Ai Healthcare Interactive Talking Agent using Nlp

M.S Bennet Praba, Sagari Sen, Chailshi Chauhan, Divya Singh

ABSTRACT: ***Good nutrition plays an important part in leading an active lifestyle. Combined with physical exercises, the diet can benefit people to maintain their weight, reduce the possibility of diseases and improve overall health. A self-help motivational tool for weight maintenance is a good option. This paper presents an interactive talking agent that is a chatbot. A chatbot is a piece of software that operates a conversation using textual methods. Chatbot will start communication with the user and help to solve the concern by initiating a human way conversation using Language Understanding Intelligence Service (LUIS) concept. Natural language processing (NLP) is the capability of a computer application for understanding human dialect. It is one of the part of Artificial Intelligence (AI). Each language has a different morphology the chatbot has to be able to separate words into individual morphemes. Morphology is one of the tasks that NLP should be able to handle.***

Keywords - NLP, morphology, Chabot, healthguide, python

I. INTRODUCTION

In today's era, a healthy body sets the stage for one's day to day well-being. It also allows people to live an active and full life, which means they will have a better quality of life as they age. Effective communication is hindered by conflicting due to the sensitivity of the subject as people are not comfortable opening to others about the way they feel about their body and lose confidence. But people won't feel embarrassed talking on the same subject to a machine [15]. So chatbot is the best option that one has to overcome this problem. A chatbot is instant messaging software that provides service using instant messaging Software that provides service using instant messaging framework with the aim of providing conversational services to users in an efficient manner [5]. It stimulates human conversation and fulfills a variety of roles, from customer service to virtual providing and fulfills a variety of roles, from customer to virtual consultant, but the functionality is always the same. Various kinds of conversational chatbots have been invented but from those agents, NLP based chatbots are in demand since they are lightweight and simple to construct [8].

The architecture combines a language model and calculation algorithm to change informal conversation between a user and computer. Rule based technique is the way to create chatbot by recognizing states or rules to the chatbot[13]. The chatbot is instructed on Natural Language Processing (NLP) with the datasets, which are a conversion dialogs, to extricate the integration of conversion containing intent, context and entity [2].

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Syntax and semantic evaluation are two main steps that are used with natural language processing. Syntax is the order of words in a sentence to build grammatically accurate sentences. NLP utilizes syntax to recognize the content from a language built on grammatical rules. Semantics includes the use and definition of words. NLP uses algorithms to interpret the meaning and architecture of sentences [11]. Here we present a natural language based interface to facilitate a user to generate an appeal without having any basic knowledge about a chatbot. Our system uses Morphology as a communicating concept. It is the study of structure and formation of words and meanings. The most important unit is the morpheme, which is defined as the "the smallest unit of meaning" [7]. In the case of bots, it finds the intention of the input from the users and then generates feedbacks based on contextual evaluation identical to a human being. It gives minor false outcomes through correct examination. It identifies user query failures and solves confusion using analytical modeling [12].Morphological Analysis is very important for various automatic natural language processing applications.

II. RELATED WORK

The chatbot industry is still in the process of development but it is growing very fast. Later many procedures were evolving the chatbot and have been presented such as bibliometric evaluation and long term memory networks. Bibliometric is a complete evaluation by means of data to consider the publications [10]. This analysis is also used in many fields like information science etc. It also has a subfield called scientometrics. We implemented human chatbot interaction using concept of Natural Language Processing (NLP) that will contribute to the health maintenance by solving the problems of many people as it will suggest them the perfect diet and exercises. Moreover these people would not be embarrassed anymore as they will ask for advice from a machine. Morphology is one of the tasks that NLP should be able to handle. Each language has a different morphology, the chatbot has to be able to separate words into individual morphemes [1].Awareness about health can be spread using chatbots as chatbot is an interesting feature which can help and interact with people. It can act as a counselor [2]. People with certain health problems feel embarrassed about their body, so with a talking agent this problem will be solved as people won't feel shy to talk freely about their problems by providing companionship and support [3].This talking agent will suggest the perfect diet and exercises based on the information provided by the user. The BMI will be calculated and the user will be categorized as overweight or underweight [6] & [8].

