

# RECRUITMENT CHATBOT

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**Abstract-** A chatbot is typically an AI (Artificial Intelligence) computer program which can act out a conversation through auditory or textual methods. Chatbots are often designed to comprehend a conclusive human response while behaving as a Human conversational partner. Using a Chatbot that is an AI for recruiting candidates, automates time consuming tasks such as sourcing, screening and messaging. Recruiting Bots are a solution to the binding field problems. Candidates believe that the Ideal Recruiting interaction is a balanced mix of Innovative technology and human Intervention. The advantage of recruitment chatbot is it can be used over E-mail, SMS and Social Media.

**Key Words:** Chatbot, Recruiting Bots, Innovative Technology, Artificial Intelligence, Human Conversational Partner.

## 1.INTRODUCTION

This Internet is the new perineal river of information, with the reaches of the internet expanding it is constructively difficult to absorb the correct information quickly. In our case it pertains to reaching/recruiting the right candidate. A solution to this problem is to use a human artefact collaborator or simply known as chatbot. It can be used by recruiters to automate many time-consuming tasks like collecting information, screening the candidates, ranking candidates based on multilateral qualifying metrics, answering FAQ's and also help schedule a human interview [1]. All this can be done Realtime and simultaneously for over thousands of candidates. A Chatbot would automate about 4/5th of the total "Top-Of-Funnel" Recruiting activities. It is Assumed that about 65% of resumes of candidates are ignored. A chatbot could do the tasks a human recruiter neither has the time nor the capacity to do. We would like to clarify that chatbots are not aimed at replacing humans rather improve their efficiency and reduce tedious and tiresome overhead tasks [2]. This paper aims to present the possible ways of implementing a typical chatbot system.

## 2.SYSTEM DESIGN

The Chatbot Designing is a process of defining the interaction between the user and the chatbot. The programmer will determine and define the chatbot personality, the questions that will be asked and the overall interaction. This is a subset of the conversational design [3]. To speed up this process, designers can use dedicated chatbot design tools such as IBM-Watson, Conversational Interface and Azure Bot Services. This allow for immediate preview, team collaboration and analysis. An important aspect of the chatbot design is user testing.

We can develop Chatbots on Content Marketing Model for companies. It is the process of creating an organic channel for the business using content. Types of content is varied like blog posts, videos, info graphics etc. Content can help acquire thousands of potential target clients/Candidates. I.e. achieved by using content to gain insights from user behavior via Machine Learning Algorithms [4]. This data helps companies interpret what their customers are like and what they require/crave. Let us now discuss as to how this is achieved.

Chatbots use Dialogues Systems, and they are of two types:

- 1) Goal Oriented Dialogue Systems.
- 2) General conversation Dialogue Systems.

The Recruitment Chatbot requires a General Conversational Dialog System, we use Generative and Selective approaches. The core philosophy for both these is the same Machine Learning principle: Build it, Train it, Test it.

We build a model by Using a dialogue dataset, bot characteristics, access flow, constrains and Sequence tokens. The problem here is finding quality data dialogue, by extension a dialogue dataset. Since labelled data sets are easiest to learn from, we acquire a developmental dialogue dataset.

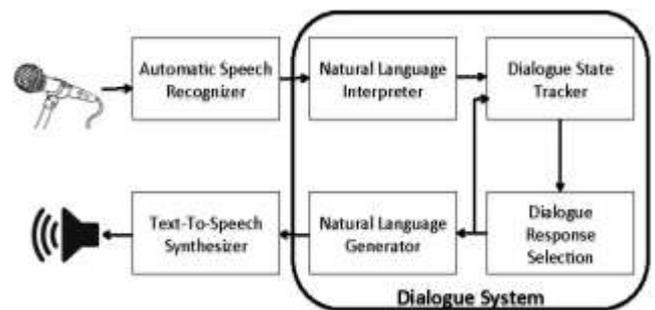


Fig -1: Data-driven Dialogue System.

## 3.IMPLEMENTATION

We call each row in the dialogue dataset [5] a Context-Reply pair. The context could be one or several input sentence's while the reply would be the label. Sometimes there are EOS Tokens (End of Sequence) at the end of each sentence in the batch. EOS tokens help Machine Learning Algorithm understand sentence bounds and update its internal state accordingly.

We can generate this dialogue datasets from various websites and these chatbots can be used as a tool for engagement on various application platforms [6].

Generative models are a consequence of “A Neural Conversational Model”. This uses a model called “sequence to sequence” to model the dialogue given to them in a dataset.

Artificial neural networks have multiple nodes, these nodes take input data and perform simple logical operations on the data. The output of these operations is passed to the next corresponding neuron. The output at each node is its value or activation. Each of these links are associated with weights. Neural Networks are capable of learning by altering weight values.

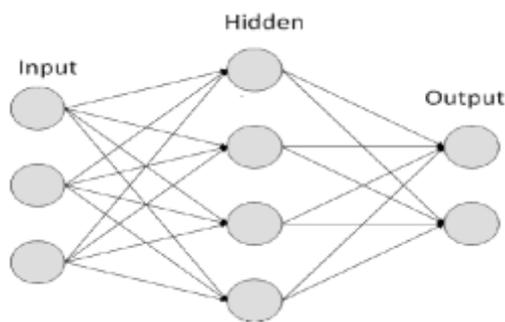


Fig -2: Basic Neural Network.

