



# Interview Bot Development With Natural Language Processing And Machine Learning AI Talk

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**Abstract:** The advent of virtual assistants has made communicating with computers a reality. Chatbots are virtual assistant tools designed to simplify the communication between humans and computers. A chatbot will answer your queries and execute a certain computation if required. Chatbots can be developed using Natural Language Processing (NLP) and Deep Learning. Natural Language Process technique like Naïve bayes can be used. Chatbot can be implemented for a fun purpose like chit-chat; these are called Conversational chatbots. Chatbots designed to answer any questions is known as horizontal chatbots and the specific task-oriented chatbots are known as vertical chatbots (also known as Closed Domain Chatbots). In this paper, we will be discussing a task-oriented chatbot to help recruitment team in the technical round of interview process.

**Keywords:** NLP, Machine Learning, Chatbot, python, Google-text-to-speech

## I. Introduction:

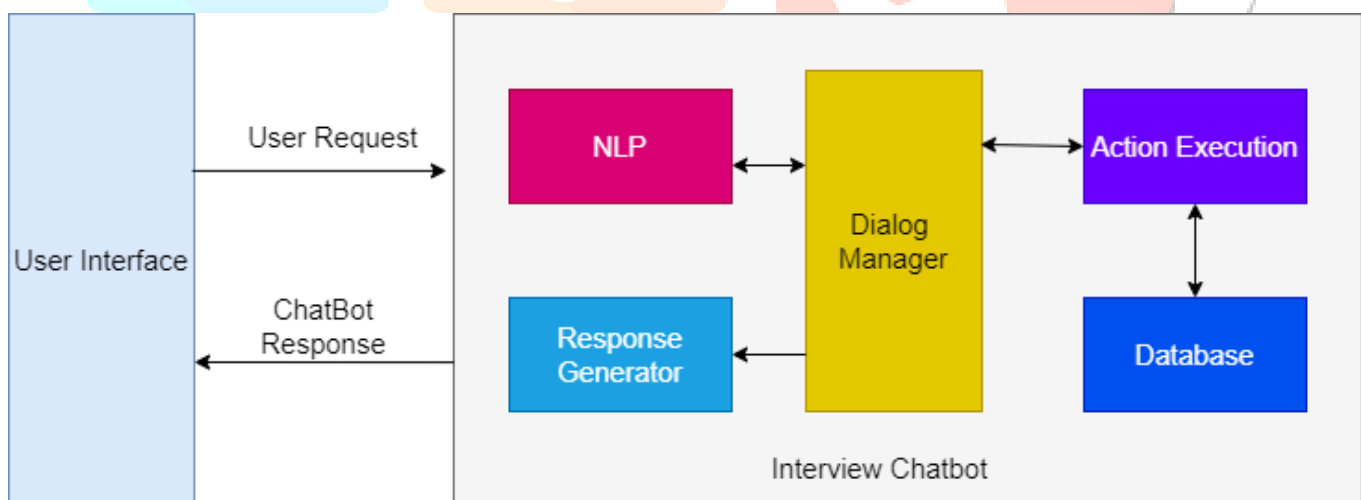
The use of chatbots has increased extensively in recent years. Many industries, hotels, and flight booking companies use virtual agents to communicate with their users. Chatbots in industries are used for various purposes. Sometimes, they are used to display information. If required, they even help in complex tasks like checking/tracking order status for e-commerce companies. This is the one of the many purposes of task-oriented virtual agents. In this paper, we will be discussing a task-oriented chatbot, which will be useful for companies to filter out the candidates who are less suited for the job based on their scores which will be determined by the bot. Each question will contribute 10% of the total questions (100%). 10 questions in each section: Easy, Moderate and Difficult. We are making use of Naive Bayes as a classification technique. Naive Bayes Classifier uses labels to distinguish between different intents. We will store answers for each question in a label that will be used as intent. Naïve Bayes Classifier is easy and fast. It uses probability to classify text. Naïve Bayes is a probabilistic classifier, which means it predicts on the basis of the probability of an object. This algorithm has a frequency table from which likelihood of the word can be predicted; When salutation is being exchanged, if the user says he is excited for the test, “excited” will be classified as a happy emotion with the help of Bayes theorem. This goal-oriented dialog system will assist the Human-Resources team to eliminate the least suitable candidate as per the company’s requirements. A Pattern matching approach is used

in this chatbot to match the answers from the pre-approved answer list which will be stored in the labels. classification method applied in this research is the Naive Bayes method and compared with the Logistic Regression method to determine the class intention.

Leverages the power of [Artificial Intelligence](#) and [Machine Learning algorithms](#) to create a Speech Recognized Question Answer generator . Besides being a smart and random question generator for test authors, it also serves as a one-stop solution for all content needs of an organization.

