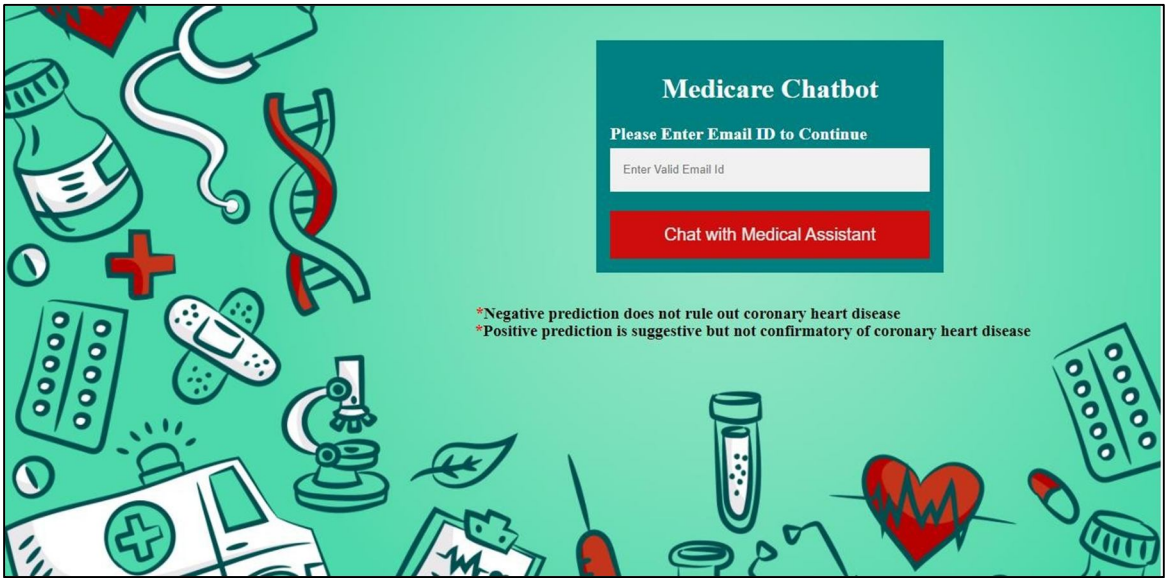


Figure 10: Homepage Output

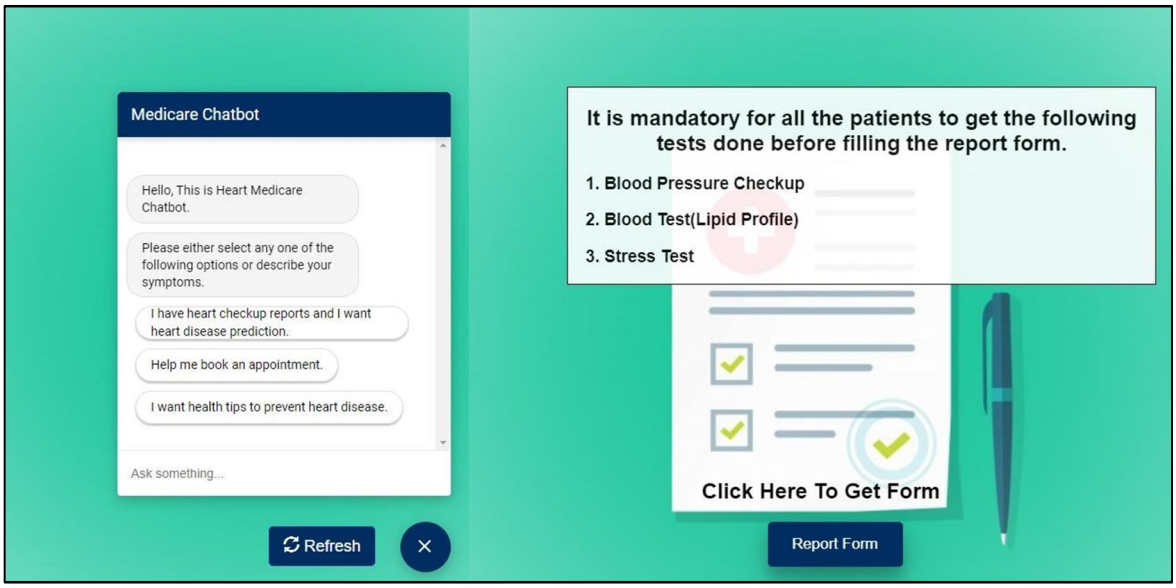


Figure 11: Main Page having Chatbot & Form

©IJRASET: All Rights are Reserved

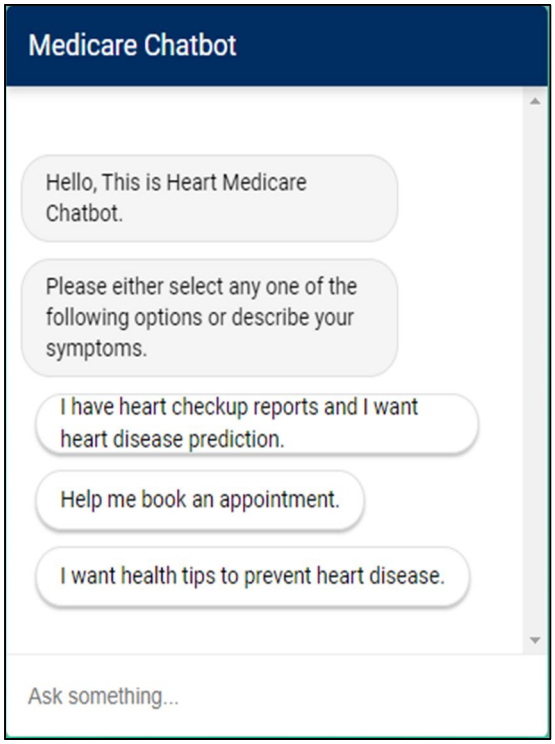


Figure 12: Chatbot Screenshot 1

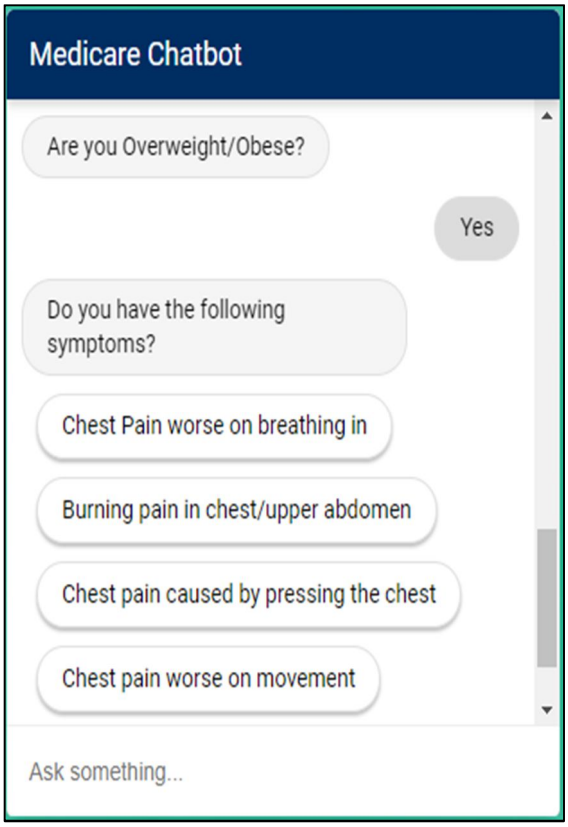


Figure 13: Chatbot Screenshot 2

