Drug Recommendation Chatbot Report

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1 Introduction

Fast and accurate access to information in the field of health is important for individuals to make informed health decisions. Access to accurate information, especially on critical issues such as medication use, plays a vital role in preventing risks such as drug interactions or age incompatibility. In this context, in our project, we aim to develop an AI-powered chatbot that can recommend appropriate medications. We want to give a solution for human health. This project aims to develop an AI-based healthcare assistant that enables users to receive meaningful, safe, and data-driven answers to their medication-related questions. Our reason to choose this problem was help people who want to check medicine according to their health condition. Therefore, we aim to build a system that can recommend suitable medications for a given condition, check drug compatibility and interactions, and assess age appropriateness of drugs. The chatbot system we will develop for our project focuses on two basic scenarios:

1) The user requests information about a specific medication.

2) The user requests a medication recommendation that is appropriate for a disease they are experiencing.

In both scenarios, age-appropriateness of drugs, possible side effects, and interactions between drugs are evaluated based on users' information. Our project uses a dataset. This system aims to facilitate access to health information and support users in making informed choices.

The main motivation of this project is to support users' decision-making processes.

2 Dataset Description

The main component that forms the information-based decision structure of the project is a drug data set prepared in a rich content .csv format. This data set is and will be the backbone of the system due to its various categories and adaptable structure according to user needs. The main columns of the data set are as follows:

1. **Drug_Name:** Allows the user to directly match the drug names entered with the dataset.

2. **Medical_Condition:** Indicates the disease for which the drugs are used and helps to make drug recommendations by comparing them with the user's symptoms.

3. **Recommended_Age_Range:** Defines the age limit that is considered safe for each drug. This information helps the system determine the appropriateness of the drug for the user's age.

4. **Drug_Interactions:** List of negative or harmful interactions that may occur when the drugs are taken with other drugs.

5. **Food_Interactions:** Information about the risks and dangers of taking the drug with certain foods.

6. **Side_Effects:** Informing the patient about the most common or serious possible effects.

This versatile structure of the dataset enabled user queries to be answered correctly and our chatbot to provide scientifically based information. We took our dataset from Kaggle and added new and meaningful rows and columns using AI assistants to expand our dataset.

```
drug_name,medical_condition,side_effects,generic_name,drug_classes,brand_names,activity,rx_otc,pregnancy_category,csa,alcohol,related_drugs,medical_condition_description,rating,no_of_reviews,
doxycycline,Acne,"(hives, c throat irritation, tro chest pain, little or no l low white k severe hea loss of app upset storr loss of app mild diarrh skin rash o darkened s vaginal itch Blackhead: Breakouts  Cys
spironolactone,Acne,"hive difficulty breathing  swelling of little or no l high potas: o signs of c Blackhead: Breakouts  Cystic acnc Pimples    Whitehead Zits Acne is this increa: excess tanning can damag
minocycline,Acne,"skin ras loss of appetite, up joint pain c severe hea  or swollen ; hair loss   discolorati muscle or j nausea, dia swollen tor rash, itchir or headach Blackhead: Breakouts  Cystic acnc Pin
```

Figure 1: Part of Dataset

3   Technologies Used

- **Python:** Main programming language for chatbot development.

- **Pandas:** For loading and processing the CSV dataset.

- **Regular Expressions (re):** To extract numeric age data from text.

- **CSV:** Dataset format for structured data storage.

- **Streamlit:** It has enabled the presentation of interactive chatbot to the end user on a web-based basis with its modern and simple interface.

- **OpenAI ChatGPT:** It provided content generation support in stages such as creating chat logic and modeling user scenarios in natural language.

Thanks to the harmonious operation of these technologies, our chatbot offers the user a flawless chat experience. These technologies have a fast and stable working structure in the background, which is of great importance in eliminating the question marks in the minds of users against the questions and diseases they are curious about.