Even if the user writes sentences that are not correct or makes some grammatical mistakes, the chatbot will be able to identify the meaning of the words by considering the words as individual morphemes and it will give the required response. All this is done using the concept of morphology [1].Chatbots can also be used in various social networking sites to increase awareness and connect with more people or to share their concerns on large levels [4]. As numerous chatbots already exist, there is a problem in creating data driven systems because a large quantity of data is needed for its growth. This problem can be solved using natural expressions implemented in python. Python is a high-level, general-purpose programming language [9].The chatbot will contribute to health management by efficiently analyzing the problems of different people dealing with stress and anxiety and by supporting them as a counselor or a companion [14]. Considering all these aspects and the importance of health in every individual's life we aim to develop a chatbot that can solve all these problems.

III. PROPOSED MODEL

We begin this segment by introducing Chatbot and describing how we use it to present health management using morphology concept of NLP. We have created the chatbot using python. Python is a platform that gives user friendly interface to make the link simpler and efficient. We have created the chatbot using python. Python is a platform that gives user friendly interface to make the link simpler and efficient. It has built-in dictionary and list data structures which can be utilized to build efficient runtime data structures. The user can get the required details by typing in their query. The input parameters include height, weight etc. First the user will enter their height and weight. The chatbot will then give the formula for BMI (Body Mass Index) and determine whether the user is underweight or overweight. The user can then ask about the diet plan and also exercises that are required by the user to stay fit. The chatbot will provide the same information to the user and hence solve their problems. This system has been created to help people to overcome their insecurities as a machine is the best option one can have to share something which they cannot share with a human being. The whole concept of morphology can be understood by the data flow diagram and the architecture diagram which have been shown in the project. NLP has many stages which are lexical analysis, syntactic analysis and semantic analysis and in this paper we have focused mainly on morphological analysis. The main problem which it solves is of the confusion of understanding words and giving best response to the user by dividing it into smaller subdivisions.

Fig.1.Architecture diagram

The above architecture diagram represents the following modules. The first module is the user message. The message is divided into two parts- entity recognition and intent classification. The next module includes system, developer and session. It deals with the user requirements, abstract description and the operation to be performed. Developer classifies the phrases and interrogative statements into syntax semantics and morphology and finally the response. We have created a text file which involves the prime buffer where we piled the text to be produced by the bot to user. Certain packages have been included to improve the work flow of this chatbot. The program has been written in python IDLE and even if the user makes certain spelling mistakes or abbreviations of any word, the chatbot will be able to identify the error because of the morphology concept. There are two main categories under morphology. They are Inflectional and Derivational which include all the grammatical mistakes, singular / plural, past/present tense. Morphology works by dividing the words into individual morphemes or parts which is the smallest unit of meaning. There are two types of morphemes, they are- bound and free. Bound morphemes don't have individual meaning when separated from a word whereas free morphemes can be easily recognized as individual word.