The Generic Chatbot model is represented by two recurrent neural networks with different sets of parameters. A Regular feed forward neural network and a Recurrent Neural Network. The Regular feed forward neural networks are given a new data point at every time step in training to learn from.

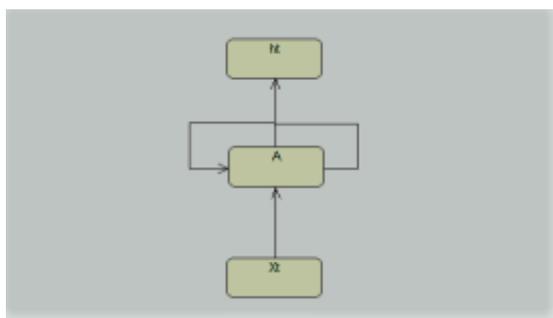


Fig -3: Regular feed forward neural network.

The Recurrent Neural Networks are given both a new data point and the learned hidden state of the previous step for each new time step during training.

Here the recurrence arises not just from the data but also from how it’s learned previously i.e. a form of feedback loop.

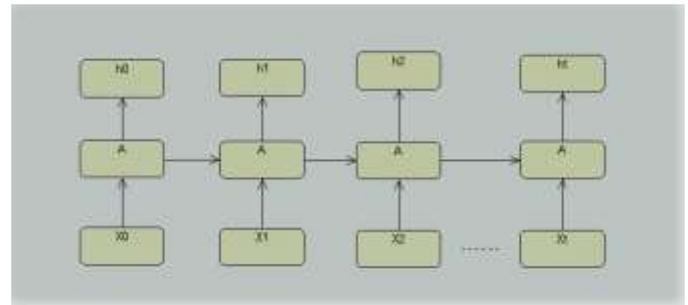


Fig -4: Recurrent Neural Network.

The first recurrent net is called the Encoder, it is given a sequence of context tokens one at a time and updates its hidden state accordingly. When the complete sequence is processed, it produces a final output called the hidden state, which integrates the context and uses it for generating the corresponding answer [7].

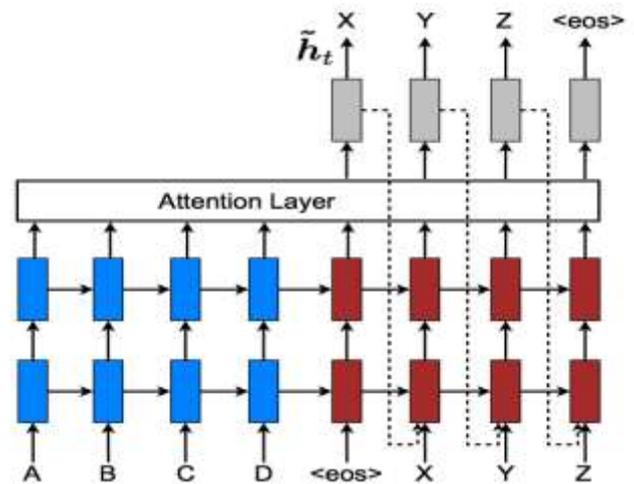


Fig -5: Encoder & Decoder Process.

The other recurrent net is called the Decoder, its job is to take the context representation from the encoder as an input and output an answer. The decoder is fed with the final hidden state of the encoder. The EOS token is the first input to the decoder which updates its hidden state. A word sampled from the last layer is fed in as input, the hidden state is updated and the new word is output this process is repeated in a loop until an EOS token is given as output or reaches some predefined answer threshold.

This process is considered as inference, it’s the process that a chatbot model goes through in real time after its been trained. The training part is slightly different in each decoding step. we utilise the correct word instead of the generated one as the input. Ultimately the decoder consumes the correct reply sequence but with the last token removed and the EOS token propended.

The goal during training is to maximise the probability of the correct next state on each time step. We minimise the error through the most popular optimisation strategy in ML called "Back Propagation".

### 3.1 TECHNICAL REQUIREMENTS

- Object Oriented Architecture.
- Machine Learning Techniques.
- Data Mining Algorithms.
- Training and Testing data.
- Neural Networks and Decision trees.
- Experienced Programmer to characterize the system.
- Intelligent Agents.

### 3.2 RISKS & CHALLENGES.

- Development and Delay Risks.
- Skilled Personnel.
- Customer feedback incorporation.

### 4.FUTURE SCOPE

There is always a scope for improvement on those lines let's see the future scope of Chatbots, the analysis techniques can be improved, Chatbots can be applied in the field of education as a learning tool. They can provide valuable insights and solutions if applied to the field of finance. In conjunction with the domain experts the bot could learn to predict and also analyze the character of a person. This will prove to be a valuable asset as the team atmosphere won't be affected adversely with addition of new members.

### 3. CONCLUSION

The common challenge across the talent Acquisition industry across product development industry and the service companies was that they all had large volumes of resumes in their Application Tracking System (ATS) and Customer Relation Management (CRM) Systems but manually filtering those resumes and mapping candidates to job openings from these systems was a very tedious task for recruiters. Finding qualified candidates from the large volume of the applicant pool and engaging them is the key to successful recruiting. This is where the technology could play a key role in making the recruiters' life easy. we are automating the screening and initial communication through our smart algorithms and candidate engagement through our intelligent assistant I.e. the Recruiter Bot.

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