



Comparing the Performance of Chat-Bot's as Conversation Agent for Interactive Applications

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ABSTRACT: Background & Relevance: A chat-bot aims to form a spoken language between human and machine. The machine has embedded information to spot the sentences and creating a call itself as a response to answer an issue. Chat-bots are going to be fully supported a text-based program, permitting the user to type commands and receive text further as text to speech response. Chat-bots are state full services, they remember previous commands and produces output accordingly. It can often used firmly by a good larger audience once chat-bots technology is integrated with web services. The college inquiry chat-bots are going to be built using artificial algorithms that analyse user's queries and perceive user's message. The response principle is matching the input sentence from a user. The User will raise the question for any college-related activities through the chat-bot while not being physically out there at the college for inquiry. The System analyses the question so answers to the user. With the assistance of AI, the system answers the question asked by the user. The system replies with a good Graphical user interface as if a real person is talking with the user. The user simply needs to register himself to the system and needs to login to the system.

KEYWORDS: Chat-bots, Natural Language Processing (NLP), Conversational Agent, AIML, NLTK, SQL.

I. INTRODUCTION

Chat-bots (also referred to as a talk-bot, Bot, Artificial Conversational Entity, IM bot or chatterbox) is a computer programme that mimics human conversations in its natural format as well as text or language using AI techniques like Natural Language Processing (NLP), image and video process, and audio analysis. Chat-bot for college management system project are going to be developed using AI algorithms that will analyse user's queries. This technique is going to be an online application which is able to offer answers to the analysed queries of the user. Users can simply ought to choose the category for queries to raise the question to the bot that is used for responding it. Artificial intelligence will be used to answer the user's queries. The user can get the suitable answers for their queries. The answers will be given to users using artificial intelligence algorithms. Users need not to go in person to the college for inquiry. The Users needs to register to the system and needs to login to the system. Once logged in, user will access the different pages. There'll be many helping pages out there, through that the user will chat by asking queries associated with college activities. The system can reply to the user with the assistance of effective graphical programme (GUI). The user will question concerning the college-related activities with the assistance of this web application. The college-related activities like annual day, sports day, intake of students and different cultural activities. It'll facilitate the students/user to be updated concerning the college activities.

II. LITERATURE REVIEW

Paper [1] has Chat-bots principally offer communication between human and machine. Admin feeds some data to the machine in order that the machine will determine the sentences and take a choice itself as a response to answer a question.. The chat used is Indonesian conversational pattern and also the database utilized in this project is MySQL. It can miss in defining a sentence and the way to the response while connecting a chat application to the database. Therefore data representation and implementation of SQL within the pattern-matching operation area are required. A data that has been sculptured based on the pattern of the communication would be tested by the assistance of a series of



situations. The conversation with the chat-bots would be cross checked back to the basic pattern. it's done in order to add some knowledge to the database because it has not been modelled before. If just in case the input sentences within the information failed to match then it'll be reworked.

In this paper [2], they tackle the issue of dialogue generation with different emotions. Given a user's utterance and emotions, the chat bot is able to generate correct responses on word contents and emotion level. They worked in Sentiment analysis which is active research area in natural language processing. 88 million lines of subtitles of videos and movies in an open subtitle database was collected for this project. They used 6 sentiments to be detected by chat bot. Text contents are first turned into audio with the help of say command of Linux. User's voice with sentiments is determined and given as input to, which then produces an appropriate response using a multilayer sequence-to-sequence encoder-decoder model.

[3] Question Answering (QA) systems may be known as data accessing systems that try and answer to natural language queries by providing answers rather than providing the easy list of document links. QA system selects the foremost acceptable answers with the help of linguistic options that are available in natural language techniques. They are different from knowledge sources; the wideness of Dialog Systems (NLDS) is associate degree acceptable and simple way to access data. QA system based on Semantic enhancement and the implementation of a domain-oriented based on a pattern-matching chat-bots technology developed among appropriate industrial project (FRASI). The projected approach simplifies the chat-bots realization that uses two solutions. Initial one is the ontology, that is exploited twofold manner: to construct answers very actively as a results of an deduction method regarding the domain, and to automatically populate, off-line, the chat-bots KB with sentences that may be derived from the ontology, describing properties and relations between ideas concerned in the dialogue. Second is to preprocess of sentences given by the user so it may be reduced to an easier structure that can be directed to existing queries of the chat-bots. The aim is to provide useful data concerning products of interest supporting consumers to get what they need precisely. The selection was to implement a QA system employing a pattern-matching chat-bots technology.

Paper [4] states that when user complaint is submitted to the system, Natural language processing technique is applied and sense of the complaint is detected. The sense of the words is found using a part of speech tagging and wordnet dictionary. By using the sentiment analysis negation level of a complaint is detected and user complaints are prioritized consequently. Once the negation level of the complaint is detected, moreover, the precise question in the complaint is detected using WorldNet. Interface. WorldNet is a lexical and semantic database for the English language with the help of which clustering English words into the set of synonyms called synsets is done. It provides short definitions and usage examples, and records variety of relations among these equivalent word sets or their members. If a selected question isn't found in database such queries are answered by admin person. Once he answered the question, that answer is sent to the user. And that question along with the response is stored in the database so whenever such queries are asked ,they get answered directly from the database. Because of this admin doesn't have to be compelled to answer same question manually any longer.

