

# Diet Recommendation System Based on Fuzzy Logic 2 and Chatbot

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## Abstract

Food and nutrition play a crucial role in health promotion and chronic disease prevention. A healthy diet and lifestyle are your best weapons to fight disease. All diseases begin at the junctions of the seasons. It is critical to pay close attention to your body during these periods. Seasonal foods, herbs, and simple yoga postures can help to eliminate excess pitta from the system. Every individual have their own unique prakriti from their birth. For maintaining health and prevent diseases, diet is the best medicine in Ayurveda. Doshas are energetic forces of nature, functional principles that help us to better understand ourselves, and the world around us. Doshas can be found in everyone , but in different proportions, which makes every individual different from each other.

In this paper we proposed a method that will make use of type 2 fuzzy logic which uses deep learning concept to create a user friendly chatbot that will suggest proper diet and lifestyle for the users. Users can get accurate results depending upon personal information and doshas of user.

**Keywords—** *Pitta, Prakriti, Doshas, Ayurveda, Diet, Fuzzy logic type 2, Chatbot*

## I. INTRODUCTION

Current lifestyle of majority of people living is very lethargic and sluggish, because of which many issues like cholesterol, hypertension, diabetes is very commonly diagnosed amongst all people. Now a days due to very busy and hectic lifestyle people don't get enough time to pay attention towards their health. Because of busy schedule work people neglect their diet and consume more junk foodstuffs.

Ayurveda is the art of daily living in harmony with the laws of nature[2]. According to ayurveda, health is a perfect state of balance among the body's three fundamental energies, or doshas (vata, pitta, kapha) and an equally vital balance among body, mind, and the soul or consciousness[2]. Ayurveda is a Sanskrit word that means "the science of life."

The three doshas are made up of the five great elements or energies (space, air, fire, water, earth). Each dosha consists of two energies , vata consists of space and air, pitta consists of fire and water, kapha consists of water and earth[2].

To maintain health and balance, we have to juggle with the three doshas, taking action to increase or decrease vata, pitta, or kapha as conditions demand. This

requires moment to moment awareness, moment to moment consciousness, moment to moment healing[1].

In this system we are getting the data from the user from their various perspectives and after getting that data, comparing them with the database available in the system[4]. The data is matched with the database and using the algorithm we are identifying the prakriti of the user. Once the prakriti of the user is found the system works for creating the proper diet plan for the user using the input and available dataset.

## II. TYPE 2 FUZZY LOGIC

Fuzzy logic is represented using fuzzy sets, sets that express uncertainty[1].

Logic is comprised of only two values such that True or False and Fuzzy logic uses logical values between 0 and 1. Fuzzy set F of universe U is defined by a membership function.

It is denoted by  $\mu F(x)$  such that:

$\mu F(x): F = [0, 1]$

$\mu F(x) = 1$  if x is totally in F

$\mu F(x) = 0$  if x is not in F

There are two types of fuzzy sets

Type 1 fuzzy set and Type-2 fuzzy set

Type-2 fuzzy sets allow us to handle linguistic uncertainties .Increased fuzziness in a description means increased ability to handle inexact information in a logically correct manner.Type-2 fuzzy set is more noise tolerant than type-1 fuzzy set[1].

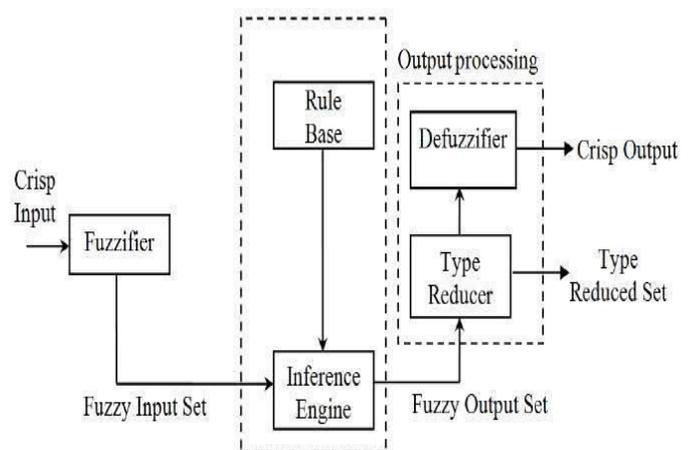


Fig 2.1. Type 2 Fuzzy Logic

The block diagram of T2FLS, illustrated in Figure 2.1, consists of five components: fuzzifier, rule base, fuzzy inference engine, type-reducer and defuzzifier. The crisp inputs are first fuzzified, in general, into Type-2 fuzzy sets input which will activate the inference engine and the rule base to produce type-2 fuzzy sets output. This output is then processed by the type reducer which combines the output sets to get type-1 fuzzy sets called the type-reduced sets [4]. To produce the crisp outputs, we can defuzzify the type-reduced fuzzy set.

