

Development of Conversational user Interface using Dialogflow for Neet Examination and Online Medical Counseling

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Abstract:

Conversational User Interface (CUI) is a user interface that interacts with the computer similar to human-to-human conversation. This paper describes the development of an intelligent Conversational User Interface using artificial intelligence algorithms for analyzing user queries regarding NEET Examination and Online Medical Counseling system in India. The medical aspirants can ask any query related to NEET and Medical Counseling through this conversational interface. The System analyses the question and then provides the appropriate guidance to the NEET aspirants accurately.

Keywords: Conversational User Interface, NLP, Artificial Intelligence, Dialog flow.

I. INTRODUCTION

A Conversational User Interface is a type of user interface that is constructed around the call and response approach. The Conversational User Interface design uses Natural Language Processing (NLP) and machine learning algorithms. The system is trained using unstructured input. The input-output features are shaped in order to improve the efficiency of the system. This application acts as human replacement for proper guidance or information retrieval.

Our proposed application is the development of Conversational User Interface associated with a voice. There are many such applications to solve career related queries and serve as a guidance tool to clarify all their doubts regarding the career but still people approach the career counselor in person to get better guidance. Our application is intended to act as a human like or human replacement application where this Conversational User Interface simulates like a NEET(National Eligibility cum

Entrance Test) counselor and helps the user to clarify all their doubts regarding NEET as well medical counseling. Our application first gets the user input on their educational qualification, interested courses, hobbies, capabilities and analyses the input to give the best guidance according to their strengths and matching with the most trending courses. This application mainly focuses on NEET aspirants to help them direct in a right path all through their registration up to the college selection. The DGHS (Directorate General of Health Services) provides an online counseling procedure through FAQ's available in PDF format that sometimes is very difficult for a common person to understand. But our Conversational User Interface can guide the user in a easy way, as if a human is interacting and providing the required information as specified by the user. This application makes use of rich intents that differs from normal text intent as it provides graphical interface in choosing the answers.

Our proposed solution has an advantage of starting back the conversation if the user is idle for sometime

or if the user is confused to answer for. The Conversational User Interface can reply back the user with their previous responses. It will act as an intelligent interface by maintaining the question pattern asked by the user. This database of queries asked by the user will be utilized for query matching and appropriate responses.

The main working of our Conversational User Interface has three phases [3]:

- Getting the user input in natural language (text or speech) and understanding it.
- The output (text or speech) from the application.
- The processing of the unstructured input to produce an understandable relevant output. This process continues till the end of the conversation. It also maintains the log of the chat.

II. LITERATURE SURVEY

Wilson Nwankwo and et al,[1] in their work have analyzed that in most of the institutions in Nigeriathe student support services actually exist but not efficient because there are specialized units/ departments dedicated to this function in majority of the Institutions. The design has a mix of the agent and object-oriented approaches that produces an implementation-ready specification whose implementation would effectively support students during their studies. The authors have used Visual studio, MSSQL server and MS bot emulator. The model was tagged as “Advisor Bot” and it has focused on knowledgebase and a database. The approach adopted in the design of this intelligent bot is considered straight forward.

Aditya Pradana and et al, [2] have created a conversational bot called Sam Bot in order to improve the user-interaction and effectiveness of corporate websites. Samsung promotion, Samsung product, frequently Asked Question, and general Knowledge stuffs constitute its Knowledge base.

The AIML interpreter runs on PHP as programming language, Apache as web server and My SQL as database. Depth-first search has been performed by this pattern matching algorithm and returns the first matching response to answer a question Generative models of deep learning on big conversation log data are used for improving the automated process of knowledge creation. The application is more objective, automated and have larger knowledge bases.

Sonal Balpande(AP)and etal, [3] have created an Intelligent Career Counseling Bot with artificial intelligence algorithms used for Career Counseling as well for analyzing user’s questionnaires and understand user’s message. The right career is chosen based on their interests and capabilities. The algorithm of Pattern Matching is used in this application. The input sentence delivered by the user will be matched with pattern that is already stored in the knowledge base of the bot. Only the basic career platforms have been placed in knowledge base.

