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DIETICIAN CHATBOT

A.Sudeshna, Ch.Sravanthi, K.Tejaswi, Mr.Rajasekhar Sastry,
Dr.B V RamanaMurthy and Mr.C Kishor Kumar Reddy.
Stanley College of Engineering and Technology for Women, Hyderabad

ABSTRACT

Artificial Intelligence chatbot is a technology that makes interaction between man and machine using natural language possible. In this paper, we proposed the architectural design of dietician or virtual dietician, a chatbot that will function as virtual dietician for an average person. The architectural design will allow the dietician chatbot to response to the whole conversation as it is specifically designed to be a dietician bot. This artificial intelligence bot suggests diet plan for an average person. It acts as a diet consultant similar to a real dietician. The bot asks the person to enter the day for which he needs the diet plan. When the user enters the day, the bot will display the diet plan and asks for the alternatives, if yes it displays the alternative for the day.

Keywords *: Artificial Intelligence, virtual dietician, architectural design.*

1. INTRODUCTION

Artificial Intelligence is an approach to make a computer, a robot, or a product to think how smart human think. AI is a study of how human brain think, learn, decide and work, when it tries to solve problems. And finally this study outputs intelligent software systems. The aim AI is to improve computer functions which are related to human knowledge, for example, reasoning, learning, and problem-solving. The intelligence is intangible. It is composed of reasoning, learning, problem solving, perception, linguistic intelligence. The objectives of AI are reasoning, knowledge representation, planning, learning, natural language processing, realization, and ability to move and manipulate objects. There are long-term goals in the general intelligent sector. Approaches include statistical methods, computational intelligence, and traditional coding AI. During the AI research related to search and mathematical optimization, artificial neural networks and methods based on statistics, probability, and economics, we use many tools. Computer science attracts AI in the field of science, mathematics, psychology, linguistics, philosophy and so on.

Chatbots come in two main varieties: those based on fixed rules and those based on machine learning. The former only respond to specified commands, and they only display a fixed level of smartness. Give this kind of bot a command that it doesn't understand language, and it won't know what to do. It does not get any smarter with more interactions or information. The second type of chatbot incorporates artificial intelligence, the ability to understand language, not just commands, and the capacity to learn. This technology has led to intelligent chatbots that can discover new patterns and get smarter as they encounter more situations. Put simply, a chatbots job is to receive input data, interpret it, and translate it into a relevant output value. Upon receiving the input data, it must analyze and contextualize in order to determine the appropriate "reaction" to whatever prompt it has received.

The artificial dietician is a bot with artificial intelligence about human diets. It acts as a diet consultant similar to a real dietician. Dieticians are educated with nutrient value of foods. A dietician consults a person based on his schedule, body type, height and weight. The system too asks all this data from the user and processes it. The bot asks the user to enter the day for which he needs the diet plan. When the user enters the day, the bot will display the diet plan and asks for the alternatives, if yes it displays the alternative for the day.

The rest of the thesis is organized as follows: chapter-2 depicts the relevant work on chatbots and dietician chatbot. Chapter-3 proposes the dietician chatbot. Chapter-4 discuss the procedure and implementation.Chapter-5 concludes the thesis followed by references.

2. LITERATURE SURVEY

Health and fitness are two extremely dominant terms in the modern world and one thing is abundantly clear. There are endless lists of diet types and exercise plans and weight loss tips provided by several applications. And this was perhaps partly because of the increasing amounts of people struggle with diet and weight based issues and obesity is more deadly than ever in the whole world [1]. This is an indication of the endless amount of people looking for solutions, ideas and plans to improve their health and fitness or simply seek out new diets, change up the way they eat or purse a healthier lifestyle. To determine a bot can function as a personal trainer or health and fitness advisor, we should test it against some criteria. The study suggested more of work on the improvement of natural language generation algorithms to enrich the functionality and humanness of the virtual coach. Research in persuasive technologies and the associated application to change an attitude or behaviour in a predetermined way is showing the potential to assist in improving healthy living, reduce the costs on the health care system, and allow the aged to maintain a more independent life. Embedding persuasive techniques in chatbot behaviour can enhance the bot efficiency in behaviour change. A work by Shawar [2] described a software to machine-learning conversational patterns from a transcribed dialogue corpus to generate chatbots speaking various languages. The work presented a program to learn from spoken transcripts of the Dialogue Diversity Corpus of English, the Minnesota French Corpus, the Corpus of Spoken Afrikaans, the Qur'an Arabic-English parallel corpus, and the British National Corpus of English. Designing patterns for specific domains is essential to increase the possibility that the chatbot can achieve the goal set. Therefore, focusing on the context, content, user-bot interaction and adapting pattern matching techniques to design sophisticated user-bot conversations can enhance the task accomplishment [3].

