INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.488

A Customer Support Bot Using NLP and Android

Dineshkumar.N[1], Aravinth.S[2], Kishore.C[3]

UG Students, Department of Computer Science and Engineering, Mahendra Engineering College (Autonomous),

Namakkal, Tamil Nadu, India[1,2,3]

ABSTRACT: Artificial Machine Intelligence is a very complicated topic. It involves creating machines that are capable of simulating knowledge. This paper examines some of the latest AI patterns and activities and then provides alternative theory of change in some of the popular and widely accepted postulates of today. Based on basic A.I. (Artificial Intelligence) structuring and working for this, System-Chatbots are made (or chatter bots). The paper shows that A.I is ever improving. As of now there isn't enough information on A.I. however this paper provides a new concept which addresses machine intelligence and sheds light on the potential of intelligent systems. The rise of chatbots in the finance sector is the latest disruptive force that has changed the way customers interact. In the banking industry, the introduction of Artificial Intelligence has driven chatbots and changed the face of the interaction between bank and customers. The banking sector plays an important role in development into any country. It also explores the existing usability of chatbot to assess whether it can fulfill customers ever-changing needs.

KEYWORDS: Convolutional Neural Networks (CNN), Gray Level Co-Occurrence Matrix (GLCM), Principal Component Analysis (PCA), Modified probabilistic neural network (MPNN)

I.INTRODUCTION

1.1 NATURAL LANGUAGE PROCESSING

Natural language processing (NLP) is an area of computer science and artificial intelligence concerned with the interaction between computers and humans in natural language. The ultimate goal of NLP is to help computers understand language as well as we do. It is the driving force behind things like virtual assistants, speech recognition, sentiment analysis, automatic text summarization, machine translation and much more. In this post, we'll cover the basics of natural language processing, dive into some of its techniques and also learn how NLP has benefited recent advances in deep learning.

Human language is special for several reasons. It is specifically constructed to convey the speaker/writer's meaning. It is a complex system, although little children can learn it pretty quickly.

Another remarkable thing about human language is that it is all about symbols. According to Chris Manning, a machine learning professor at Stanford, it is a discrete, symbolic, categorical signaling system. This means we can convey the same meaning in different ways (i.e., speech, gesture, signs, etc.) The encoding by the human brain is a continuous pattern of activation by which the symbols are transmitted via continuous signals of sound and vision.

Understanding human language is considered a difficult task due to its complexity. For example, there is an infinite number of different ways to arrange words in a sentence. Also, words can have several meanings and contextual information is necessary to correctly interpret sentences. Every language is more or less unique and ambiguous. Just take a look at the following newspaper headline "The Pope's baby steps on gays." This sentence clearly has two very different interpretations, which is a pretty good example of the challenges in NLP.

Note that a perfect understanding of language by a computer would result in an AI that can process the whole information that is available on the internet, which in turn would probably result in artificial general intelligence.

1.2 ARTIFICIAL INTELLIGENCE

Artificial Intelligence is an approach to make a computer, a robot, or a product to think how smart human think. AI is a study of how human brain think, learn, decide and work, when it tries to solve problems. And finally this study outputs intelligent software systems.The aim of AI is to improve computer functions which are related to human knowledge, for example, reasoning, learning, and problem-solving.

The intelligence is intangible. It is composed of

- Reasoning
- Learning

- Problem Solving
- Perception
- Linguistic Intelligence

The objectives of AI research are reasoning, knowledge representation, planning, learning, natural language processing, realization, and ability to move and manipulate objects. There are long-term goals in the general intelligence sector. Approaches include statistical methods, computational intelligence, and traditional coding AI. During the AI research related to search and mathematical optimization, artificial neural networks and methods based on statistics, probability, and economics, we use many tools. Computer science attracts AI in the field of science, mathematics, psychology, linguistics, philosophy and so on.

1.3 ARTIFICIAL INTELLIGENCE BASED CHATBOT SYSTEM

The power of chatbots is not lost on the business world. As brands focus on promoting personalized experiences, more and more intelligent chatbots are being built to engage users and improve brand image. That said it is a rarity to find a live intelligent chatbot, also called as AI chatbot. As the thought of a chatbot springs up, we know it is not a real person for sure. What we know is that chatbot brings a human touch. For that to become a reality, chatbots need to be really intelligent. The crux is not the chatbot rather it is the intelligence quotient of the chatbot that can bring the human touch.

It is the intelligence that gives power to the AI chatbot to learn from conversations and handle any and every situation that comes its way. As chatbots move into complex territories, raising the intelligence quotient becomes increasingly difficult.