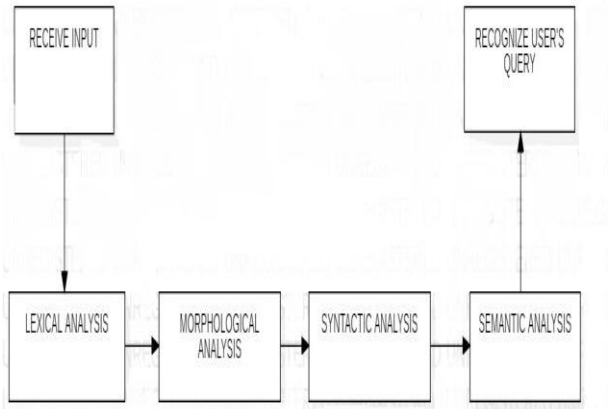
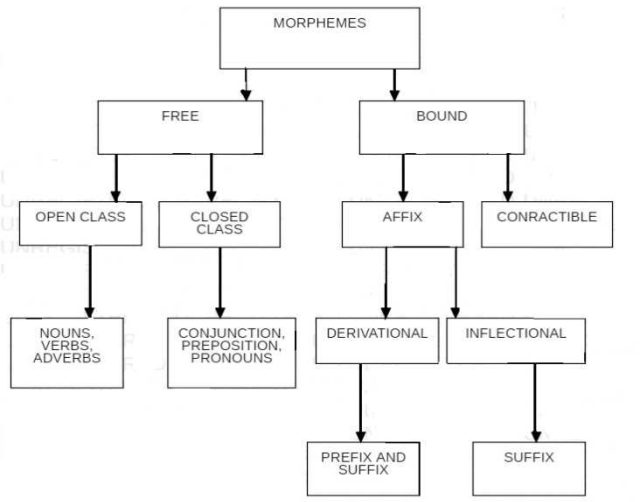


Fig.2.Data flow diagram

In fig.2.dataflow diagram, the user's objective is recognized by these steps, which are: lexical analysis, it deals with study of words at different levels with respect to their lexical meaning and part of speech. Then comes morphological analysis which deals with the study of word structures and formations by dividing the words into morphemes which is the smallest unit of meaning. Syntactical analysis is parsing which allows the extraction of phrases so that it conveys more meaning than just the individual words by themselves. Semantic analysis deals with what a sentence really means by relating syntactic features and disambiguating words with multiple definitions to the given context and finally the user's objective is recognized [15]. The last module is response which is generated by the response selector as it selects a distinct and best reply from the entities and further responds back to the user.



. **Fig.3. Morphological Analysis**

The diagram in fig.3 shows how morphological analysis works. Using morphology the words are divide into smaller units called morpheme. Morphemes are classified into free and bound. Free morphemes can stand as single words by themselves and bound morphemes do not have any meaning when separated from a word. Free morpheme consists of open and closed class. Open class includes nouns, verbs, adverbs whereas closed class comprises of conjunctions, prepositions and pronouns. Bound morphemes are further divided into affix and contractible where affix consists of inflectional and derivational subdivisions. Inflectional is divided into suffix and prefix but derivational only consists of suffix.

IV. RESULTS AND DISCUSSIONS

For examining how efficiently the bot recognize the errors, we created 10 text files with different responses and then ran the program to analyse whether the bot was able to recognize the questions or not. The remarks from the coordinated survey are given in Table 1

Table. 1. Evaluation of response

CORRECT RESPONSES	INCORRECT RESPONSES
7	3
TOTAL	10

Due to NLP the bot is able to recognize the errors like spelling mistakes and also abbreviations which is an important part if we need a correct response. In the fig.4 the abbreviation of 'you' is easily recognized and the bot is also able to give the response even after spelling mistakes of the words 'formula' and 'plan'.

Fig.4. Output Screenshot

V. CONCLUSION AND FUTURE WORK

In this system, we've introduced the building of chatbot by python using concept of morphology. It was based on health maintenance due to which different people will able to resolve their issues by interacting with our chatbot. It analyses the information provided by the user and responds according to an individual's requirement of diet plan and exercises. The morphology concept enables the bot to work in a more efficient way as it recognizes the meaning of each part of the word individually and thus it is able to rectify errors. The disadvantage of this chatbot is that if the inputs are not in sequential order as our text file then the responses may be wrong. Future work includes connecting the chatbot to the server so that people can access it all over the world even without having the text file in in their system. Analysis on artificial intelligence and interaction build models can bring a good platform for the users and also for the industries. Chatbots can be made using AIML as the applications are related to cultural heritage, interaction framework, semantic analysis framework, network management etc.

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