Logical Flow: Conversation interfaces can provide the opportunity for the user to state what he/she wants to do in his/her own terms, just as he/she would do to another person, and the system takes care of the complexity [4]. The chatbot should have logical thinking that fits with its domain, tasks and behaviour. Users expect the bot to remember information such as their name or topics already covered in conversations. Moreover, they expect more flexibility in terms of interaction-multiple feedback options and more free speech. Finally, they expect the bot to be intelligent and reason about the situation and interaction paradigm. We illustrate a logical conversation flow between the user and a pizza ordering chatbot.

Bot: You can select pizza pepperoni, pizza margarita and pizza with veggies. What is your choice ?

Human: I want pizza pepperoni

Bot: 1 pizza pepperoni, cool, now tell me the size (small, medium, large) ?

In this scenario the bot asks more details to confirm the users order. The user basically responds to various chatbot questions. Although this example is short, it does show many of the key issues that need to be dealt with in a question-based practical dialogue.

Pattern-matching

For each level, a pattern-matching process will be done in order for ViDi to detect keywords from patient's input data. Several steps need to be done in the process and the steps are as follows:

- Receive input data from patient.
- Convert all alphabets into lower case.
- Separate words from sentence by dot ".", comma"," and space " ".
- Put all words into an array.
- Create an array of possible input to be match (sentence, phrase and words).
- Matching the array to "keywords" database one-by-one starting from the full sentence until for the each words (note that matching will based on level where the conversation is located).
- Exit all loop if matching were found.

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The total possible input to be match is calculated by the Triangular Number equation, as given.

- m = Variable for matching
- n = Total words in input data

$$T_n = \frac{n(n+1)}{2} = \sum m$$

3. PROPOSED CHATBOT

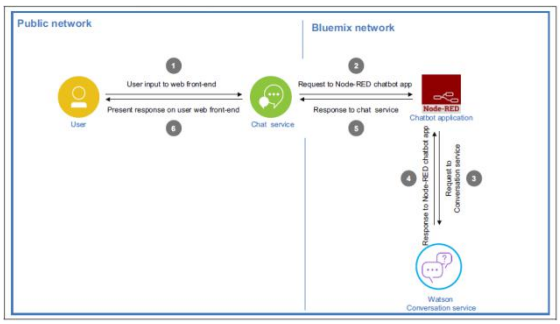

Figure 1: architecture

Notice that the flow shown in the figure represents one loop of a conversation, therefore this cycle repeats several times during a conversation:

The user sends a message to the web front-end (chat service).
The chat service (for example, Slack, Facebook Messenger, web app) determines whether the message is for the Help Desk Assistant chatbot application. If the message is for the chatbot, then the chat service sends the message to your chatbot application (Node-RED).
Your application parses the message and sends the filtered message to the Watson Conversation service for processing.
The Watson Conversation service processes the message and provides a response.
The response is received and filtered by your application, which then sends the response to the chat service.
The chat service identifies that the inputs are from the Help Desk Assistant chatbot and presents the message as a response from the chatbot to the user.

Project structure

These are the components you use in this use case:

A Node-RED instance that is created in Bluemix, which is cloud-based, so installing software, is not necessary.

A Watson Conversation service instance.

A team space in Slack, which is the cloud collaboration tool that provides the chat service in this use case.