1.4 CHATBOT A LEARNING CHAMPION

If a chatbot is smart, then learning becomes a distinguishing trait of the chatbot. An intelligent chatbot is one that learns conversations all the time to improve its performance. The modules in a chatbot including user modeling modules and the natural language understanding module which can perform better by learning continuously. Machine learning (ML) algorithms and human supervisors enable the learning of the chatbot. ML techniques like reinforcement learning supervised, and unsupervised techniques can be leveraged to ensure the AI chatbot becomes a good learner. The ability to learn is a key factor in creating an intelligent chatbot. With neural networks and deep learning, chatbots can become good learners. Learning is paramount to ensure that the chatbot recognizes patterns in data it receives and responds to user requests in the most appropriate way.

1.4 PROJECT DESCRIPTION

A computer program designed to simulate conversation with human users, especially over the Internet. Chat bots are used in applications such as ecommerce customer service, call centers and Internet gaming. Chat bots used for these purposes are typically limited to conversations regarding a specialized purpose and not for the entire range of human communication. One well known example of a chat bot is ALICE. Chatbots are capable of simulating a conversation with a person and therefore are increasingly present in messaging applications. ... A chatbot is a software system, which can interact or "chat" with a human user in natural language (such as English, or whatever other language the chatbot has been built on). Chatbots also known as "conversational agents" are software applications that mimic written or spoken human speech for the purposes of simulating a conversation or interaction with a real person. There are two primary ways chatbots are offered to visitors: via web-based applications or standalone apps.

What is a Chatbot and How to Use It for Your Business

- "A computer program designed to simulate conversation with human users, especially over the Internet."
- "Chat developers and designers are the gardeners: they have to tend to the chatbots and coach their growth through continuous, yet gentle, correction.

It allows a form of interaction between a human and a machine the communication, which happens via messages or voice command. A chatbot is programmed to work independently from a human operator. It can answer questions formulated to it in natural language and respond like a real person.

II.LITERATURE SURVEY

CONTENT-ORIENTED USER MODELING FOR PERSONALIZED RESPONSE RANKING IN CHATBOTS
Bingquan Liu; Zhen Xu; Chengjie Sun; Baoxun Wang; Xiaolong Wang; Derek F. Wong; Min Zhang

Automatic chatbots (also known as chat-agents) have attracted much attention from both researching and industrial fields. Generally, the semantic relevance between users' queries and the corresponding responses is considered as the essential element for conversation modeling in both generation and ranking based chat systems. By contrast, it is a nontrivial task to adopt the users' information, such as preference, social role, etc., into conversational models reasonably, while users' profiles play a significant role in the procedure of conversations by providing the implicit contexts. This paper aims to address the personalized response ranking task by incorporating user profiles into the conversation model. In our approach, users' personalized representations are latently learned from the contents posted by them via a two-branch neural network. After that, deep neural network architecture is further presented to learn the fusion representation of posts, responses, and personal information. In this way, the proposed model could understand conversations from the users' perspective; hence, the more appropriate responses are selected for a specified person. The experimental results on two datasets from social network services demonstrate that our approach is hopeful to represent users' personal information implicitly based on user generated contents, and it is promising to perform as an important component in chatbots to select the personalized responses for each user.

AN INITIAL MODEL OF TRUST IN CHATBOTS FOR CUSTOMER SERVICE—FINDINGS FROM A QUESTIONNAIRE STUDY
Cecilie Bertinussen Nordheim; Asbjørn Følstad; Cato Alexander Bjørkli

Chatbots are predicted to play a key role in customer service. Users' trust in such chatbots is critical for their uptake. However, there is a lack of knowledge concerning users' trust in chatbots. To bridge this knowledge gap, we present a questionnaire study (N = 154) that investigated factors of relevance for trust in customer service chatbots. The study included two parts: an explanatory investigation of the relative importance of factors known to predict trust from the general literature on interactive systems and an exploratory identification of other factors of particular relevance for trust in chatbots. The participants were recruited as part of their dialogue with one of four chatbots for customer service. Based on the findings, we propose an initial model of trust in chatbots for customer service, including chatbot-related factors (perceived expertise and responsiveness), environment-related factors (risk and brand perceptions) and user-related factors (propensity to trust technology).

RESEARCH HIGHLIGHTS

• We extend the current knowledge base on natural language interfaces by investigating factors affecting users' trust in chatbots for customer service.
• Chatbot-related factors, specifically perceived expertise and responsiveness, are found particularly important to users' trust in such chatbots, but also environment-related factors such as brand perception and user-related factors such as propensity to trust technology.

III.PROPOSED METHODS

In, proposed system the user can search the bank details using an android application. In this system user can search the details of multiple banks. Thus this helps the user to know the entire details of the bank regarding loan, account and so on. User can select the bank and know the entire details about that bank. They don't need to enquire their friends or the bank employees.

ADVANTAGES OF PROPOSED SYSTEM

- User can search the entire details of the bank they are willing to know.
- User can also search the details of multiple bank which they order to know.
- Need not to enquire their friends or bank employees about the bank account, loan details and so on.
- User friendly and a good interface is created since it is developed as an application project.

