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An Interactive Healthcare Bot with Personalized Diet and Disease Guidelines Recommendation for Women

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Abstract: ***Recently people pay more and more attention to how to effectively and efficiently analyze the result of regular physical examinations to provide the most helpful information for individual health management. Womaniyaa is a platform where women can find a solution to their innumerable problems. Here they will get to know about the detailed scenario of their health status and can interact with a medical bot. This bot has facilities like providing a diet plan based on BMI and age and home remedies based on the symptoms.***
Keywords: Women, Health, Diseases, Home remedy, Diet plan, Fitness, Yoga, Dialogflow, NLP, Natural Processing Language.

I. INTRODUCTION

In every society, the ladies community wasn't given due attention, especially on the health aspect. In most societies, women are the most deprived sections of all the health facilities. They are the foremost affected groups right from conception to the top of their lives in terms of poor medical aid during pregnancy, after delivery as a baby, as a girl, and as a lady. They suffer from poor nourishment, medical aid, education, and moral support. Health is concerned with the qualitative improvement and it is not subject to the exact measurement. Women experience more episodes of illness than men and are less likely to receive medical treatment before the illness is completely advanced.

Table 1 **Number and distribution of the world's women and girls by age group and country income group, 2007**

	Low-income countries		Middle-income countries		High-income countries		Global total
Age group	000s	%	000s	%	000s	%	000s
0–9	300 768	50	241 317	40	57 456	10	599 541
10–19	267 935	45	263 464	44	61 577	10	592 975
20–59	580 014	34	875 052	51	276 140	16	1 731 206
60+	86 171	22	183 099	48	115 681	30	384 952
Total	**1 234 888**	**37**	**1 562 932**	**47**	**510 854**	**15**	**3 308 673**

Source: United Nations Population Division.[3]

From the above Table1, it is observed that most of the world's women live in low- or middle-income countries, almost half of them in South-East Asia and Western specific regions. Only 15% of the world's 3.3 billion females board high-income countries.

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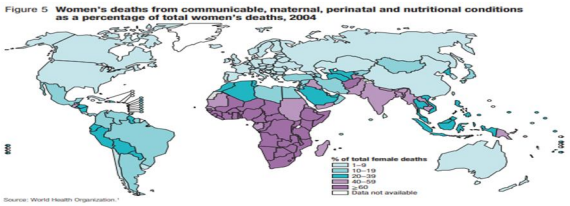

The health transaction is least advanced in Africa and India, where patterns of mortality among girls and women are still characterized by a predominance of infectious diseases (communicable, maternal, perinatal, and nutritional conditions).

II. REVIEW OF LITERATURE

A. The paper titled "An Integrated Approach of Diet and Exercise Recommendations for Diabetes Patients" stated that:

They have implemented an ontology-based integrated approach to combine knowledge from various domains to urge diet and exercise suggestions for diabetes. The answer is developed as a Semantic Healthcare Assistant for Diet and Exercise(SHADE). For every domain (person, diabetes, food, and exercise) they have represented separate ontology alongside rules then an integrated ontology connects these individual ontologies.

B. The paper titled "An Interactive Healthcare System with Personalized Diet and Exercise Guideline Recommendation" stated that:

This system examines the results of the traditional physical survey to live health risk and supply personalized healthcare services for users in terms of diet and exercise guideline recommendations. They developed some interactive ways for users to simply feedback their vital signs to the system and quickly get suggestions for health management from the system. First, they use the physical examination result because the data to be analyzed. It's very convenient for users at a really low cost. Second, the system design is extendable, so this is usually simply adjusted to figure for any chronic ills, even other forms of diseases.

C. The paper titled "PhytoCloud: A Gamified Mobile Web Application to Modulate Diet and Physical Activity of Women with Breast Cancer" stated that:

The paper presents a user-centred approach of developing a Mobile Web App that focuses on breast cancer patients watching their specific dietary, physical, and mental requirements counting on the stage of their medical treatment. The planning of PhytoCloud is being described, a gamified Mobile Web App that allows users to record their dietary habits and physical activity and motivate their consumption of food with estrogen-like properties (phytoestrogens) which are linked to the prevention of reappearance of breast cancer.