TABLE I. COMPARISON TABLE OF SOME RESEARCH PAPERS

Ref. No.	Methodology	Strengths	Weaknesses	Accuracy	Domain	Voice/Text
[1]	Data pre-processing and Training & Testing the Models in SVM & ANN.	The Testing Procedure for System Model was regarding Specification, Precision, Accuracy, and Sensitivity.	Multiple Thresholds need to be added for Progressing.	SVM – 85.6% ANN – 83.3%	Medical (Heart)	Text
[2]	Defines an Emotional Expression Model in order to Categorize, Collect Training Data for Emotion Recognition, Emotion Recognition, and Inference, Continuous Emotional Monitoring.	Focuses on human emotion recognition and its monitoring, and also conversation understanding on chat assistant.	It needs to expand this conversational service to game addiction cases of teenage, and thereby investigate clinical results with user satisfaction.	67.52% on avg. for all seven emotional states.	Mental/ Psychiatric Counselling	Both



[3]	Uses energy balance equation, which is: $E_s = E_i - E_e$.	SWITCHes app was designed to take in an individual's dietary intake and energy expenditure data on a regular basis into the webserver.			Weight Control	Text
[4]	Built using Convolutional Neural Network using Tensorflow.	Great way to deliver personalized healthcare and fitness information.	The user has to jump into various services for healthcare and fitness	98.39%	Medical	Text
[5]	It's a prototype which can extract and determine unknown knowledge related with heart disease from a past heart disease records.	Cost-effective computer-based treatment. Support Systems can be developed to make better decisions.	Bad clinical decisions can lead the death of a patient which can be expensive for any hospital	Naive Bayes – 90% and Decision Tree- 96.5%	Medical (Heart)	Both
[6]	Single-supply biasing method	DocBot system can provide easy access, 24/7 availability and anonymity to the users.	When a disease affects a crowd of people, regional doctors can get overburdened and cannot consult all patients at the same time.		Medical	Both
[7]	The chatbot makes use of Beautiful Soup python library to scrap data from cancer forums and store it in a local database also uses NLTK available in python for pre-processing of data.	Cancer bot helps Cancer patients to share their problems regarding cancer when they are in a helpless situation. It can learn from previous conversational experience.	Accuracy of the chatbots generated responses depends on the accurate data scrapped from cancer forums.		Medical	Text
[8]	Uses open-source PHP interpreter designed for AIML called program-o to build its core. It uses MediaWiki API if the user's query match is not found in the local database to explore from external Wikipedia knowledge source.	Program-o is open-source technology and has a flexible structure which can accommodate code modifications.	AIML doesn't have a logic engine and has a poor pattern matching functionality with the presence of fixed knowledge in the chatbots knowledge-base.	65%	Medical	Text
[9]	Uses Dialogflow Platform	Dialogflow supports Natural Language Understanding which can develop chatbots without	Chatbot may respond with the incorrect answers because of small training phrases.	Not Mentioned	Medical	Both



		writing code.				
[10]	Uses Decision tree Algorithm for prediction of Heart Diseases.	Divides data set into 2 parts for performance evaluation.	There can be possibilities of classification errors.	Correctly Classified Instances 87.41722%	Medical	-
[11]	Made a conceptual model connecting the system to the information source. Used MAS tools to achieve anticipated behavior in the dialog manager, and RL to ensure facilitate learning.	Has access to reliable and accurate maternal health information. Helps in reducing waiting time in hospital avoiding queues.	Don't have any consolidated health record systems and may rely/feed on another system.	-	Medical	Text

III.PROPOSED SYSTEM

This system is going to be a web application which is able to give answers to the analysed queries of the user.

1. User login and Complaint
User registers himself/herself on Chat-Bot application. Then submits his/her complaints and college related queries.
2. Chat BOT Responding System:
 - a. NLP processing and Sentiment Analysis for Complaint:
When user complaint is submitted to the system, Natural Language Process is applied and sense of the complaint is detected. The sense of the words is found with the help of part of speech tagging and worldnet lexicon. By using the sentiment analysis, negation level of a complaint is detected. And user complaints are prioterized accordingly.