Benilda Eleonor and et al, [4]have created a Pharmabot which is a pediatric medicine consultant. This app uses Visual C# as its frontend and MS Access at its backend. It is very basic level of chat bot used in a stand-alone computer and extended to a web application. It has a simple page containing four options of start, instructions, guidelines and stop. The user can get help using instructions and they can start consulting the bot in basic ailment of pediatric generic medicines. It uses a survey questionnaire to test the effectiveness of the application and further improvement. The survey measures the AWS(Average Weighted Mean) from two groups: Experts and Pharmacy students and get analyzed for better performance.

S. J. Du Preez1and et al [5] have developed an Intelligent Web based Voice Chat bot. When black box approach and RSS (Rich Site Summary) feeds and expert systems exist, they have come up with the more interactive and real time web based chat bot.

They have used technologies like SOAP, XML, JAVA, AIML, ALICE to render the best interactive interface to the user. The main component used in their application is JAVA Applet and MYSQL at their backend. Also they have used Apache Server and all communications to and from the server are XML formatted. They also have used the best GUI features, modular design and GPS to embed with mobile and web applications.

Abbas Saliimi Lokman and et al [6] have designed a Chat bot for Diabetic Patients. The application has a solution for monitoring and diagnosing the diabetic patients through their chat bot application. They have identified three different reasons for diabetic control activities of the users and keep on monitoring them using their application. The technology used in this application is Wildcards in AIML to remember the previous chats and also retrieve the topic of the conversation. The path used to remember the conversation is V Path. They also use Pattern Matching technique that eliminates the inefficient data and recognizes the tokens and matches to give relevant answers.

III. PROPOSED SYSTEM

The main objective of our proposed system is to develop an interactive Conversational User Interface that will help NEET aspirants to clarify all their doubts regarding NEET Examination and Online Medical Counseling System in India.

The NEET aspirants from rural background struggle a lot in understanding the procedure given by DGHS.

This Conversational User Interface provides an appropriate reply to the query asked by the user. The database is designed in such a way that it consists of all the FAQs posted in DGHS related to Online Medical Counseling.

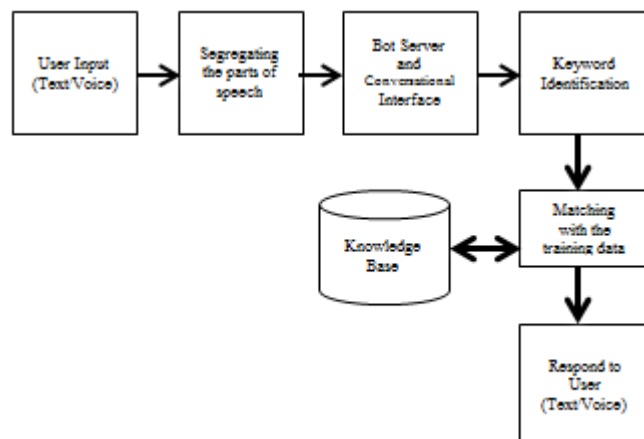


Fig. 1. Architecture of the Conversational User Interface

The Algorithmic flow will be as follows:

- Step 1: The system will get input from user either in the form of text or speech.
- Step 2: The text will be extracted from the speech, if the input is in speech format.
- Step 3: It processes the queries and generates response which makes use of a data repository.
- Step 4: Search in Knowledge base for appropriate answer.
- Step 5: The result will be displayed in speech as well as in text.

The modules involved are:

- Delivery Channel
- Speech Recognition
- Bot Server
- Language Understanding
- Data server

Delivery Channel

Google assistant will be acting as a delivery channel for this Conversational User Interface. The application will be integrated with Google assistant from Dialog flow through which user can interact to get appropriate answers for their queries. Through natural voice (NLP, which will be discussed in further section) or through keyboard input, the users can make an interaction with Google Assistant. In order to build apps for Google Assistant, Actions on Google is used. A two-way conversation can be

engaged using Google's Natural Language Processing algorithm.