D. The paper titled "Healthcare for patients with interstitial cystitis/bladder pain syndrome based on internet health education" stated that:

The objective of this study is to utilize Internet interruption for caring for Interstitial Cystitis patients to alleviate their pains and bothering symptoms. Healthcare education was conducted through the network by asking the patients, divided into study and control groups to work out contraindications, habits, and behaviours weekly to remind and consolidate important rules for promoting quality of life. The E-health system was demonstrated to be effective in improving the QOL of IC patients through the intervention of the Internet healthcare education for the consolidation of healthy dieting habits and lifestyle.

III. PROPOSED SYSTEM

The web application tells us all about common diseases, feminine diseases, recipes as home remedies, and some exercises and yoga asanas. It also consists of an interactive healthcare bot that gives a personalized diet plan and also diagnoses diseases from the symptoms given by users.

A. Facilities by Womaniyaa

For a good lifestyle and health, women need to overcome diseases occurring and need to eat healthy food and practice regular exercises and yogas. Womaniyaa provides good homemade recipes for common diseases and diseases which are especially seen in women. There is detailed information about every disease with its definition, symptoms, causes, home remedies, and preventions. It also provides exercises and yogas which can be done at home without any trainer. An interactive healthcare bot helps the users by giving them a diet plan and it also helps by diagnosing the user by the symptoms collected by user inputs.

B. Working of Womaniyaa Bot

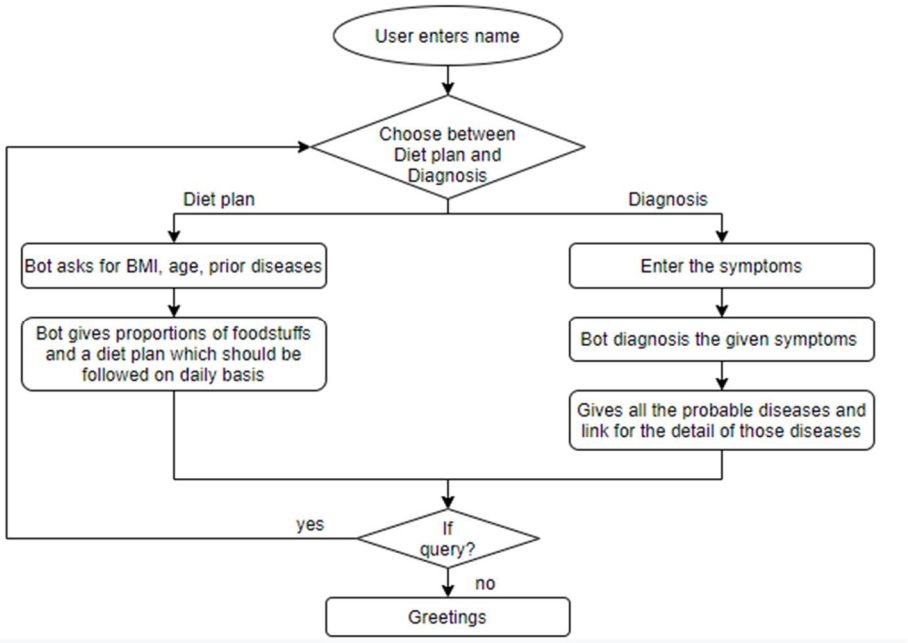

Fig 1: Flowchart diagram of our healthcare bot

The process of operating the bot is explained as follows:
The user is asked to enter his/her type of help from the bot, i.e., for a diet plan or to diagnose the user. If the diet plan is chosen, the user asks for the user's BMI, age, and prior diseases. Based on the age and BMI the bot provides a diet plan including proportions of foodstuffs to be consumed by the user every day. If the diagnosis part is chosen, the user asks for symptoms. After every symptom, it asks for more symptoms (if any) and then checks for the symptoms in the database and displays a list of probable diseases. For details, it gives a link to the webpage having detailed information about that particular disease.