©IJRASET: All Rights are Reserved

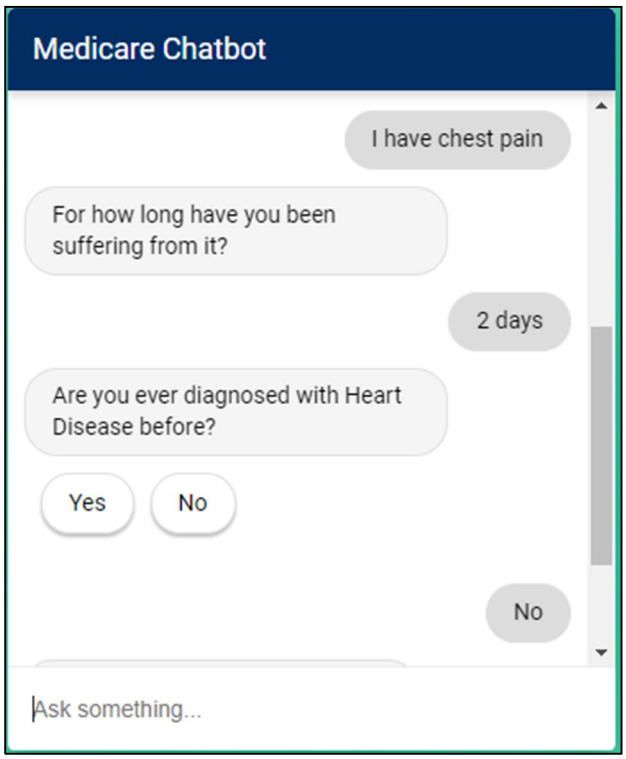


Figure 14: Chatbot Screenshot 3

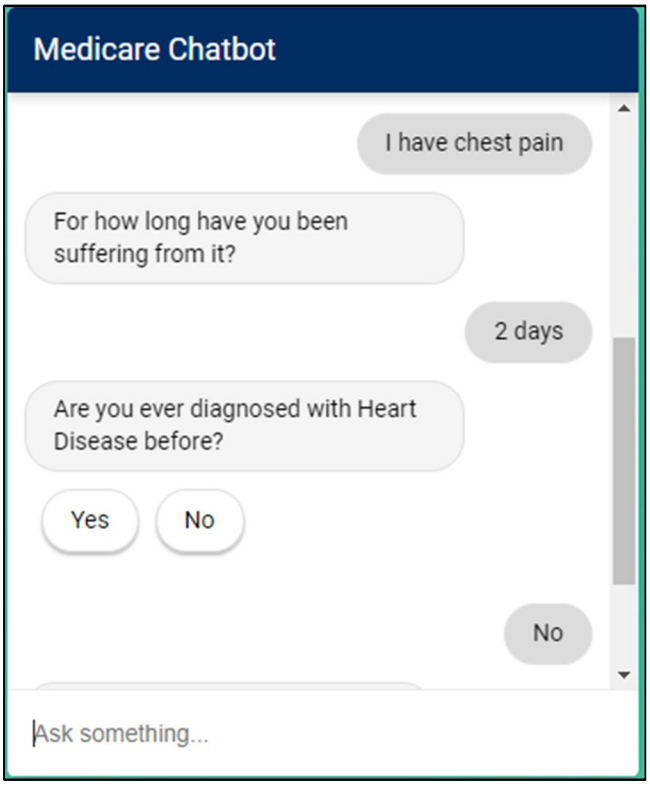


Figure 15: Chatbot Screenshot 4

©IJRASET: All Rights are Reserved

When the chatbot asks you to fill the report, it is compulsory to enter your name, age and gender, as these parameters are part of the dataset. The input