MODULES

- Admin Training
- Bank Access
- Customer queries
- Decision Tree
- Untrained Queries

MODULE DESCRIPTION

3.2.1 ADMIN TRAINING

We have prepared our data set as questions and answers that people usually ask to bank employees, at customer care centers or inquiry desks. We have referred different banks' websites and collected FAQs as our data. We have used different web scrapping tools for this task. Distribution of questions in Data-set. The admin will be provided with a login session where the complete login can be made for the training and maintaining. The admin will make a training session to each system as a virtual assistance. The complete details about the registered banks will be collected from the knowledge based system and then the analyses of the customer queries are get known.

3.2.2 BANK ACCESS

The bank will be given with a separate access to get know their customer queries. Usually the customer queries will be classified according to the user selected bank and directed to them. The virtual assistant here will be of two processes: admin and the bank assistant. The customer can easily connect with the bank server so that they can ask any queries they wish to ask for. We have converted our text data to vectorized format using Bag of Words (BOG) concept. BOG is a method for preparing text for input to our machine learning algorithm. BOG model develops a vocabulary from all of the documents and then model each document by counting number of times each word appearing in respective document.

3.2.3 CUSTOMER QUERIES

Users can chat with the bot as if talking to a real banking operative. This part is the core parts our chat bot system. An artificial technology is new as well as it will help us to create very interactive system. It is very difficult to make decision on user's query but it is become easier because of the intelligent system. This part is accepts the input in text form and process. Then it will reply back to the user. The customer queries will be forwarded to the server bank where the virtual AI assistant will be assigned to the user. The query generated will be matched and identified by the server to know the analysis of the implementation carried. The decision tree algorithm is used to find out the best search agent out of the classified answers. The classified answers will be known from the trained data server.

3.2.4 DECISION TREE

Here the Natural Language Processing (NLP) system is implemented to identify the complete word embedding identification. Each word gets matched with the trained data server which will be made connected when they get match. The user query will be passed with the number of root nodes matching with the left child node and right child node. The best search agent searches with the left child node and the right child node. The best will be selected as the user query answer.

Stripped of their often beautiful developer user interfaces most chatbot frameworks 'under the hood' combine rocket science Natural Language Understanding (NLU) technology with Soyuz-era networks of chained-together IF…THEN statements. The NLU is used to extract **intents** and **entities** from free-text user **utterances** (questions and answers) and the chained-together IF…THEN statements are used to program conversational **flow**.

3.2.4.1 Algorithm

Step 1: ID3(Examples, Attributes, TargetAttribute)
Step 2: Create RootNode for the tree
Step 3: if all members of Examples are in the same class C
      then RootNode = single-node tree with label = C
 else if
      Attributes is empty then RootNode = single-node tree with label = most common value of Target_attribute in Examples;
else
      A = element in Attributes that maximizes InformationGain(Examples, A)
Step 4: A is decision attribute for RootNode
Step 5: for each possible value v of A
      add a Branch below RootNode, testing for A = v
      Examples_v = subset of Examples with A = v
Step 6: if Examples_v is empty
      then below Branch add Leaf with label = most common value of Target_attribute in Examples;
else
      below Branch add Subtree ID3(Examples_v, Attributes - A), TargetAttribute);
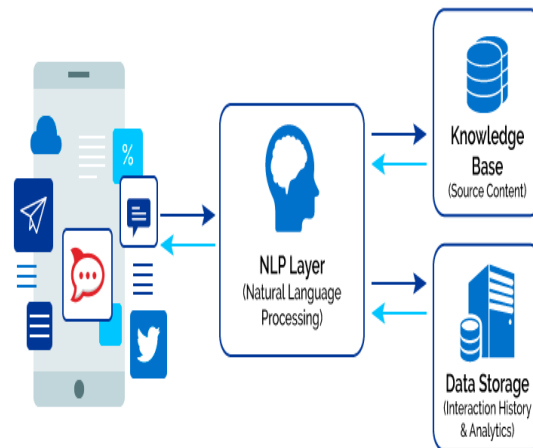**step 8:** return RootNode;

Fig1:System Architecture of the Banking Chatbot System Using the NLP

IV.CONCLUSION

An intelligent chat bot system for bank, which will gives an appropriate response to user's query. It is an intelligent system which will think like human beings. This system will be helpful in reducing workload of employees. Due to an AIML files accurate and quick answers will be given to user. ICB system will take both voice as well as text as an input. If person is not having knowledge about the typing of particular language the system provides voice input facility. Intelligent query handling program which could in next phases not just respond but self-learn to improve itself thereby increasing not just the quality of customer service but also reducing human load, increase in productivity and of course increasing number of satisfied customers

V.FUTURE ENHANCEMENT

In future reference we are trying to implement our system in three languages such as English, Hindi and Marathi. Developing android apps for banking Chabot after completion of project successfully.

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