Create the Help Desk Assistant chatbot application flow with the Node-RED flow editor

Now you can start to create flows. You use the Node-RED flow editor to add nodes and values and create and *wire* (connect) the flows:

Click **Go to your Node-RED flow editor**

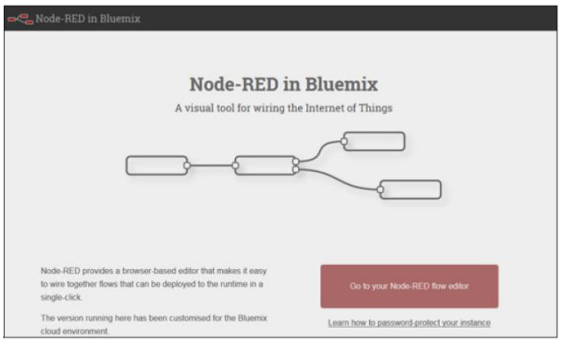

Figure 2: open the node-red flow editor

The Node-RED flow editor opens. The panel on the left shows a palette of nodes. You can drag nodes to the workspace and connect them together (wire them) to create an application. After dragging a node to a workspace, you can double-click the node to open the *Edit* (configuration) dialog to provide values for the node.

Figure 3: node-red flow editir workspace

In the next steps, drag the following nodes to the workspace, add values as shown in the figures of each step, and then click **Done**:

http *input* node : This node will receive the text that the user submits to the Help Desk Assistant chatbot. Edit the node and add these values:
Method is the method used to receive the data, POST in this example.
URL is the last part of the URL (the first part is the route to the Node-RED application as shown in figure. Enter /watson-chatbot for this example. You can customize this value as desired. Just remember that it should always start with a forward slash character.

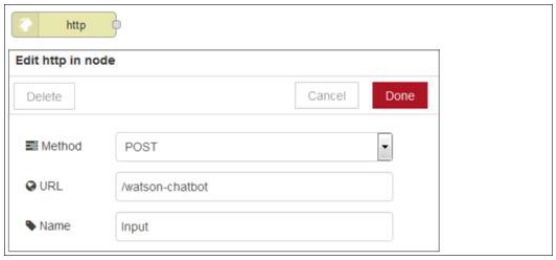

Figure 4: edit http in node

debug node: This node displays the message info (for example, Slack user_id, token, and text) received from Slack. You configure and integrate Slack components later in the chapter.

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In fact, every time that a user submits text to the Help Desk Assistant chatbot, you can see the information received on the debug panel (at the right of the window). This data is important for troubleshooting and analysis of the flow.

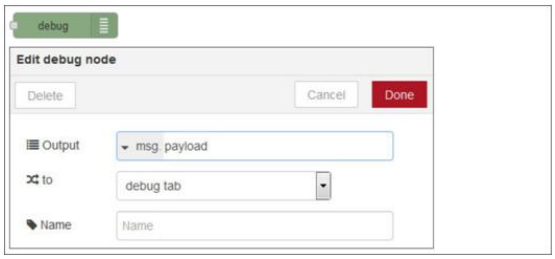

Figure 5: edit debug node

switch node (Figure 4-31 on page 128): This node is a filter to avoid unauthorized users from using the chatbot.Add two rules as shown in Figure , which will create two outputs on the node. The token to be pasted in the rule will be created and copied in steps.
This node routes messages based on the value of the payload. When a message arrives, this node checks the value of the Slack token (contained in payload.token) against the values configured in this node. If a match is found then the flow goes to the first output (to continue the flow), otherwise the flow goes to the second output (to exit the flow).

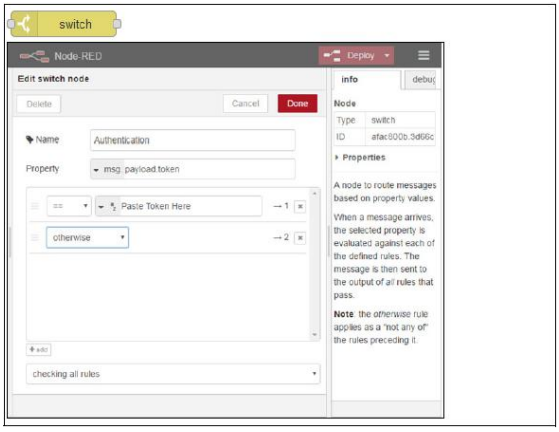

Figure 6: Edit switch node

function node: This is the *first* function node you use. Every time a user sends a question to the Help Desk Assistant chatbot, some metadata will be submitted with the text, so this function filters the data to send only the user text to the Conversation service. This example queries just the text from the payload. Be sure you enter the same information as shown in the figure.

