

A Review on Implementation Techniques of Chatbot Using Artificial Machine Intelligence Language

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Abstract—Artificial Intelligence (AI) acts because the powerhouse of all the growing industries. At a time like this, the banking sector is trying its hand, leg and even head to give a head-start to the AI developments. The financial services industry is appealing to enter AI market to avail the luxurious of accurate data and investment. The development assists banks with better customer service, fraud detection, reduction of managing cost and simple decision-making through AI analysis. The Indian industry consists of 12 public sector banks, 22 private sector banks, 46 foreign banks, 56 regional rural banks, 1485 urban cooperative banks and 96,000 rural cooperative banks additionally to cooperative credit institutions As of November 2020. chatbots implementation in Indian banks started during 2016 to 2019 and majority of personal banks have implemented these technologies. Out of which 8 banks had taken an enormous lead and launched their own AI based Chatbot and are providing seamless experience to their customers, while other bank's customer still must hit the bank to induce their work done. this might be because banks not having enough capital to spend on technology or they can't afford that much spend on technology. So, to beat this problem and top off these technological gaps, why not we came up with Centralization of Virtual Assistant so Customer of any bank can approach and avail services remotely that other bank customers are availing. It will be a feasible solution for several banks with the limited staff available in their branches. This Centralization will reduce the strain on this industry and bank employees also will bring the coherence altogether bank's work. it'll also reduce banks disburse on technology.

Index Terms—Artificial Intelligence, Natural Language Processing, Chatbot, Virtual Assistant, Banking Technology.

I. INTRODUCTION

The first chatbot was came into being in 1966.This was called ELIZA.It was a text messaging agent developed at MIT computing Laboratory.The platform basically worked on pattern matching substitution technolgy A chatbot may be a conversational agent which uses the natural language to speak with users. There are several chatbots required for serving in various domains. Nevertheless, chatbots knowledge domain is hand-coded in their brain. This paper provides a summary of ALICE chatbot, its AIML structure and our experiments for automatically creating various ALICE prototypes supported a

corpus method. A summary of the program built that translates readable text (corpus) into AIML format is provided together with a review of the various corpora we used.

II. USAGE OF CHATBOT

The creation of chatbots is simply just like the pattern of developing mobile apps and web pages and begins with the design initially. This design describes the bot's and user's interaction. The pattern also includes the building of the bot that uses a natural language processing engine to involve the input analysis. The bots are then analyzed and maintained after the initial stages. the event of chatbot can take place on platforms provided by providers of Platform-as-a-Service. The IBM Watson, SnatchBot, and Oracle Cloud Platform are among them. Recent studies seem to point that people are spending longer using messaging apps than social media. Consequently, messaging apps now provide more channels to realize many customers for companies and businesses. Chabot's performance, especially those using AI, entices and encourages businesses to require an edge in these styles of services. Companies across industries are discovering the potential of conversational bots— to help automate and streamline business, enhance business productivity, and enhance employee and customer engagement. While the primary conversational bots models are basic response systems, today's AI-powered bots are far more powerful— and might only become more advanced and efficient within the years to come back back.

III. REVIEW ON CHATBOTS IMPLEMENTED BY INDIAN BANKS

In India all categories of banks and private banks are making use of artificial technologies and have deployed AI based chatbots and Virtual Assistants in the recent past.

A. State Bank of India

SBI has deployed the chatbot named SIA.It is an artificial intelligence powered software that has the capability to respond to 864 million queries a day making it largest financial sector.SIA has been set up to handle nearly 10,000 enquiries per second.It is nearly 25 per cent of the queries processed by Google.

B. HDFC Bank

HDFC Bank’s EVA (Electronic Virtual Assistant) is India’s first and largest Artificial Intelligence powered banking chatbot. Eva was built with the aim to leverage latest technologies to help serve the bank’s customers better and faster. Eva uses the latest in AI and Natural Language Processing to understand the user query and fetch the relevant information from thousands of possible sources, all in a matter of milliseconds

C. ICICI Bank

ICICI Bank’s has deployed the chatbot with name iPal. It is an Artificial Intelligence (AI)-powered chatbot and has completed 6 million responses. It has interacted with 3.1 million customers in eight months of its implementation (Bank website) and handles around one million queries monthly on both website and mobile apps, providing resolutions to customers round the clock (Maru, 2017).