Speech Recognition

The user can enter the NEET and Medical Counseling related queries in voice and this speech would then be recognized using Speech Recognition module. The person's voice is analyzed by the system and it is fine tuned to get the accurate results. Voice recognition programs uses a range of statistical and pattern recognition techniques to help convert into textual format. Then this textual input is sent to the dialog flow component that matches with the predefined intents. Once the intents are matched, the output is fetched from Knowledge base that in turn provides the results to the user via Google Assistant. The main advantage of audio output is that it is more understandable to the user rather than the textual output.

Bot Server

The bot server used in this application is Dialog flow. Dialog flow is Google AI powered chat bot development framework. It is the interface where user queries are fed as input in, that can then be processed and respective data will be given as output.

Language Understanding

The user query will act as an input that can then be fed to Dialog flow, which identifies the tokens from it and processes using NLP. Natural Language Processing (NLP) is associated to artificial intelligence that is concerned with the interface between computer and human (natural) languages. Natural Language Processing involves Natural language understanding, Natural language generation, connecting language and machine perception, managing human-computer dialog systems. The token (entities) identified are matched with their intents and give the response back to the user in the frontend. The response principle is to extract the tokens from the sentence then processes it and finds the output by matching the input from the

user. By this way, the user language is understood.

Data Server

The data server is the Knowledge Base in Dialog flow framework. The complex structured and unstructured information are stored in a computer as a Knowledge Base (KB). Knowledge Base is the significant part of Conversational User Interface. All the vital data that the Conversational User Interface processes and requires, in order to interact with the user will be stored in the knowledge base. Certain knowledge has been embedded into the machine so that it recognizes the sentences and makes decision on itself as response to answer a particular query. The knowledge base could also be trained by machine learning models to produce efficient response.

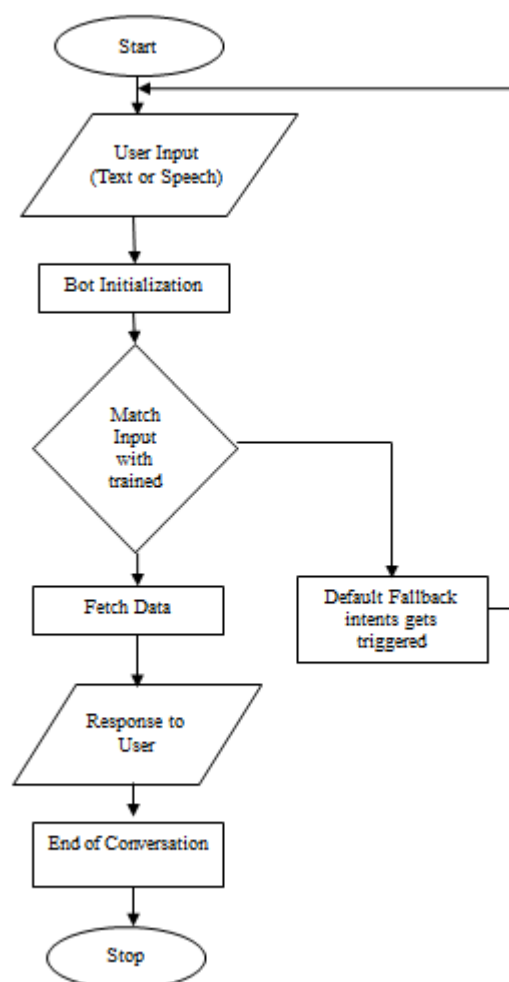


Fig. 2. Flowchart of Conversational User Interface

IV. RESULT AND DISCUSSION

The Conversational User Interface is designed in such a way that the user understands the NEET Examination procedures as well Online Medical Counseling System in India. The NEET aspirants, parents, and experts could test the AI based bot. The database is prepared in considering all the aspects of queries put forth by the parents and medical

aspirants. Even people from rural background will find it much useful to clarify all their doubts regarding Medical Counseling. The bot uses Natural Language Processing (NLP) and tend to analyze people's mindset to answer them according to their expectation. This process is done using data mining and machine learning techniques. The training datasets are carefully identified to match the user query and answer them appropriately.