data required to fill in the report are attribute values of the heart disease dataset.

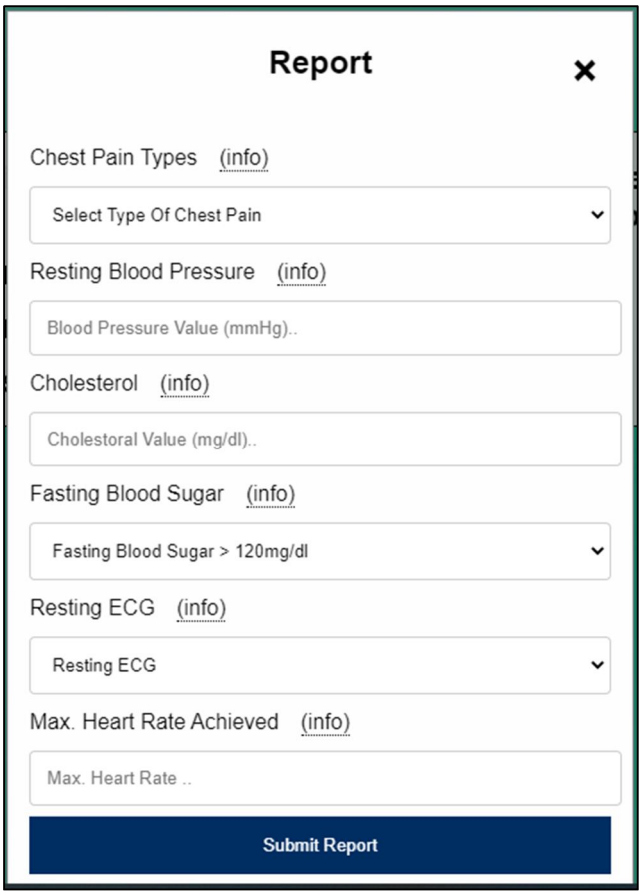


Figure 16: Chatbot Screenshot 5

Figure 17: Form Submission Success Message

©IJRASET: All Rights are Reserved

The chatbot will then give the summarized report to the user predicting whether the user has a heart disease or not.

