Dietbot - Diet Recommending Chatbot

Dr. Dipti Patil[1], Surekha Iyer[2], Pooja Mehta[3], Deesha Gavand[4]

[1]*Professor, Department of Computer Engineering, Universal College of Engineering, Mumbai, India*

[2,3,4]*Student, Department of Computer Engineering, Universal College of Engineering, Mumbai, India*

Abstract - **Inadequate and inappropriate intake of food is known to cause various health issues and diseases. Due to lack of concise information about healthy diet, people have to rely on medicines instead of taking preventive measures in food intake. Therefore, a user-friendly conversational agent like chatbot can be implemented for better user interaction which can give solutions to people's common questions like 'what are some healthy meals to have in breakfast, lunch and dinner?', 'how much calorie should be consumed in a day?' and many more questions related to individual's health. This system attempts to build user's health profile and stores it in database and recommends food and diet with consideration of the health profile constructed. Also, one can check and calculate their BMI count, ideal body weight and calorie count/consumption based on their information. It is a personalized interactive food recommendation system.**

Index Terms - **Chatbot, Diet, Natural Language Processing, Prediction mode, Recommendation, Rasa NLU.**

I.INTRODUCTION

Good nutrition is an important part of leading a healthy lifestyle. Combined with physical activity, your diet can help you to reach and maintain a healthy weight, reduce your risk of chronic diseases (like heart disease, diabetes and cancer), and promote your overall health. Your food choices each day affect your health — how you feel today, tomorrow, and inthe future.

World Health Organization states that –A healthy diet is essential for good health and nutrition.

Eating a variety of foods and consuming less salt, sugars and saturated and industrially produced trans-fats, are essential for healthy diet.

A healthy diet comprises a combination of different foods. These include:

- Staples like cereals (wheat, barley, rye, maize or rice) or starchy tubers or roots (potato,yam, taro or cassava).
- Legumes (lentils and beans)
- Fruit and vegetables.
- Foods from animal sources (meat, fish, eggs and milk).

II. LITERATURE SURVEY

- This paper discloses a virtual conversational method and system to relieve the psychological stress of adolescents. This Chatbot will allow a user to simply ask questions in the same way that they would address a human. The technology at the core of the proposed chatbot is Natural Language Processing ("NLP"). [1]
- This paper presents review of the categories of recommender systems and different recommendation methods that are mainly classified into three categories: collaborative filtering, content-based filtering and hybrid filtering. This paper also discusses advantages and disadvantages of recommendation methods. Each method has its strengths and weaknesses that relate to the domain.[2]
- This paper proposes the mechanism of creating knowledgeable chat application which cannot permit the user to send inappropriate or improper messages to the participants by incorporating the bottom level implementation of natural language processing (NLP).[3]
- The authors have successfully explained and demonstrated different features of this framework like conversational flow, complex tasks, implementation of NLU, etc. [4]
- In this paper the authors have successfully explained Rasa NLU and Rasa Core, which are open-source python libraries for building conversational software.[5]
- The paper states that Chatbots are an intelligent system being developed using artificial intelligence (AI) and natural language processing (NLP) algorithms. It has an effective user interface and answers the queries related to

examination cell, admission, academics, users' attendance and grade point average, placement cell and other miscellaneous activities.[6]

- It states that content-based recommendation systems recommend an item to a user based upon a description of item and a profile of the user's interests. While a user profile may be entered by the user, it is commonly learned from feedback the user provides on items [7].

- The goal of this paper is to explain the role components play in the Rasa NLU pipeline, and also to explain how they interact with each other. The NLU pipeline defines the processing steps that convert unstructured user messages into intents and entities.[8]

III. METHODOLOGY

Dietbot uses a chatbot as the interface agent between the system and the user. The interaction of the user with the system and input of responses takes place via the chatbot. Once the user logs in into the system, the chatbot interface is made available which performs the task of asking relevant questions to the users to get the required information from the users such as the age, weight, height, amount of physical activity and any specific health conditions. The textual responses from the users are pre-processed and Natural Language Processing techniques are used to process the user responses and extract the relevant information from the responses obtained which can be provided to the developed model. The age, height and weight values help the system to calculate user specific values such as Body Mass Index (BMI), Basal Metabolic Rate (BMR) and Total Daily Energy Expenditure (TDEE) and Lean Body Mass (LBM). The proposed approach helps the users to control their weight and bring it around to a normal or ideal value as weight gain or obesity is one of the reasons which may lead to increased risk of health conditions like Diabetes II and cardiovascular diseases. Weight control can help in maintaining a healthy life balance and reduce the effects of the health conditions. Based on the calculations made earlier, the ideal values of calories consumption suitable for the user to maintain a healthy weight can be determined and the diet recommendation can be made by referring to a model trained on the nutritional values of food ingredients and food items. Rasa is an open-source machine learning framework used to create conversational chatbots. It is used to automate the text and voice-based assistants.
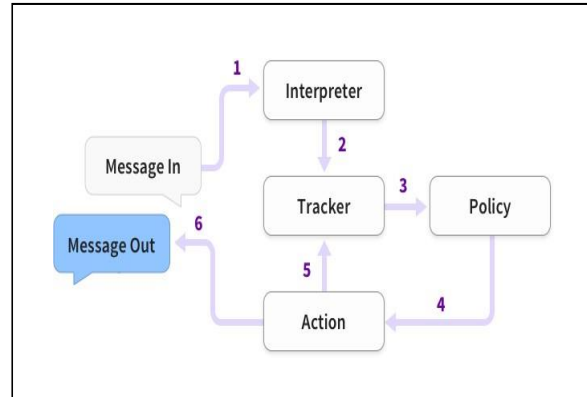

Fig1: Rasa Framework [9]

The Following steps explained below:

1. The message is received by the user into the bot and passed to an Interpreter, which converts it into a dictionary including the original text, the intent, and any entities that were found. This part is handled by NLU.

