Smart Bot

A Virtual Help Desk Chat Bot

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***Abstract*—FAQ section on websites is mostly used by users to clarify their queries and doubts, but this section does not provide high level interaction and does not cover all the queries, as a result of this, user's queries and doubts remain unsolved. A chat bot with high level interaction can be used as alternative to FAQ section. In this paper, a proposal is carried on to explain the design of a chat bot specifically tailored as a bank information system that helps customers of RSS Bank with account related questions and policy information In particular, the proposal investigates the implementation of chat bot system as a domain specific chatter bot named 'Smart Bot', our work will show how a chat bot can work as domain specific information system and experiments on how the system's accuracy could be improved based on a specific domain. The chat robot accepts query or doubt in natural language input from users, navigates through the Information database and responds with related answers in natural language.**

***Keywords*—Smart Bot, chatter bot, RSS Bank**

I. INTRODUCTION

The World Wide Web has grown into a rich repository of information in a distributed manner. It is a great tradeoff for the information revolution that end-users are finding it challenging to locate relevant information and services quickly and easily. The web changes from static to dynamic and provides a meaningful web. We need social aware tools and social matrix and collective intelligence [12], so that, human and artifact collaborate meaningfully to lessen the burden of user searching and browsing in social platform.

Given a specific domain of interest and its audience pool, there are two important aspects of a networked knowledge transfer platform and in human computer interaction [11] [13]. We have question answering

system [1] as a knowledge delivery platform in which the expert delivers knowledge for the solicitation of the user. Another is knowledge acquisition in the form of online forum and social web platform in which different dialogues form a knowledge repository.

There is a growing interest in Chat bot interface that takes into account Chat bot discourse design and knowledge delivery. One platform for knowledge delivery is a lightweight dialog system Chat bot that will hold the user's attention with human like responses. Chat Bots are computer programs that interact with users in natural language although different names are adopted like virtual agent, dialogue system and chatter bot etc. in different programming architecture.

A chat bot is software that is used to interact between a computer and a human in natural language. It can extend daily life, such as help desk, automatic telephone answering systems, in education, business and e-commerce. In our thesis we tried to implement a chat bot system as a domain specific chatter bot named 'Smart bot'

A. *Why is Smart bot useful for RSS Bank?*

The implementation of this project on a Bank environment is particularly useful for customers looking for information regarding their accounts in RSS Bank, and its related activities and policies. Even though most of the information is available on the web, customers often like to have personal interaction with the help assistant. In such an environment, a Smart Bot could be designed for providing advice. The main goal of such a system is to conveniently retrieve information without having to look or browse several web pages to fetch answers to frequently asked questions. Smart Bot provides responses to slang words as well as provides necessary reference links so that user can easily navigate on the website. In the end if the user is still not able to get his query cleared, then we provide an option of human assistance as well. When the user asks a question that the bot has never addressed or is out of scope for the bot's knowledge base then the bot stores that question in a separate table. Later the person monitoring the bot can answer the queries that the bot couldn't answer. This paper describes our use and evaluation of CLIPS as a knowledge base and acquisition platform in the form of Smart Bot chatter bot in experiments of specific banking domain. In the remainder of the paper, we describe related work, including quite a few implemented systems in the Literature review. We then describe our research questions as well as our Banking Advisor system. We worked with CLIPS to provide knowledge base to the Smart Bot and to develop our FAQ chatter bot system.

II. LITERATURE REVIEW

Chatter bot development is reasonably well studied ever since the Turing Imitation Game (TIG) [7] was first proposed. Eliza [6] was the first famous chat bot, and ALICE [5] was another milestone. The Loebner Prize [8] and The Chatterbox Challenge [9] are both annual competitions which have their roots in TIG. However, these are typically text only experiments, although some limited visual components are often added. This focus is on; however, whether with the text exchange alone, we can replicate human "behavior". The purpose of a chat bot system is to simulate a human conversation; the chat bot architecture integrates a language model and computational algorithm to emulate information chat communication between a human user and a computer using natural language.

With the improvement of data-mining and machine-learning techniques, better decision-making capabilities, availability of corpora, robust linguistic annotations/processing tools standards like XML and its applications, chat bots have become more practical in daily life applications such as help desk tools, information retrieval tools, automatic telephone answering systems, advertising, tools to aid in education, business and E-commerce. In E-commerce, chat bot helps in information retrieval tasks, such as for searching and browsing, as menu based navigation poses difficulties in locating the appropriate information. The dialogue system provides additional information on products and simplify decision making process to find a product that satisfy customer's requirements [1] [2].According to Dr. Wallace, perhaps, the biggest market of chat bot is Entertainment Markets, in which, we can imagine that chat bots can act as a talking book for children and provide foreign language instruction or can be a tutor in Intelligent Tutoring system. One such study used an ALICE system to help Chinese university students practice their conversational English skills. The study was qualitative in nature and used pre-existing conversational English skills [3].

The study focused more on user attitudes rather than on chatter bot efficiency. It was discovered that 62% of users chatted for 10 lines or less, and that 8.5% of the time ALICE bot has no specific pattern to match the given input and had to rely on root-level generic responses. In all of these conversational entities, one thing is common; and that is, they are having the difficulty of maintaining dialogue for sustainable period of time. Another tutoring study focused on using ALICE as a course enhancement tools with Social and Political Theory knowledge [4].

This study found that most subjects used the system as a search engine rather than as a conversation partner. It was further concluded that their system was unable to function as a stand-alone tutor. Dialog system can adequately carry out the conversations with the user and can log the conversations which can be good source for knowledge acquisition for domain specific topic. Therefore, techniques of knowledge acquisition were rightly used in [11] [13] with their system AZ-ALICE chat bot that is an extension in ALICE chatter bot. They tested their system.

