

RESTROBOT: An Interactive Chatbot For A Restaurant's Website Using Azure Bot Service

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ABSTRACT

Chatbot is a conversational software program that enables any business, be it any big company like Amazon, Zomato or a small business startup, to automate various business processes. They are built of multiple lines of code that runs in a machine but act like a real "human" while chatting with a customer. It is majorly used for customer management in order to respond to client's queries or grievances in a faster way than the usual method of solving issues by customer service representatives either through voice or non-voice process. This not only saves time but reduces man power, money and many other things. There are multiple ways using which a chatbot can be developed. The proposed project aims to use cloud technology in building, developing and maintaining a chatbot for a restaurant's website. Multiple cloud providers like AWS, Google cloud, IBM etc. provides platform to build, deploy and manage chatbots easily in cloud in a pay per use manner. This project is going to use Azure bot services as a framework provided by Microsoft Azure to build a knowledgeable, AI-based QNA bot to manage customers of a restaurant.

Keywords: Azure, cloud computing, chatbot, NLP, QnA maker

1. INTRODUCTION

ELIZA, an early natural processing software agent is believed to be the first ever chatbot developed by Joseph Weizenbaum between 1950s to 1960s. Since then a lot of chatbots has been developed. With the discovery of technologies like Machine Learning and Artificial Intelligence, the chatbots around the world are only getting better day by day. Everybody is well aware of importance of using a chatbot. Along with its automation capabilities, it also holds various benefits such as cost effective, time saving and most importantly, it can understand human language using NLP, hence making it user friendly.

According to Forrester Research, "... globally 57 percent of companies either use chatbots already or plan to do so in the coming year." Chatbot needs less human resource and hence it increases the business profits. As it automates customer interactions and business transactions at optimal cost, it saves a lot of business investment. With advanced technologies like ML and AI, chatbots are becoming better day by day. In order to survive in this growing competition among various businesses companies around the world, one needs to implement technologies like this to optimize their business processes and remain in the market. Any business needs a scalable, robust and easily manageable bots. Hence, in this proposed model, we have taken the scenario of a small restaurant which can take the help of chatbot to answer many repetitive / common questions asked by their customers.

2. OBJECTIVES

- To develop a robust, easy to manage chatbot
- To reduce human effort on managing customer interaction
- To build a scalable and secure system using technologies like cloud computing

3. LITERATURE REVIEW

[1] In this paper the author discussed about Azure and its cognitive services. He talks about the way Azure helps developers to build any face recognitions or virtual assistance easily. [2] In this paper the author talks about multi turn model in emotional chatbots. The author emphasizes that intent recognition and natural language understanding of multi-turn dialogue is key for the commercialization of chatbots. [3] In this paper the author does a detailed analysis on importance of chatbots and conversational agents. [4] In this document the author discusses about the role of Microsoft azure in building AI based chatbots. [5] In this document, the author discusses about the techniques available to implement bot technologies with social media accounts like twitter. [6] In this paper, the authors discuss about a chatbot which can be used to combat depression among young students. The bot can understand user's emotion based on some predefined labels such as "happy", "sad" etc. It identifies user's emotions based on this label. [7] Here, the author talks about a health care chatbot which is

designed to identify symptoms of patients online and help resolving queries related to health issues. [8] The author talks about a chatbot made up of AIML, which can be used as a tool for web analytics.[9] This document describes how AI and ML techniques can be used to build an intelligent chatbot which can answer all university related queries for students.[10] Here the author discusses about a bot made using python. [11] In this paper, various trends in development of chatbots has been discussed. [12] This paper discusses about a chatbot model made up of AIML and LSA templates to answer to various university related FAQs. [13] In this document, the author discusses about developing a chatbot using IBM Watson. [14] Here, the author discusses about various chatbot technologies and challenges. [15] In this documents, deep learning techniques for developing a chatbot has been discussed. [16] The author talks about a chatbot that is used to answer user questions using adobot approach. [17] Here the author talks about a bot called echo, that analyses all the cloud based chatbot and compares them. [18] Here the writer talks about HMI mechanism to design a chatbot. [19]The author proposes a model used to act as a companion for small children. [20] Here the designs an interviewing chatbot using NLP technology.

4. PROBLEMS WITH EXISTING SYSTEM

Let us have a look at some already existing models used for managing customers:

4.1 Manual customer management

- It involves handling customers by manually by people working in customer service
- Uses voice and non-voice process

4.2 Deploying chatbot in traditional way

Creating a chatbot using traditional methods involve a three-step process:

- Create and train a Machine Learning model for the chatbot.
- Add an API layer to the model, host it in a secure environment.
- Add a UI layer in the form of an app or something else, for the end user.