Figure 7: Edit function node

conversation node: Here you add the Conversation service and interconnect it to your chatbot application. *Before you can edit the conversation node*, you must gather the credentials and workspace ID as described in the steps.

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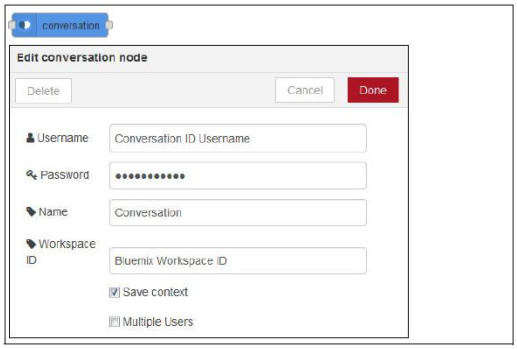


Figure 8: Edit conversation node

Gather the information needed to fill out the values in the conversation node:

In another window, open the Bluemix Dashboard, find the Conversation service instance you created, "Creating a Watson Conversation service instance" and click to open it (shown in figure).

Select **Service Credentials** and click **View Credentials**. If you do not yet have any listed credentials, click **New Credential** to create one.

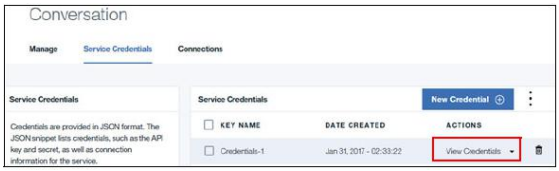


Figure 9: Watson Conversation credential.

Copy the Username and Password values and paste them in the Node-RED conversation node, as shown in the Edit conversation node window.

Click the **Manage** tab and click **Launch tool** to open the Conversation workspace.

Find the Chatbot workspace, click the three vertical dots icon and select **View details**.
From the details, copy the Workspace ID and paste it in the Node-RED conversation node, as shown in the Edit conversation node.
function node : This is the *second* function. It will filter all the output from the Conversation service and send only the response in the format needed.
Add the values shown in Figure.

Figure 10: editing function node

http response node : This node takes the response from the Conversion service and sends it back to the chat service (Slack). Add two instances of this node (one for each flow). The configuration for both nodes is the same as shown in Figure.

Figure 11: Edit http response node

Configure the Help Desk Assistant chatbot application in Node-RED

Now you can connect and configure all the nodes that you dragged to the Node-RED workspace.

Connect the modules. To connect each module, click the small grey connector on the edge of the node and drag it to the desired node.

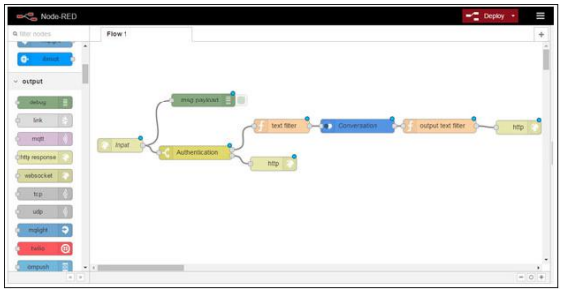


Figure 12: Connecting the required nodes for the application

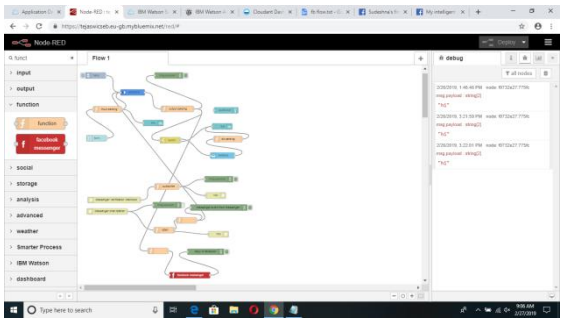


Figure 13: our node-red formation

4. RESULTS AND DISCUSSION

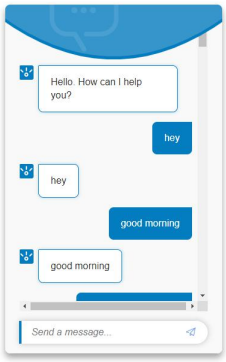


Figure 13: Welcome message

In the IBM Watson assistant we can create our own assistant .The assistant responds in the following manner. Firstly the greetings are given to the assistant bot when we open the preview link it directly gives that hello how