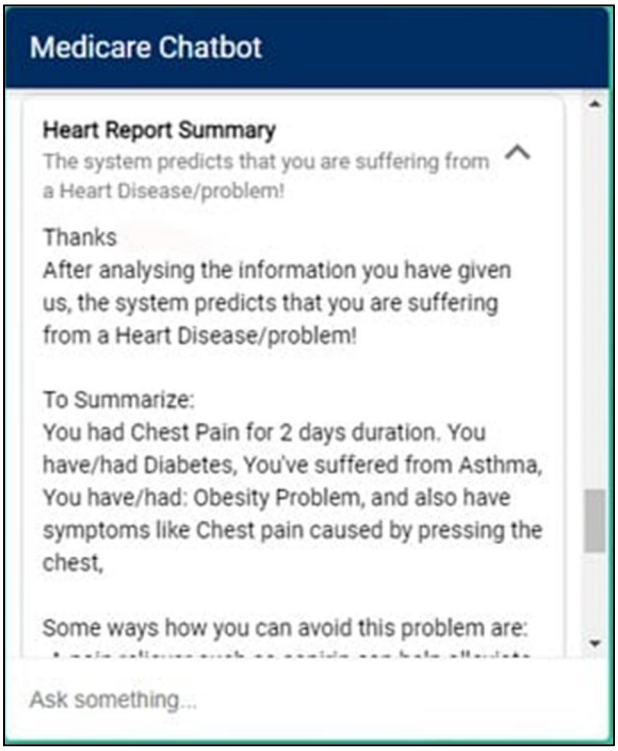


Figure 18: Final Heart Report Summary

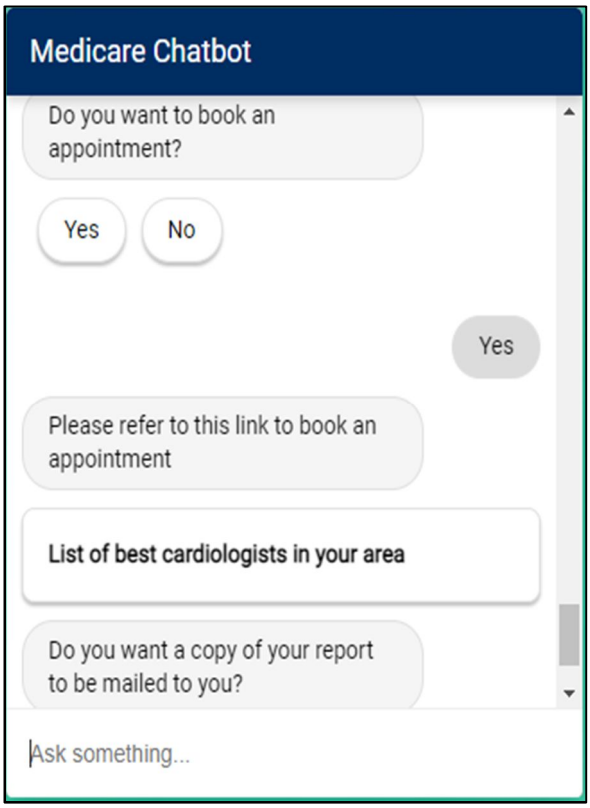


Figure 19: Chatbot Screenshot 6

©IJRASET: All Rights are Reserved

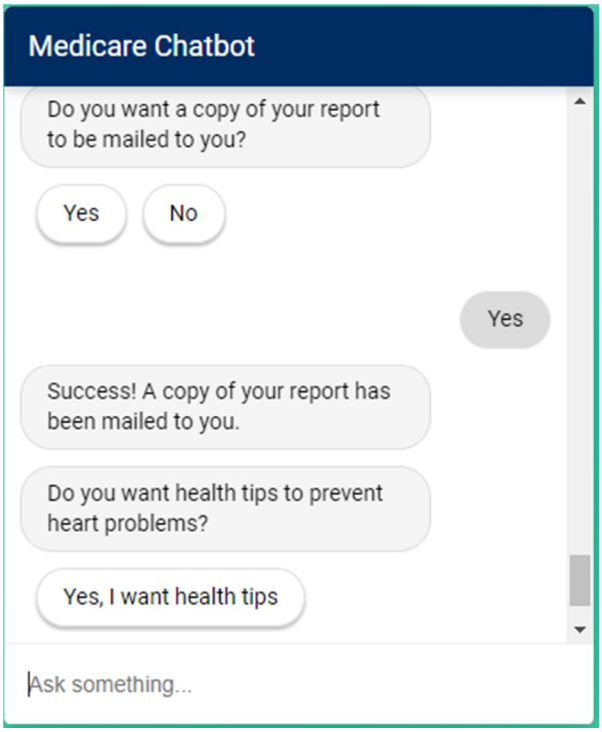


Figure 20: Chatbot Screenshot 7

The user (registered with a valid email-id at the start), will receive a copy of the report on the mail.