2. Then, the Tracker is the object which keeps track of the conversation state. It receives the info that a new message has come

3. The policy receives the current state of the tracker.

4. The policy chooses which action to take next.

5. The chosen action is logged by the tracker since it helps to keep the track of path or flow of the conversation.

6. Response is sent to user. User then replies according to response.

Fig2.Rasa Architecture [10]

- Rasa NLU: A natural language understanding solution which takes the user input and tries to infer the intent and extract the available entities.
- Rasa Core: A dialog management solution tries to build a probability model which decides the set of actions to perform based on the previous set of user inputs some common keywords are

Intent
- What is the user intending to ask about? Entity
- What are the important pieces of information in the user's query?

Story
- What is the possible way the conversation can go? Action
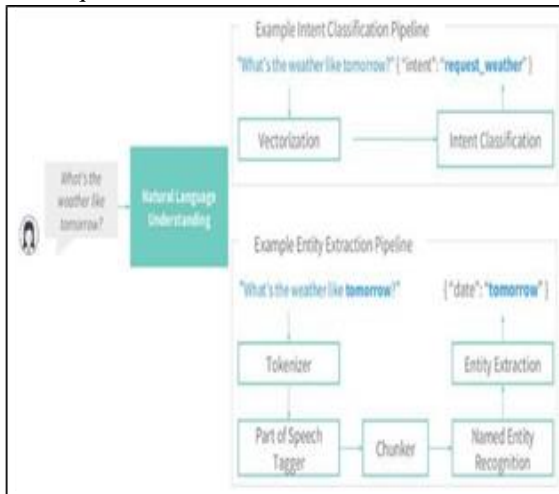- What action should the bot take upon a specific request?

Fig3. Intent Extraction Pipeline and Entity Extraction Pipeline [11]

Rasa NLU processes user input text and understands what the user is trying to say. Basically, it takes the user text as input and extracts the intent and entities from it.

Intent: An intent represents the purpose of a user's input, what the user wants to do. The user input text is first vectorized and then the intent of the text is extracted.

Entity: An entity represents a term or object that is relevant to your intents and that provides a specific context for an intent.
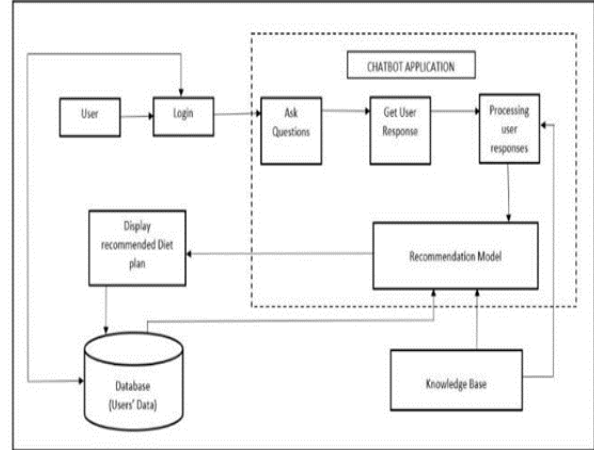
IV. SYSTEM ARCHITECTURE

Fig4. System Architecture of Dietbot

The fig.4 shows the general system architecture of the proposed system. The user logs in to initiate the communication with the chatbot interface. The Chatbot is initiated and the user can input the query/give response to the presented questions in the form of text (English Language). The textual responses from the user undergoes pre-processing and Natural Language Processing to achieve Tokenization and extraction of keywords corresponding to the database and facilitate further processing. The keywords are then passed to a model which incorporates Content – based techniques for making recommendations for the user with the help of a knowledge base or model which attempts to recommend based on the users' individual characteristics. If the system has acquired enough information through the series of questions and responses from the session start, the application will provide a food (diet) recommendation to the user on the interface. The chart will be stored on the database. If the application has not gained enough information to provide a final result, further question(s) may be asked to the user to reach a result. The responses will be provided to the user primarily in the form of text.

1] Response Retrieval and processing:
The user is prompted to enter the information required for processing by providing appropriate questions on the interface. The process will continue till the chatbot has retrieved responses and the user does not want to provide any more queries. The received responses will undergo text processing to extract relevant information and the user will be notified to correct a

response in the situation where the user might have entered erroneous responses.

2] Training:

The recommendation engine will be trained on a database consisting of food items and food ingredients along with their nutritional contents such as calories, proteins and carbohydrates. The ingredients can be classified or labelled according to their nutritional contents and their suitability to be consumed under health conditions.

3] Recommendation:

The proposed model is a content - based recommendation model which can identify the similarity between the user (based on health indicators discussed above) and the food items and ingredients based on their nutritional factors.

V. CONCLUSION

Medical Studies have revealed that consumption of healthy foods help the body to fight against diseases. Food provides our body with essential nutrients needed by the body to sustain us for our day-to-day activities. This system provides user best recommended diet chart and also contains functionalities that helps the user to stay on track. The use of chatbots within the field of health promotion has a large potential to reach a varied group of people. This system allows the user to know about his/her actual diet information. This software reduces the time span and cost for expert advices for diet. This system is exceptionally valuable to wellbeing cares and dietician. A diet recommendation chatbot can provide user with good nutrition and improved health and that too at the convenience of user's home. It is a cost-effective app and provides instant answers to user query.

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