C. Dialog flow

Dialogflow may be a tongue understanding platform that creates it easy to style and integrate a conversational interface into your mobile app, web application, device, bot, interactive voice response system, and so on. Dialogflow have intents, entities, fulfilment, Dialogflow Messenger.

1) *Intents:* An intent classifies an end user's intention for one conversation turn. For every agent, you define many intents, where your combined intents can handle an entire conversation. When an end-user writes or says something, mentioned as an end-user expression, Dialogflow matches the end-user expression to the only intent in your agent. Matching an intent is additionally referred to as intent classification.
2) *Events:* Entities which dictates exactly how data from an end-user expression is extracted.
3) *Contexts:* Dialogflow *contexts* are similar to natural language context. Using contexts, you can control the flow of a conversation. You can configure contexts for intent by setting input and output contexts, which are identified by string names. When an intent is matched, any configured *output contexts* for that intent become active. While any contexts are active, Dialogflow is more likely to match intents that are configured with *input contexts* that correspond to the currently active contexts.

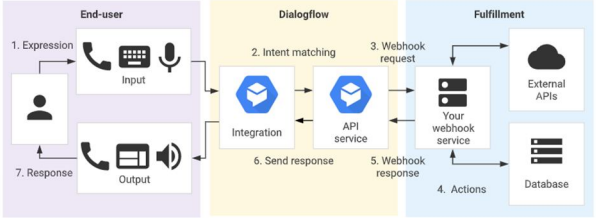

Fig 2: Flow for Fulfillment

From End-user to Fulfillment via Dialogflow:

a) The end-user types or speaks an expression.
b) Dialogflow coordinates the end-user expression to an intent and extracts parameters.
c) Dialogflow conveys a webhook request message to your webhook service. This message contains information about the matched intent, the action, the parameters, and thus the response defined for the intent.
d) Your service performs actions as required, like database queries or external API calls.
e) Your service exports a webhook response message to Dialogflow. This message contains the response that ought to be sent to the end-user.
f) Dialogflow sends the response to the end-user.
g) The end-user sees or hears the response.

In short, we are taking data from the user via Dialogflow passing the parameters to the online server running a question on the database.

IV. RESULT

We have developed an Interactive Healthcare Bot in a web application that gives a diet plan and analyzes user's symptoms to predict diseases and provide home remedies on it.

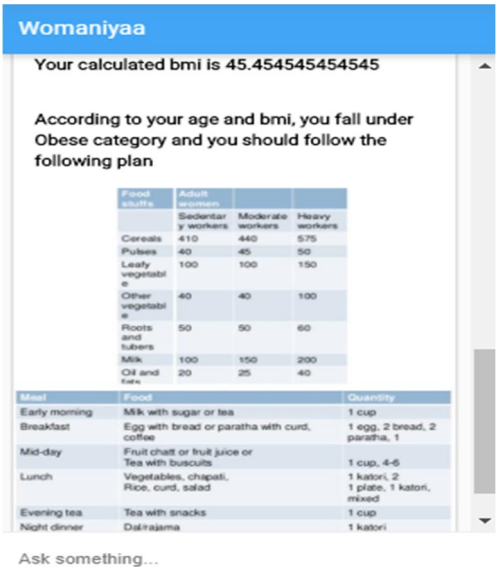

Fig 3: Result for diet plan

Fig 4: Result for disease diagnosis.

V. CONCLUSION

Chatbots in the healthcare domain are very young and the scope for innovation is broad. We have built the bot in small pieces to cover a very tiny set of diagnosing diseases for women based on their symptoms and providing home remedies and providing a diet plan. Using this idea, there are a lot of scopes to improve Womaniyaa and take it to the next level. One of the 13 challenges concerning the healthcare domain, in general, is that the data is sparse. Even if large datasets are available, it is difficult to feed them to the bot as the responses from patients are unpredictable. Just a decade ago, chatbots and virtual assistants were hardly used. Now everyone has an assistant built into their phone which makes our lives easier. We certainly believe that chatbots have a lot of potential and the research trends and creativity, especially in healthcare, is going to be a game-changer.