Figure 21: Confirmation Email to the User

©IJRASET: All Rights are Reserved

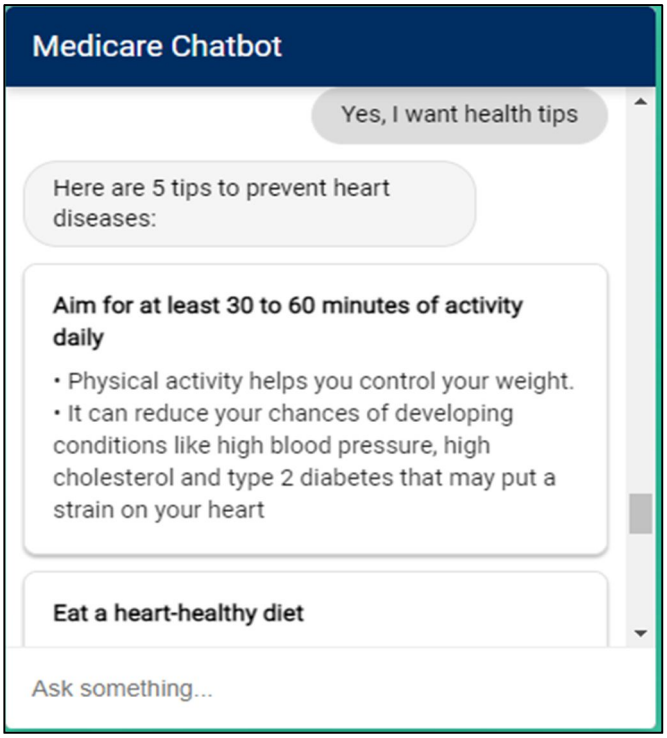


Figure 22: Chatbot Screenshot 8

V. CONCLUSION

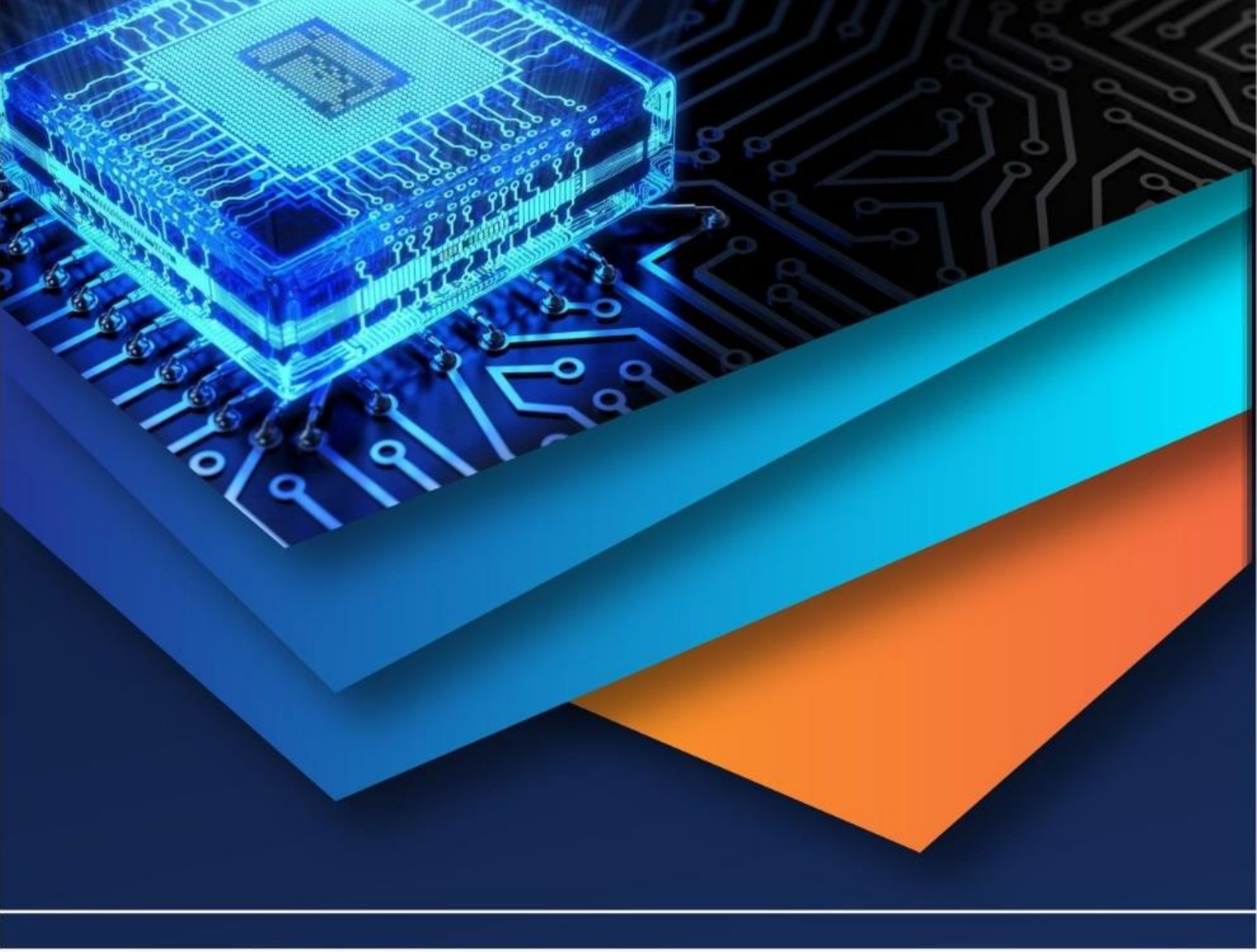
The main objective of this system is to detect & predict the presence or absence of a heart disease and generate a report for the same with the best possible accuracy. Dialogflow medicare agent is trained for all the required intents and integrated on the web page to provide 24/7 online heart consultancy to the users. From the surveys conducted on various predicting algorithms like KNN, ANN, SVM, Naïve Bayes, Decision tree etc., it was found that Support Vector Machine algorithm on a Heart Disease Dataset gives the best possible accuracy. Using this technology, the medicare chatbot is built which can get the patient reports, analyze it and conclude whether he/she is suffering from heart diseases or not. The process is done in a conversational manner using Dialogflow Platform. This healthcare bot system will help hospitals and medical centers to provide medical support online 24 x 7.
Expected benefits to the target audience are:

A. They can get immediate access to heart health care facility free to access from anywhere.
B. Patients need not wait in a queue to consult doctor to know their heart health, saving time of both.