So in both these methods we see a common drawback. It involves a lot of time and takes a lot of man power. In manual method we need people separately to handle calls and emails whereas in existing method of bot development, we need people separately to develop, maintain and test the bots. We also need to take care of physical infrastructure if we adopt these methods.

4.3 traditional method of developing chatbots has the following drawbacks

- Time consuming
- Requires more human resources
- Costly
- Maintenance of servers, upgrades etc.

5. SOLUTION

To overcome this problem, we are going to use azure bot service, a service provided by Microsoft azure in building and deploying the chatbot. Azure Bot Service enables us to build intelligent, enterprise-grade bots with ownership and control of data. We can begin with a simple QnA bot or build a sophisticated virtual assistant using Azure cognitive service with the bot framework. It also allows us to pull codes directly from GitHub and connect the bot to multiple channels like social media and Gmail.

The benefits of cloud computing are well known to everyone. The use of this technology in building a bot proves to be very advantageous in the following ways:

- **Cheaper Cost:** As this is pay-as-you-go model, developers need to pay only for what is being used.
- **Easy Integration:** It's easy to integrate the chatbot framework with other services like app services, website deployment etc.
- **Easy development:** Even non coders can build a chatbot easily
- **Easy integration of technologies:** such as ML and AI
- **Saves resources:** As all the resources will be from cloud, we there will be no physically underutilized resources left in our physical system
- **No worry for upgrades:** All the software upgrades will be maintained by the providers
- **Secure:** Cloud services uses proper authentication and authorization techniques to prevent unreliable access
- **Availability:** cloud services are available 24*7
- **Easy deploy:** Using PaaS services, we can easily deploy an application without having to worry about system configuration or need of any other resources

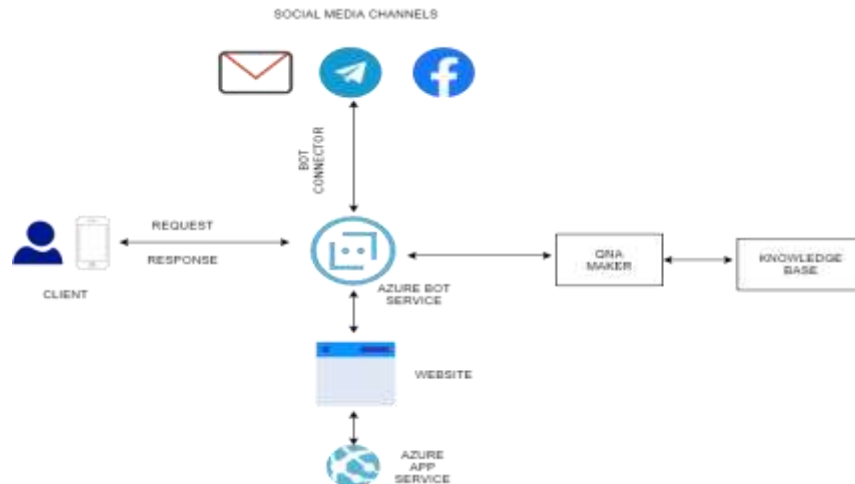


FIG 1: Conceptual Architecture of the proposed model

5.1 Componenta

1. **Client:** responsible for requesting as well as receiving queries from the bot
2. **Website:** A basic website where the azure bot service will be integrated
3. **Azure Bot Service:** A service provided by Microsoft azure which allows to develop and deploy chatbots without worrying about management of the underlying infrastructure
4. **QnA Maker:** Azure AI service which allows the bot to answer common FAQs of the customers
5. **LUIS:** a cloud-based conversational AI service that applies custom machine-learning intelligence to a user's conversational, natural language text to predict overall meaning, and pull out relevant, detailed information.
6. **Bot Connector:** allows us to integrate the bot service with various channels like Gmail, social media etc
7. **Knowledge base:** it is the repository that contains the information in the form of question answer pairs , used by the QnA maker to respond to customer queries
8. **Intent and entity:** used by LUIS to understand the meaning of customer's query and return relevant results
9. **Azure app service:** used to host web applications in azure.

6. WORKING

1. The end user accesses the bot via user interface
2. The user posts their queries.
3. The bot grabs the queries and looks for matching pattern of the queries in its knowledge base.
4. The bot responds back to the clients with most appropriate answers.

7. FUTURE ENHANCEMENTS

- By using other Azure cognitive services like LUIS, face recognition and speech recognition systems, the proposed model can be made more creative and advanced
- We can use azure analytics services like text analytics to analyses and understand the user data
- We can enable the scalability option in order to make the bot scalable according to the work load
- Other services like logic apps, azure functions etc can be used to make the bot more automatic.

8. CONCLUSION

Using cloud computing framework we can easily build chatbot of our own without having to worry much about its maintenance, cost, system requirements and scalability.

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