D. Axis Bank

The bank has implemented the chatbot with name Aha. The chatbot has been launched in partnership with Singapore based tech firm, Active.Ai. The chatbot is AI based. The bank has seen a surge in usage of its conversational AI platform chatbot on their mobile banking app which has over 10 million customers (Asiaone, 2019). The chatbot is one of the advanced versions in the Indian banking industry as it is not only capable of answering the customers queries through voice and text but is also able to execute actual transactions like blocking card and doing recharge

IV. REVIEW ON THE ALICE CHATBOT SYSTEM

Wallace first introduced the Artificial Linguistic Internet Computer Enterprise A.L.I.C.E (Foundation of Artificial Intelligence, 2007). Alice’s English dialog series data is included in AIML documents. AIML is a subset of the markup language (XML) or the mark-up language of artificial intelligence [17]. AIML comprises of data items named AIML objects, comprising of structures called topics and categories . The topic is an additional item at the top level, it has a name attribute and a collection of similar categories. The design of AIML is as follows: PATTERN THAT TEMPLATE. The tag can be an option and implies that the present pattern relies on a previous chatbot input. The AIML template is plain, with letters, spaces, and the wildcard’s and* signs. Since the beginning of 2013, A.L.I.C.E has been focusing on a draft proposal of AIML.

```

;aiml version –“1.0.1”
;topic name-“About TOPIC”
;category
;pattern; .About the PATTERN.;/pattern;
;that;.About the THAT;/that;
;template;.About the TEMPLATE.;/template;
;/category;

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;/topic;
;/aiml;

```

Terms can be letters and numerals, but there are no other representations. Characters are divided into one room, and the characters of the wildcard are like characters. The pattern language of the series is invariant. The principle of pattern matching methodology is based on finding the best matching pattern used to produce the answer to the chatbot of ALICE. The AIML structure is as follows: optional is the ; tag ;, which means that the current design is focused on a previous chatbot output. The design of AIML is simple with the lines, spaces, and* indications of the wildcard. The terms that include letters and numerals, but there are no other characters. Words are divided by a single space, and the characters of the wildcard are like words. The vocabulary of the template is invariant string. The principle of matching pattern strategy is based on finding the shortest, best match between patterns

V. TYPES OF ALICE/AIML CATEGORIES

ALICE / AIML can be categories in three different categories, as Atomic, default and recursive

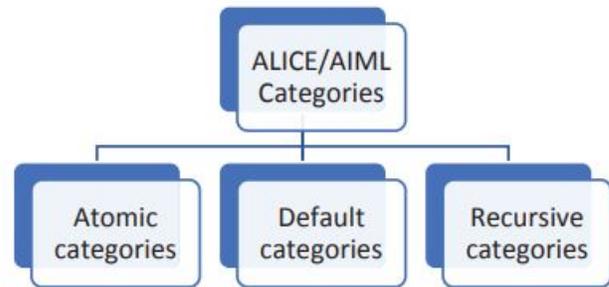


Fig. 1. Types of ALICE/AIML Categories

Atomic categories: They don’t have wildcard symbols like and *. For Example:

```

;category;
;pattern;25 Dirhams;/pattern;
;template;Lets go for this, its affordable. ;/template;
;/category;

```

In the above category, if the user inputs ‘25 dirhams (AED)’, then ALICE answers ‘Lets go for this, its affordable.’ Default categories: Such forms have wildcard signs such as * . The wildcard symbols suit some data, but in alphabetical order they can differ. If the computer does not consider the previous class with an atomic template, then it will match with a normal pattern like:

```

;category;
;.pattern.;25 * ;/pattern;
;template;
It is Twenty Five.
;/template;
;/category;

```

So ALICE will respond 'It is Twenty Five'. Recursive categories: These are the ones that apply to the laws of recursive reduction with templates and tags. Recursivedefinitions have different applications: linguistic reduction that reduces complicated grammatical forms to simpler ones; dividing and winning that divides the sentence into two or more sub-parts and blends the responses to each; and dealing with synonyms by translating different ways of saying the same thing to the same response. The feedback is mapped to a different form, indicating the same.