4   Methodology and Implementation Strategy

This chatbot project we have done is a structure that operates within a created user scenario and has a step-by-step decision-making mechanism. The methodological steps in the system are below.

1. **Obtaining and Verifying Age Information from the User:** The user logs into the system by specifying his/her age at the beginning of the chat. This information is critical for the appropriateness analysis to be performed by comparing the drugs with the recommended age ranges in the next steps.

2. **Determining User Intention: The system offers three basic action options after receiving age information from the user:** (1) Obtaining detailed information about a specific drug, (2) Obtaining a suitable drug recommendation for a specified health problem, (3) Querying the interaction between two drugs.

3. **Dynamic Matching and Searching with the Data Set:** The drug or health status information entered by the user is checked with the records in the data set using the exact or close match (string match) method to access the most appropriate data. This process is performed without case sensitivity to increase accuracy.

4. **Age Compatibility Analysis:** The obtained drug record is compared with the user age previously obtained by the system and evaluated whether the drug is suitable for that age group. This evaluation is presented to the user with green (suitable) or red (not suitable) visual icons to increase comprehensibility.

5. **Drug-Drug Interaction Check:** When the user enters two different drug names separated by a comma, the system analyzes whether there is any interaction defined in the data set between these drugs. If there is an interaction, a warning message is presented, if not, a safe use message is presented.

6. **Creating and Presenting Responses:** After all checks, a detailed and understandable information message is delivered to the user in natural language form. Relevant responses are structured to include headings such as the name of the drug, purpose of use, age suitability, food interaction and side effects.

Thanks to this methodological structure, we wanted to create a digital health consultant that is not only a tool that provides information, but also guides the user and helps the decision-making process.

5   Using GenAI

One of the most striking aspects of this project is that we actively use Generative AI (GenAI), one of the most powerful technologies of our time.

1. Large language models such as ChatGPT have inspired the interpretation of user inputs.

2. GenAI capabilities have been used in processes such as content production, natural language output generation, report and chat flow editing.

3. At the same time, Streamlit has paved the way for this structure as an interface that allows the chatbot to communicate with the user in real time under the influence of artificial intelligence.

4. In these aspects, our project is not only a classic chatbot; it also has the feature of being a personalized digital health consultant supported by GenAI.

6 Chatbot Conversation Flow

The chatbot follows a structured and user-friendly conversation flow designed to guide the user through drug-related queries in a step-by-step manner. The interaction process is as follows:

- **Greeting and Age Input** The system welcomes the user and prompts them to enter their age. This information is used to assess the suitability of drugs based on age restrictions.

- **User Intent Selection** The chatbot offers two options:

  - **Drug-Based Inquiry:** The user can enter the name of a drug to receive detailed information about it.

  - **Condition-Based Suggestion:** The user can enter a medical condition to receive a list of recommended drugs.

- **Drug Information Display** If a drug name is provided, the system presents:

  - Medical usage (condition it treats)

  - Age suitability check

  - Food interaction details

  - Known side effects

  Medical Condition Lookup If a condition is provided, the chatbot searches the dataset and lists drugs commonly used to treat that condition.

- **Drug Interaction Check (Optional)** After receiving drug or condition-related suggestions, the user is asked whether they would like to check if two drugs can be safely used together. If so, the chatbot evaluates potential interactions using the dataset.

- **Conversation End** The system ends the conversation with a polite message, encouraging safe and informed medication use.

7 Project Presentation Video

We prepared a presentation video. You can reach our presentation via link: LINK EKLICEZ!!!

8 Conclusion

As a result, this project has presented an effective prototype powered by artificial intelligence that enables users to learn about conscious drug use. The developed system contributes to the increase of individual awareness in the field of health by providing customized recommendations and warnings according to the age, health status and drug combinations of users.

Although this system does not replace a doctor, it aims to contribute to the spread of a culture of safe drug use by providing support to the user before medical consultation.