**III. RELATED WORK**

Diet is one of the three supporting factors of life, plays a key role in maintaining health and prevention of diseases .Health of human being is totally depending on diet. Human body is made from Tridoshas and is also as Prakriti[2].

According to Ayurveda year is divided into Six Seasons. Each season consist of two months and in every season particular prakriti raises their proportion in human body and which results in illnesses. Fuzzy logic is divided into two type viz. Type-1 fuzzy logic and Type-2 fuzzy logic[3]. Type 2 makes system more noise tolerant and reduces the problem further such that outcome can be made more accurate.

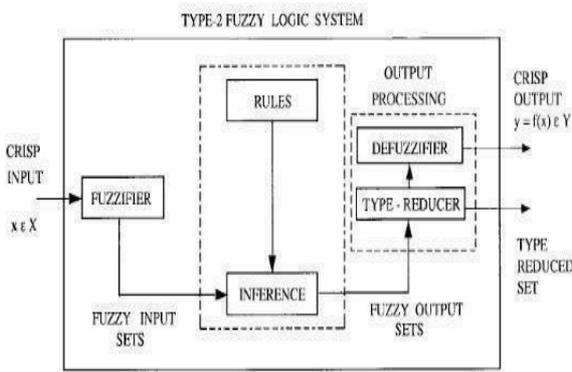


Fig 3.1. Fuzzy Logic System

As shown in the fig.3.1 Fuzzifier gets the input and that input set is processed by the fuzzy rules and gives the output in the reduced set of data.

**IV. PROPOSED SYSTEM**

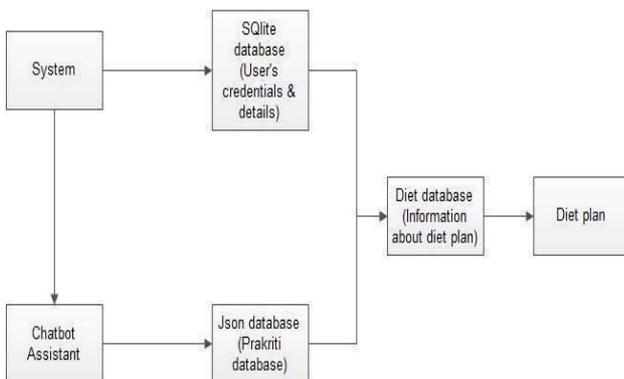


Fig 4.1. System Architecture diagram

In the proposed system, a user friendly chatbot is used for communicating with the user. Chatbot uses Json database to find prakriti type. Sqlite database is used for the user's data. Combining both data sets system generates proper diet plan for user[11].

The proposed system consists of database required to find the prakriti of the user and the algorithms which analyze the input and data. System creates the proper diet plan for the user considering the current season and user's lifestyle. With the help of diet plan user can achieve a healthy life[7].

**Project deliverables:**

Web application deployment with GUI. A large dataset for creating diet plan. Currently our focus is only on websites not on mobile application.

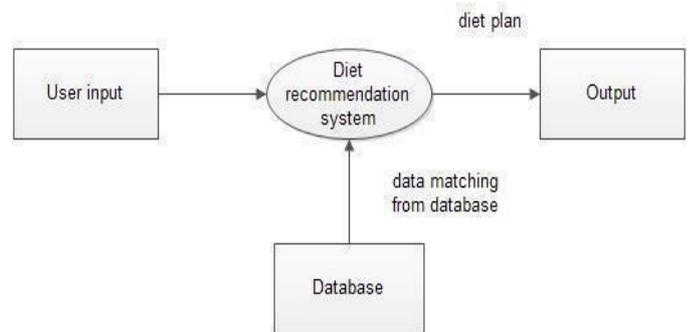


Fig 4.2. Data Flow diagram level 0

As shown in above figure 4.2 our proposed Diet recommendation system takes User's input and Database information as input and generates diet plan as output by matching the data from database. For matching the input with database system uses Fuzzy Logic

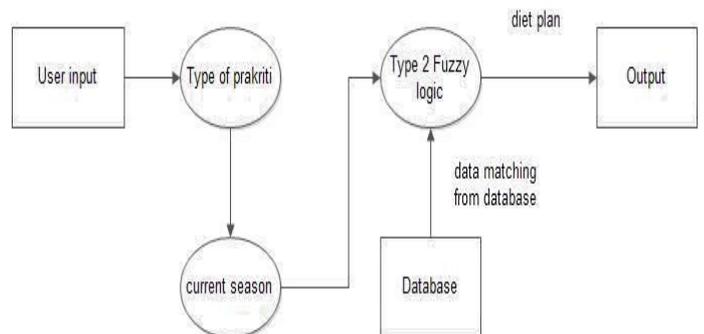


Fig 4.3. Data Flow diagram level 1

Above figure 4.3 shows the data flow diagram of the proposed system. As shown in figure system takes the input from the user. The user input is personal health information and it is used to find the Prakriti type. Then Prakriti of user is compared with the current season and using type 2 fuzzy logic diet plan is generated.