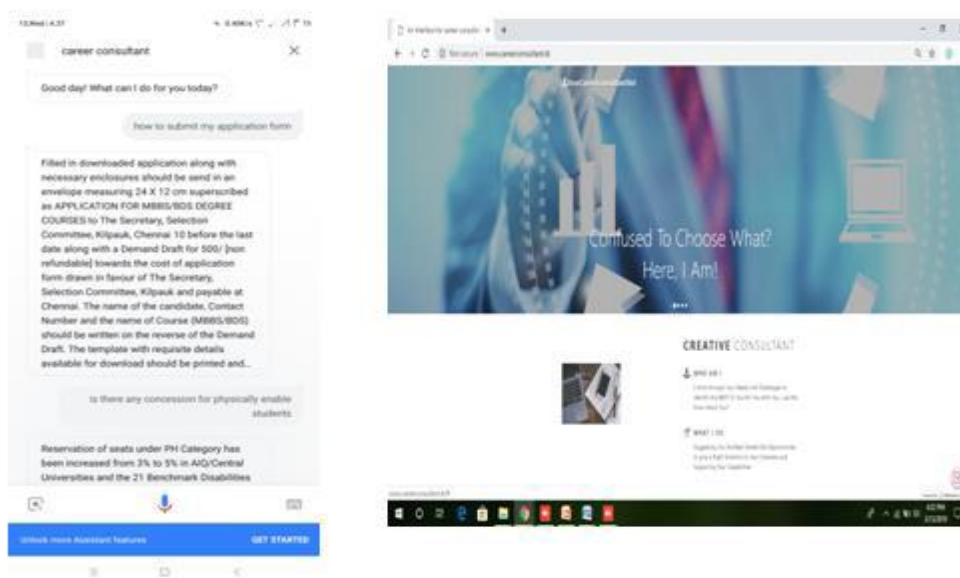


Fig. 3. Design of Conversational User Interface

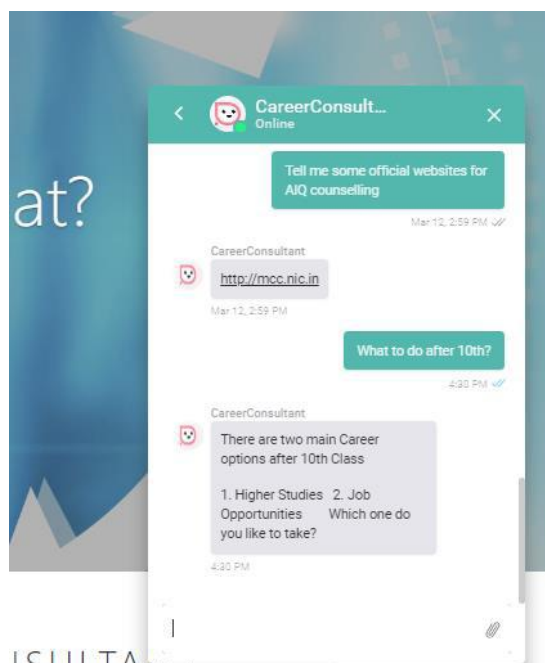


Fig. 4. Web Interface of the Application

V. CONCLUSION

The procedure for applying to NEET Examination and Online Medical Counseling is a difficult problem for medical aspirants and parents. The norms and procedures provided by DGHS are quite hard to understand. In order to make the people from rural background to find it easy to apply for NEET and Online Medical Counseling, the proposed work has been designed. It provides a user friendly platform to discuss about their doubts and clarification with respect to NEET Examination and Online Medical Counseling. This Conversational User Interface will be a great tool for quick interaction with the user and provide them with the best solution and suggest any alternatives needed and guide them through all the way. Since the knowledge base is compact, it can give the results faster. If the questions asked by the user are apart from the knowledgebase fed into the system, the application can dynamically assist by connecting it to the Google search for information retrieval. As and when required by the user, the history of the chat can be sent as a report to the email of the user for future reference. The application will also be designed to send the notifications to the users, if any urgent information is posted on DGHS portal. The Conversational User Interface can be further featured to use GPS and display the nearby NEET study Institutes from the user specified location. The proposed work is developed for English language. In future, the work will be extended to incorporate all the Regional Languages of India so as to fulfill the needs of the rural community.

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