III. SYSTEM ARCHITECTURE OF SMART BOT

The System architecture of the Smart Bot is as shown in figure 1.The modules which are used are web module, Natural language processor, Slang language dictionary, Morphological dictionary, Information repository (knowledge base), response generator, text to speech convertor.

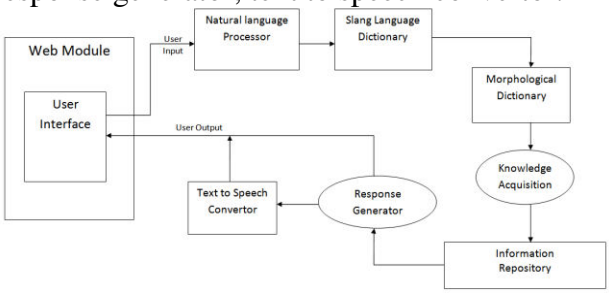

Fig.1.System Architecture of Smart Bot

On main web page of RSS bank, Instead of FAQ section, a link is provided for Smart Bot web page. The design of user interface of a main bank web page is as shown in figure 2.

Fig.2.User Interface of RSS bank website

When user clicks on the 'Ask SMART BOT' tab, Smart bot webpage opens up. On this webpage, there is text box is provided where user enters the question, after pressing command button 'ASK!' , Smart Bot response is displayed in the form of labels. There is 'clear' button provided to clear the text area and speaker icon to get the response in audio format.

Fig.3.User Interface of Smart bot Web Page

The use query from web module is passed on to the Natural language processing unit which parses the input and separates the keywords. To find out meaning and type of those keywords morphological dictionary is used and to understand slang queries, slang language dictionary is used. These keywords are mapped with the keywords stored in knowledge database. CLIPS s/w is used as Expert System. After mapping, response in generated in both text and audio format. For audio response, Microsoft's SAPI packages are used to convert text to speech.

IV. METHODOLOGY

To look for user inputs in different ways and to make sure that the smart bot will understand these inputs well and give suitable responses, we plan to use two search engines namely Special Search Engine and Matrix Search Engine.

The Special Engine compares between sentences stored in the database and user inputs, while the Matrix Engine compares between words stored in the database and user inputs. Each file has two types, Matrix Database and Special Database. Each type of database uses its engine.

File: "Laugh"

...to Special "Laugh" Database

...to Matrix "Laugh" Database

The following example shows the difference between the two engines.

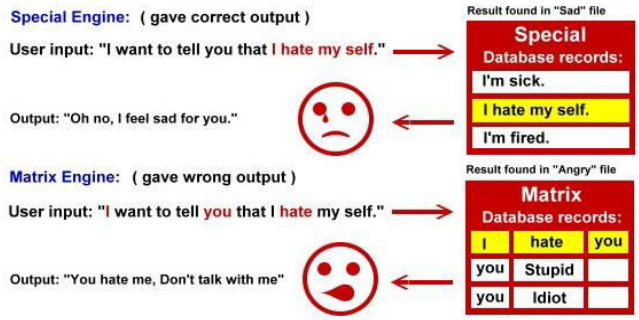

Fig.4.Advantage of Special Engine

As you see in above figure, the Matrix Engine failed to give the correct answer because it was looking for words. We can't fill the AI Base with all possibilities and so the Matrix Engine is very important to cover more possibilities than the Special Engine.

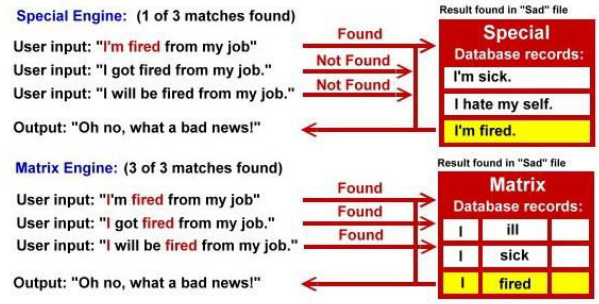

Fig.5.Advantage of Matrix Engine

Above figure shows the importance of the Matrix Engine in understanding three different sentences that have the same meaning. The match is with only one record in the Matrix Database. That means that the Special and Matrix Engines complete each other. The steps of searching are as follows:

1st search in: Special Engine. If a result is found, then give the output. Else search using the Matrix Engine.

2nd search in: Matrix Engine. If a result is found, then give the output. Else query get stored for human assistance.

The accuracy of the Special Engine and Matrix Engine:

If the result is found in the Special Database, its accuracy in producing suitable output is roughly 95%.If the result is found in the Matrix Database, its accuracy in producing suitable output is roughly 65%.We can increase the accuracy of chatbot's response by increasing the records of Matrix and Special Databases for each file.

V. CONCLUSION AND FUTURE WORK

The Design of Bank FAQ bot is aimed for implementing topic specific FAQ Bot so that it helps customers as a banking advisor. In order to do this, the objective was in the experiment is to design the parameter which meets the hypothesis that domain knowledge is more effective in a Chat Bot environment to obtain domain specific knowledge than conversation knowledge alone. The contribution of this system is that we addressed the problem of evaluating a low level dialog system's ability to bestow domain knowledge in a very systematic way. In future, more statistical parameters on data mining and user profiling would be of use. Future research based on Smart bot should focus on specific categories of knowledge that participants are most likely to correct as well as which knowledge categories have higher Response Satisfaction scores. Finally, measuring the quality of user-suggested knowledge would be worthwhile.

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