C. Earlier diagnosis may be affordable then later diagnosis. The proposed system helps in early diagnosis.
D. It may reduce the travelling cost and time as the application provides 24x7 online help.
E. Doctors can get more clients online.

REFERENCES

[1] Engineering@ZenOfAI , Creating Chatbot with Webhooks Using Python (Flask) and DialogFlow, 2019
[2] Adil Hussain Seh,, Pawan Kumar Chaurasia, "A Review on Heart Disease Prediction Using Machine Learning Techniques", in ijmra ,Vol. 9 Issue 4, April2019.
[3] Mrs. Rashmi Dharwadkar1 , Dr.Mrs. Neeta A. Deshpande," A Medical Chatbot", in International Journal of Computer Trends and Technology (IJCTT) – Volume 60 Issue 1- June 2018
[4] Mrs. S. Radhimeenakshi; "Classification and prediction of heart disease risk using data mining techniques of Support Vector Machine and Artificial Neural Network"; 978-9-3805-4421- 2/16/$31.00 ©2016 IEEE, 2016
[5] SUPPORT VECTOR MACHINES(SVM) – Explore AI https://ai538393399.wordpress.com/2021/02/08/support-vector-machinessvm/
[6] Heart Disease Data Set - UCI Machine Learning Repository; https://archive.ics.uci.edu/ml/datasets/Heart+Disease/
[7] Dialogflow Documentation- Google Cloud; https://cloud.google.com/dialogflow/docs

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)