can I help you. Then we need to give the input as how can you help me. Then the bot replies I can show you a week diet plan and its alternatives by entering for which day you need a diet plan. Then we need to give the input as show me today's diet then it replies as to enter the day to show the diet. Then we have to enter the day and it shows the diet on the specific day by giving an image, description and then it simultaneously asks do you want any alternatives. When we give a reply with yes then its shows alternatives on that particular day and if the input is no then it ignore showing alternatives of the diet.

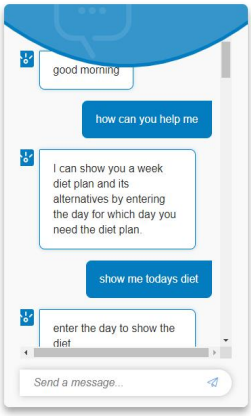
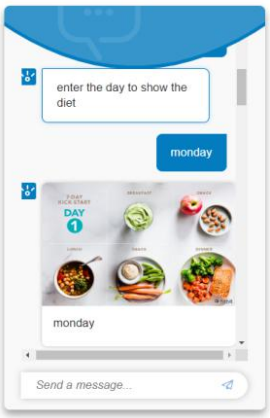
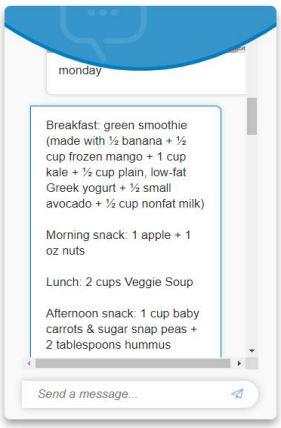


Figure 14: Output for first question

We need to enter the day for which we need a diet plan. The bot gives the diet plan on that day and asks for the alternatives. When we reply with yes then it also gives its alternatives on that day. If we ask directly alternatives mentioning specific day then the bot directly replies with the alternatives on the given day.





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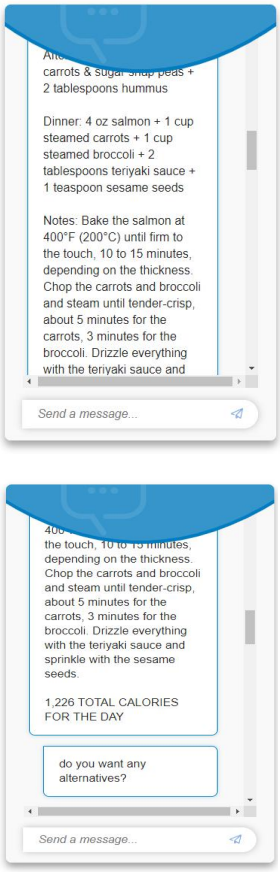

Figure 15:output for second question

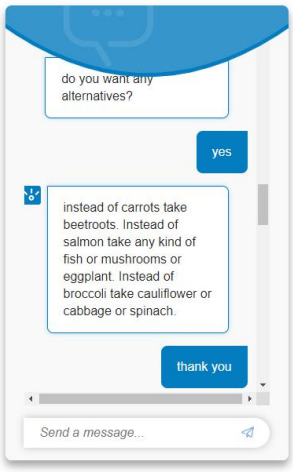

Figure 16:Output for third question

5. CONCLUSION

The use of chatbots within the field of health promotion has a large potential to reach a verified group of people. This paper described the background and motivation for chatbot system in the context of healthy diet recommendation. It also described architectural design of the dietician bot. This bot gives the diet plan for a week to an average person. During the conversation between the user and the bot, the bot will respond according to the question asked by the user. For example, if the user enters the day, the bot will display the diet plan simultaneously it will ask for alternatives if the user wants or not. Instead of consulting a dietician directly this

virtual dietician helps us without any hesitation and paying a high of cost. User can access to this bot as much they want and the user also may not hesitate to enquire the diet plan. Hence this dietician chatbot is a virtual dietician which is easily accessible for the user.

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