

Review Article

Conversational AI: A Comprehensive Study of Chatbot Development with Emphasis on Implementation on User Experience

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A B S T R A C T

Chatbots and conversational technologies have turned into a popular study topic, many firms are beginning to use them to fulfil simple communication roles. Business organizations may rapidly and easily design their own systems using a wide range of accessible frameworks for chat-bot development from software behemoths. However, these platforms frequently lack a comprehensive set of tools for creating a controllable, flexible, robust chatbot. As a result, extra machine learning mechanisms are typically required to boost performance. In this research, we show how a chatbot system can respond to frequently asked questions (FAQs) from our institution's website using machine learning. To deal with extensive and sophisticated user questions, the system incorporates several forms of user inquiries as well as a vector similarity analysis component. Furthermore, Google's Dialog Flow framework 1 is employed for the purpose of identification.

Keywords: Chatbot, Dialog Flow, Conversational AI

Introduction

A chatbot is an automated software program that interacts with humans. It is merely a computer program that fundamentally simulates human conversations. A chatbot that functions through AI and machine learning have an artificial neural network inspired by the neural nodes of the human brain. Chatbots are programs that can do talk like human conversations very easily. For example, Facebook has a machine learning chatbot that creates a platform for companies to interact with their consumers through the Facebook Messenger application.

In 2016, chatbots became too popular on Messenger. Consequently, it was noted that 2016 was the entire year of chatbots. The software industry is mainly oriented on chatbots. Thousands of chatbots are invented on

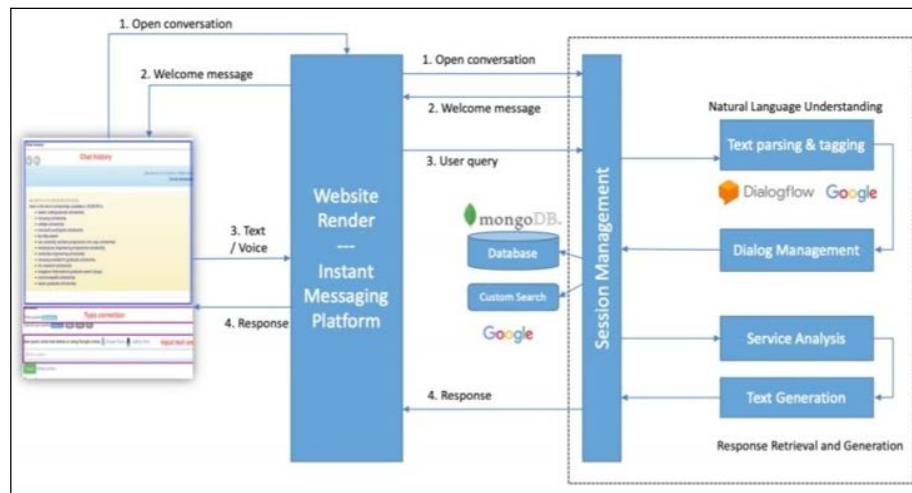
startups and used by businesses to improve their customer service, keeping them engaged by kind communication. According to research, nowadays chatbots are used to solve a few business tasks across many industries like E-Commerce, Insurance, Banking, Healthcare, Finance, Legal, Telecom, Logistics, Retail, Auto, Leisure, Travel, Sports, Entertainment, Media, many others. Thus, that was the moment to look at chatbots as which is a new technology in the communication field.

Nowadays various companies are using chatbots to answer quickly and efficiently some frequently asked questions from their own customers.

System Architecture and Implementation

In this section, we will describe in detail the different

We also implemented two additional sub-components to improve the chatbot performance: A module to compute sentence similarity to select the best response, a question generation module to provide more training data for chatbot.



Web User Interface

We use Python and Flask framework to build the website, as illustrated in Figure 3. It has a chat history to store the conversation log between user and system, a debugging panel to analyze the correctness of intent/entities extraction, similar queries to display the suggestion of typos corrected queries.

User interface for conversation with user. (a) User can have a conversation with the chatbot via text or speech (We are using two speech engines: Google Voice and our in-house speech engine). The input query (or transcription from speech engine) is entered in the User query text field. When user presses the Send button, the query will be sent to the chatbot agent. The back-end (Dialog flow agent and our webservice) processes the query, returns the response, displays output text in the Chat history area.

Other Modules

In addition to the main FAQ related capabilities, the following features have been also integrated into the system:

Chitchat: To make the chatbot more friendly and interactive with real users, we also used the small-talk feature provided by DialogFlow. This enables the chatbot to support out-of-topic conversations about itself, saying hello or goodbye or other chitchats.

User feedback: Getting explicit feedback from users is also useful for improving and adjusting the system responses. To this end, we also developed a feedback feature, which the user can provide any time after each query is responded.

Spelling correction: Our system also includes a sentence correction feature, which checks typos in user queries by using a Standard English dictionary. A sentence suggestion module will check the input sentence on the fly. We used the python library of *enchant*, with additional words.

Web crawler. To collect data used for our chatbot, we write the program, using the Selenium framework and Sukhoi 8 to browse the FAQs website of NTU to get the asked questions and answers. After processing and removed HTML tags and other meta-information, we had approximately 2600 question answer pairs, covering many topics.

Scope of the Project

Artificial intelligence is the hottest talking point for business users looking to improve their efficiency, deliver new ideas and take the next steps in the transition to a digital enterprise. AI and chatbots are helping democratize business, empower startups, help build new partnerships, something that every organization needs to prepare for.

“Every business is a technology business” was one of the mantras of the decade just concluded. Every company

across every vertical and market started working and communicating with smartphones, using cloud services to open their data and adopted as-a-service solutions to reduce the cost of doing business and broaden their business base and the opportunities for workers.

Bots can also boost collaboration, working as part of SharePoint, intranets, similar tools to provide key information, live updates and messages from both workers and other applications, warning of required approvals or actions to be taken.

Virtual agents can be deployed across the business to handle internal requests and processes, from risk management to planning and budgeting. All of these can be acquired or developed in-house to meet a specific need.

Conclusion

In this project, we developed a chatbot capable of interacting with people. This chatbot can respond to textual user input. AIML with program-o was utilized for this purpose. The chatbot can only respond to queries for which it has an answer in its AIML dataset. So, to expand the chatbot’s expertise, we may include APIs from Wikipedia, the Weather Predictions Department, sports, news, government, many more. In such instances, the user would be able to communicate with and engage with the chatbot across every field. The chatbot will be capable of answering queries outside of its dataset that are now occurring in the real world by using APIs such as Weather, Sports, News, Government Services. The next stage in developing chatbots is to assist humans in facilitating their job and interacting with technology using natural language or their set of rules. In future these chatbots, powered by artificial intelligence (AI), will be able to recall previous interactions and pick up information from them to respond to future ones. Conversation with the numerous multiple users of bots would be difficult. We can create a chatbot based on AIML and LSA as further development. This technology will allow a customer to connect more naturally with a chatbot. We may improve the conversation by incorporating and altering patterns and templates for typical client inquiries using AIML, the correct response is provided more frequently than LSA.

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