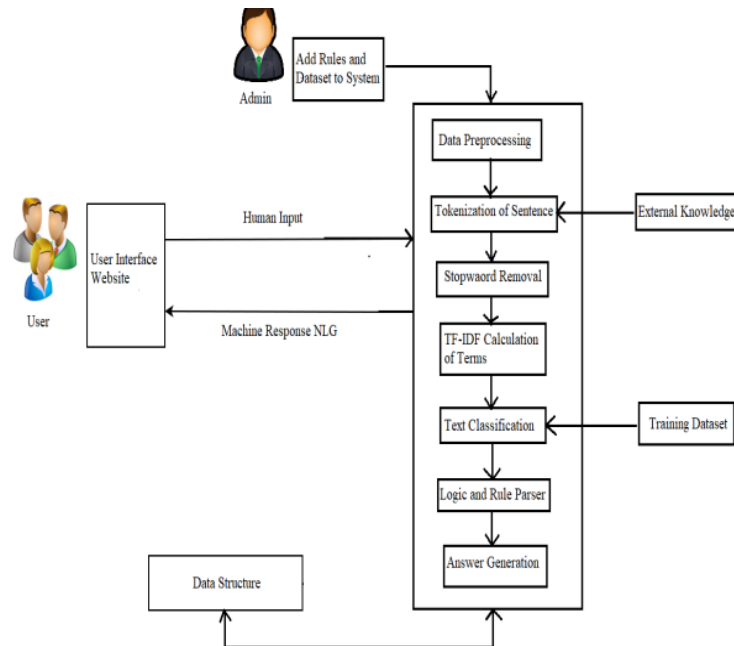


Fig1. System architecture



b. Search queries in knowledge database:

Once the negation level of the complaint is detected, moreover, the precise question within the complaint is detected using WorldNet.

As every person's complaint description is different, the equivalent question could also be asked otherwise from multiple users. One user raise a query simply and clearly whereas another user might ask the equivalent question with a lot of negatively. Therefore it's necessary to seek out what's the precise technical issue with the actual product to present an accurate resolution.

3. Answer the Complaints

As described above, whenever user submits a complaint, the negation level and actual issue/question of the complaint are detected. Then it's checked that there's such question registered in the database. If the solution is found then that answer is sent to that user. If specific question isn't found in database such queries are answered by admin person. Once he answered the question the answer is sent to the user. And that question along with answer is stored in knowledge so whenever such queries are asked again, they get answered directly from the database. Due to this, admin doesn't need to answer same question manually any longer

Interface. WorldNet is lexical and semantic database for English language. It is used to cluster English words into the set of synonyms referred to as synsets, it provides short definitions and usage examples, and records variety of relations among these equivalent word sets or their members.

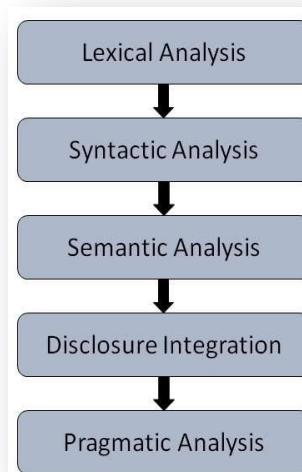
Proposed Methodology:

1. Data Set : In proposed system, two datasets will be used.

- Text query: The proposed work consist of chat bot which will input as text queries with limitations.
- Voice query: The proposed work consist of chat bot which will input as voice queries with limitations.

2. Proposed Methodology:

Following is the proposed system methodology:



- I. Lexicon analysis: It involves recognizing and analysing the structure of words. Lexicon of a language means that the gathering of words and phrases in a language. Lexical analysis is dividing the full chunk of text into paragraphs, sentences, and words.
- II. Syntactic Analysis (Parsing):- It involves analysis of words within the sentence for grammar and composing words in a very manner that shows the link among the words. The sentence like "The faculty goes to boy" is rejected by English grammar analyzer.
- III. Semantic Analysis:-It specifies the precise meaning or the wordbook meaning from the text. The text is checked for its meaning. It's done by mapping grammar structures and objects in the task domain. The semantic instrument disregards sentence like "hot ice-cream".
- IV. Discourse Integration:-The meaning of any sentence depends upon the meaning of the sentence simply before it.



V. Pragmatic Analysis:- During this, what was aforementioned is explained again what it really meant. It involves interpreting those aspects of language that needs real world knowledge.

The flow chart of the system is as follows :



Fig 2. Flow chart

Algorithm Used:

Input : Query q, Answers (A₀....A_n)

Output : Relevant Answer,

Procedure : Parse User Input Sentence q.

If (q==chat)

```
{
    Add Chat to Chat table
    Grammar Parsing
    Generate Relevant Reply
}
```

Else if (q==statement)

```
{
    Add Statement to Database
    Apply Grammar Parsing
    Generate Relevant Reply
}
```

Else if (q==question)

```
{
    Generate Tokenization of Question (T0....Tn)
    Remove Stop Words Using Corpus
    1. Tf = fTnin (s) / l(s)
    2. IDF = l(s) in D / l(s) ∈ Tn
```




```

Find Most Important Term
Match Term  $T_n$  in Dataset
If (! match)
{
No Answer Found
Else
{
Generate Answer Reply to User
}
}

```

IV. CONCLUSION

We produce a software package tool which can be employed by any company to facilitate the users to freely upload their queries. Once the user's complaint is registered in database, automatic tokens are generated and sent to the client through a text message and email for tracking of the complaint. NLP technologies are used for parsing, tokenizing, stemming and filtering the content of the complaint. The output is given to the algorithm wherever the strength of the sentence is calculated. The negation intensity is measured, that helps ordering the complaint automatically for the service provider to resolve the complaint.

In this way, the planned system can facilitate several organizations to confirm quality service provision and client satisfaction with less human efforts.

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