**Django Framework:**

Django is a high-level Python Web framework. It helps to create websites with ease. Django takes care of most of the irritating parts in Web Development. It is free and open source Web framework with an excellent documentation. Django works with different format files like HTML, CSS, JS, JSON,etc. [12].

Django is MVT architecture i.e, Models , View and Templates as shown in figure 4.4. Models are used to define structure of the system. View is the request handling function, to satisfy request via models and formatting the responses to templates [12].

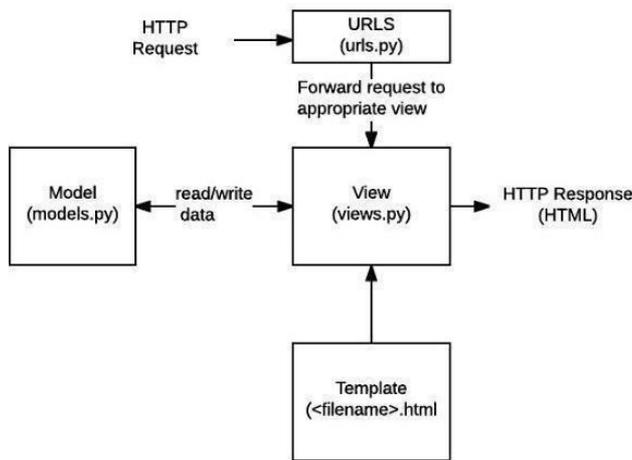


Fig.4.4 Architecture of Django Framework

**Deep Learning And Natural Language Processing :**

Natural language processing focuses on computer understanding and manipulation of human language. Figure 4.5 shows the types of NLP.NLP is a way for computers to analyze, understand, and derive meaning from human language in a smart and useful way. Deep Learning is a part of machine learning. It consists of the algorithms which can be used in building artificial neural networks .

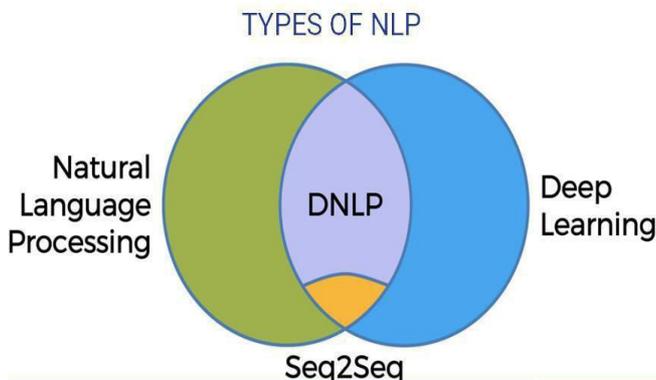


Fig.4.5. Types of NLP

**Chatbot:**

ChatBot can be described as software that can chat with people using artificial intelligence. It is an assistant that communicates with users through text messages, a virtual companion that integrates into websites, applications that helps users.

Simple Chatbots:

Pre-prepared answers based on regular expressions.

Smart Chatbots:

Rely on Artificial Intelligence. All the words said by the users are recorded for later processing[13].

**Sequence To Sequence Model:**

A typical sequence to sequence model has two parts – an encoder and a decoder. Both the parts are practically two different neural network models combined into one giant network. A general-purpose encoder-decoder framework for Tensorflow that can be used for Machine Translation, Text Summarization, Conversational Modeling, Image Captioning[11].

**V. APPLICATION**

Medical Research:

In Medical research field this project can be used for improving the health of the patients and cure the diseases with the help of prakriti of patient.

Ayurvedic Research:

In Ayurveda diet is best medicine for keeping the body healthy. Ayurveda provides the diet according to the type of prakriti and balance their energy level. All this diet related data is kept saved in the books but now on internet there are many websites which provide the diet data for quick search. So This Proposed work help to combine this data and gives the summarized form of the diet data.

**VI. CONCLUSION**

In the proposed system, accurate and efficient diet recommendation method is to be implemented to recommend the diet based on users prakriti type and season. In this work Fuzzy Logic 2 and chatbot assistant is integrated to represent the food knowledge of the collected dataset of the food. The proposed system is more interactive and user friendly for the users. Hence the proposed system will give more accurate and efficient diet plan to the user based on user's data.

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