### Methodology

In this proposed work we want to build a chatbot for conducting an interview which can overcome some of the problems in current system. Consider an organization wants to conduct an interview, and to do this they have to select an interview panel members, location of interview. During this process organizations spend lot of money. This problem can be solved by using chatbot. First we will feed candidate's personal, academics details in database (knowledgebase). Then system will assign unique ID to each candidate. When candidate enters his unique ID, he will be authenticated and interview session will be started. Chatbot will begin interview by greeting candidate just like human interviewer. Now, based on the candidate's details bot will start asking questions. Questions can be multiple choice, finding output of given program, questions based on current technology etc. All responses will be checked and result will be stored in database. This will be performed for all candidates. On the basis of results and statistics classification of candidates will be done. In this way suitable candidate for particular post in IT company can be selected.



#### 1) Verification of the assigned candidateID:

As the user begins the interview a photograph of the candidate is to taken and stored in the database. The next step involves the user giving the input i.e. the uniqueID provided to him which is different for each candidate. The ID is the verified with the back end database and the candidate is authenticated. The result of the authentication is sent back to the computer and the further process can be continued.

#### 2) Interview Phase:

This phase includes the actual interview process which is similar to the orthodox interview method. The only difference is that the interviewer will be an Artificial Intelligence powered Chatbot instead of a human. The answers provided by the user are stored and analyzed and finally the result is generated.

The NLP framework spaCy is used which is very coded and documented. The two data structures in spaCy are the Doc and the Vocab. spaCy's tokenizer has to assume that there will be no multi-word tokens. In this way our expression is simplified and we deal with only a small chunk of data at a time. Keyword Extraction is the process of choosing specifically declared words. This is used to match the answers with keywords and to calculate the accuracy of the candidate's answer.

### **Design process and methods**

For the project, we wanted to have a simplified user-centred approach (hereby referred to as UCD). UCD is an iterative design process in which designers focus on the users and their needs in each phase of the design process (Interaction design foundation, unknown). UCD calls for involving users throughout the design process via a variety of research and design techniques so as to create highly usable and accessible products for them. The reason why we wanted to have a UCD design approach is to use the chatbot to explore how the users can, wish and needs to use the chatbot to achieve their goals. Our goal was to facilitate user involvement through interviews and to learn about their context. The interviews was small where we tried to understand people's opinion about the subject. They were not only a conversation between the us and the participant but we also asked participants to execute some tasks interacting with a chatbot. Afterwards we asked them questions about the experience.

### **Result and Discussion -**

Chatbot will be deployed on local machine in order to keep the architecture of system simple .Here we are taking user's data manually before interview and giving candidate a unique ID. This process is time consuming. In future we can deploy it using web client services. Which will make it available 24\*7.And candidates data will be taken by using html form and this data will be given to Chatbot knowledge base. This will improve assessment process as more relevant questions would be asked to candidate .In the future we can also develop a feature to detect the candidate's state of mind to see if he is nervous or not using webcam. Chatbot will assess the candidate's resume, marksheets and other related documents using image processing. User interaction session then begins and the chatbot begins the interview. User's answers are matched with the keywords and final outcome of the selection process is calculated. If a candidate has a specialization in any field the system may ask questions based on those specific topics.

### **Conclusion and Future Work**

Although traditional human interviewing method is accepted worldwide, it can be replaced to some extent by using AI powered chatbot. System is developed to use in IT companies as of now. Companies would definitely select this system to overcome the drawbacks in existing systems and procedures. Furthermore system will bring transparency and in candidate selection process. Chatbot will generate results within minutes as compared to traditional method. As knowledge-base is connected to internet, it can be easily updated and changes would take place immediately.

Advancements in NLP and ML are propelling chatbots toward a future where their conversations closely mimic human interaction. Users will experience more natural and engaging interactions with chatbots, improving user satisfaction.

Because of the scope of the project we did not have time to conduct as much user testing and re-design to the chatbot as we would have liked. This has an impact on the validity of our research. Through the project we have touched on some theory when making the chatbot, but this should also have a larger focus for higher validity. Even though the participants trusted the information given in this project we cannot say that people trusts a chatbot as much as they trust a human being. There are also biases in our project, one of them is that all the students that we included in the project already knew a lot of the answer the prototype could provide. Another bias is that the information the chatbot provides could be seen as “casual” and are not crucial and/or vital This could have had an impact on the results regarding trustworthiness. With that being said we also think that some of our findings could give some insights into how a very small group of people think about using a chatbot to gain information in a school context. Some of the characteristics of our chatbot was viewed as appropriate for the given context, like “casualness” and links to where the information was gathered. If the IFI chatbot is to be furthered developed, this could be something to draw upon