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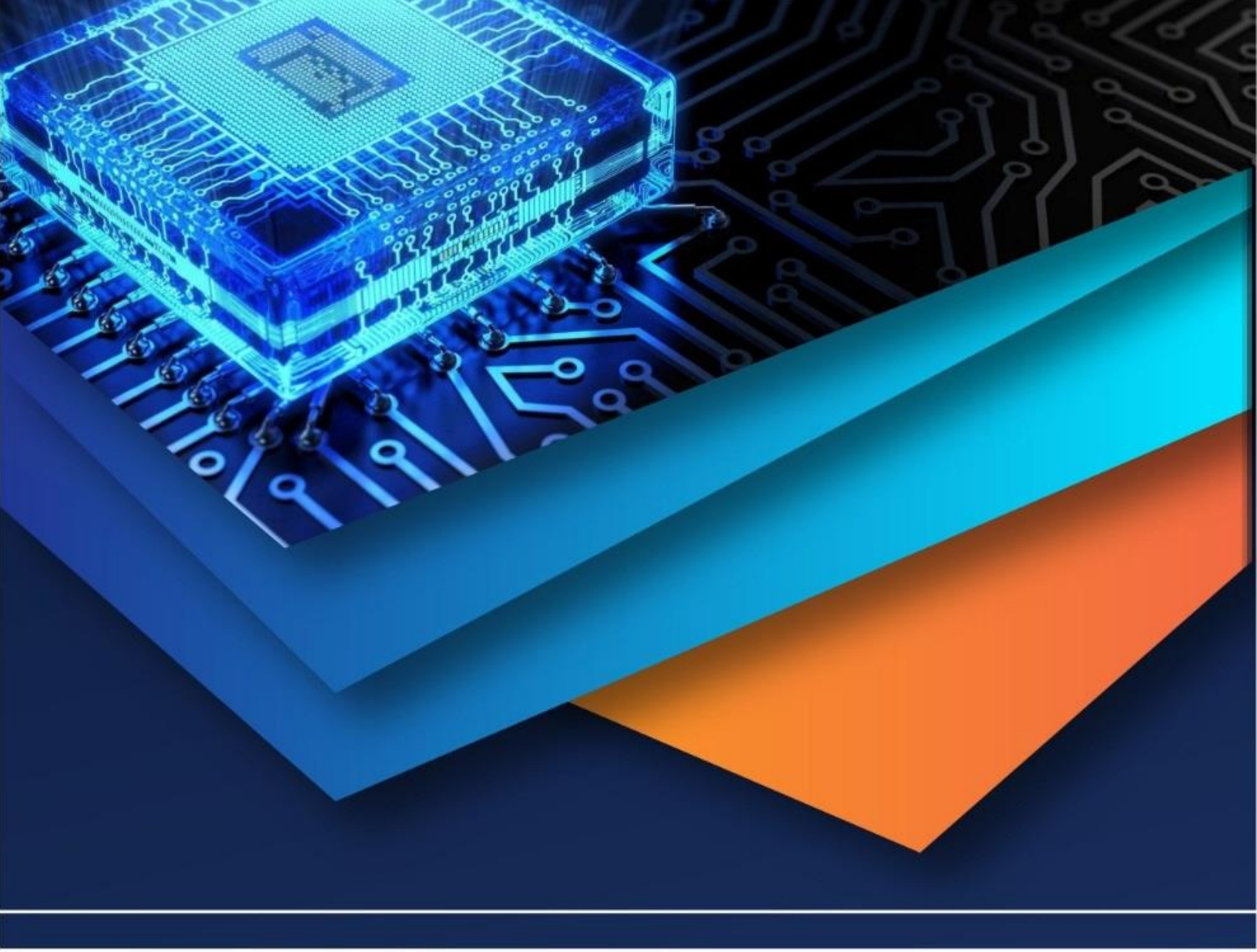

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