## References

- 1) Joko Siswanto, Sinung Suakanto, Made Andriani IJtech Vol 13, No 2 (2022), “Interview Bot Development with Natural Language Processing and Machine Learning”,
- 2) Suman K. Saksamudre, P.P. Shrishrimal, R.R. Deshmukh, “A Review on Different Approaches for Speech Recognition System”
- 3) S. Furui; T. Kikuchi; Y. Shinnaka; C. Hori 2004 - [ieeexplore.ieee.org](http://ieeexplore.ieee.org) , “Speech-to-text and speech-to-speech summarization of spontaneous speech”.
- 4) Augello, A., Gentile, M., Weideveld, L., Dignum, F.: A model of a social chatbot. In: De Pietro, G., Gallo, L., Howlett, R.J., Jain, L.C.(eds.) Intelligent Interactive Multimedia Systems and Services 2016. SIST, vol. 55, pp. 637–647. Springer, Cham (2016)
- 5) [Nishimura et al., 2005] R. Nishimura, Y. Watanabe and Y. Okada. A Question Answer System Based on Confirmed Knowledge Developed by Using Mails Posted to a Mailing List. In Proceedings of the IJCNLP 2005, pp.31-36, 2005
- 6) Avalverde, D. (2019). A Brief History of Chatbots. Perception, Control, Cognition. Retrieved March 9, 2019 from: <https://pcc.cs.byu.edu/2018/03/26/a-brief-history-of-chatbots/>
- 7) Ayedoun, E., Hayashi, Y., & Seta, K. (2015). A Conversational Agent to Encourage Willingness to Communicate in the Context of English as a Foreign Language. *Procedia Computer Science*, 60(1): 1433–1442.
- 8) Ben Mimoun, Mohammed Slim, & Poncin, I. (2015). A valued agent: How ECAs affect website customers' satisfaction and behaviors. *Journal of Retailing and Consumer Services*, 26: 70– 82.
- 9) Chatbot Magazine (2019). A Visual History of Chatbots. Retrieved March 9, 2019 from: <https://chatbotmagazine.com/a-visual-history-of-chatbots-8bf3b31dbfb2>
- 10) Colace, F., De Santo, M., Lombardi, M., Pascale, L., Pietrosanto, A. (2018). Chatbot for E-Learning: A Cases Study. *International Journal of Mechanical Engineering and Robotics Research* Vol. 7, No. 5, September.
- 11) Egencia (2018). What is a Chatbot and How does it work? Retrieved March 9, 2019 from: <https://www.youtube.com/watch?v=38sL6pADCog>
- 12) Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*: Routledge. <https://chatbotmagazine.com/a-visual-history-of-chatbots-8bf3b31dbfb2>
- 13) Lip ko, H. (2018). Meet Jill Watson: Georgia Tech's first AI teaching assistant. Retrieved on March 9, 2019 from: <https://pe.gatech.edu/blog/meet-jill-watson-georgia-techs-first-ai-teaching-assistant>.
- 14) Maruti Techlabs. (2018). Why can chatbots replace Mobile Apps immediately? Retrieved March 9, 2019 from: <https://www.marutitech.com/why-can-chatbots-replace-mobile-apps-immediately/>

- 15) [Nguyen, M. \(2017\)](#). How artificial intelligence & machine learning produced robots we can talk to. Business Insider. Retrieved March 9, 2019 from: <https://www.businessinsider.com/what-is-chatbot-talking-ai-robot-chat-simulators-2017-10>
- 16) Simplilearn (2018). Machine Learning Basics. Retrieved March 9, 2019 from: <https://www.youtube.com/watch?v=ukzFI9rgwFU>
- 17) Sproutsocial.com (2018). A complete Guide to Chatbots in 2018. Retrieved March 9, 2019 from: <https://sproutsocial.com/insights/topics/chatbots/>
- 18) V Soft Consulting. (2019). 7 of the best Language-learning Chatbot Apps. Retrieved March 9, 2019 from: <https://blog.vsoftconsulting.com/blog/7-of-the-best-language-learning-chatbot-apps>
- 19) Wikipedia (2019). Chatbot. Retrieved March 9, 2019 from: <https://en.wikipedia.org/wiki/Chatbot>
- 20) Wikipedia (2019). Siri. Retrieved March 9, 2019 from: [https://en.wikipedia.org/wiki/Siri#Features\\_and\\_options](https://en.wikipedia.org/wiki/Siri#Features_and_options)
- 21) Winkler, R., Söllner, M. (2018): Unleashing the Potential of Chatbots in Education: A State-Of-The-Art Analysis. In: Academy of Management Annual Meeting (AOM). Chicago, USA.