VI. TURING TEST

Turing test, introduced in artificial intelligence (1950) by the British mathematician Alan M. Turing to decide whether a machine would "think" [18]. The experiment was conducted as a kind of imitation game, as established by Turing. In one side of a computer screen sits a human investigator whose task is to talk with some enigmatic interlocutors on the other hand. Most of those interlocutors will be people; one will be a chatbot, created solely to make the judge think it is the real human being [18]. Turing's conceptual research was clear and strong, but it was disturbing from the outset. Turing does not contend on the basis that the ability to convince an unspecified number of people, unspecified credentials, an unspecified length of time, and an unspecified number of times, would support the inference that the machine is thinking—it merely asserts this [19]

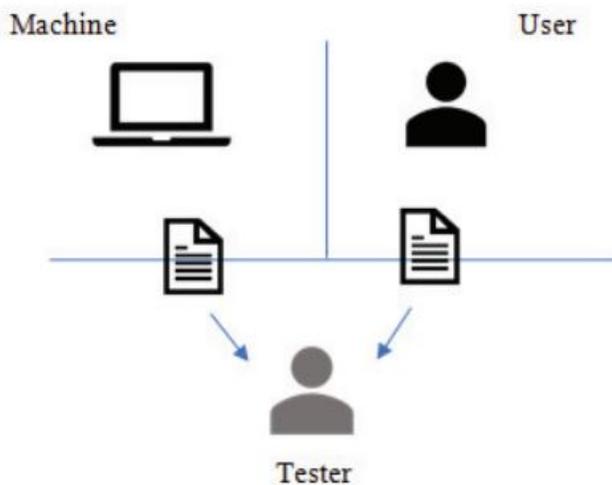


Fig. 2. Types of ALICE/AIML Categories

VII. PROBLEMS FOR TURING TEST

In the Fig 2. the Turing test is not a perfect measure to determine if a computer is smart. There may not be a stupid way to tell if an entity is sensible or not. Intelligent conduct is sometimes found by intelligent beings. On the opposite hand, sometimes stupid machines can perform most things better and more reliably than intelligent people. But the Turing test has its own problems described below [12]. The Turing test

is expounded in chatbot because it may be a test accustomed tell if a chatbot is nice enough and or is akin to a personality's being or not. It helps to spot weather or not the pc is capable of thinking sort of a creature. During the test the human functions, because the question are while the second human and the computer function as respondents. This test is repeated many times .if the questioner makes the proper choice in half of the test runs or less the computers considered to possess artificial intelligence because the question regards it as even as a human respondent. Limitedness: In terms of a machine's conversational abilities, the test can only feature intelligence in accordance to it. Intelligence is way over that. Short Preview: The scope of this test is restricted to the bounds of human ability to grasp and respond during a human language. But it isn't just the smart / intelligent behavior of the world. What about the intelligence of the animals? Consequently, the flexibility to pass the Turing test isn't the sole human intelligence predictor. Unproductive Developments: it's just a distraction from more productive research to do to pass the Turing Test. Disillusionment of Goals: Producing lifelike models of human beings may be a vital activity. These objects is also useful in a match, or even as a more user friendly gui, but they're not part of the core science of creating smart machines, that is, machines that solve smart problems. to attain higher AI research goals, the experiment isn't required to be passed.

VIII. CHATBOT BASED ON NATURAL LANGUAGE PROCESSING

The chat bot suppose to interact with user by summarizing their Query and by understanding what they want and also to provide them the most accurate answer.

For understanding User's Query we had implemented NLP i.e. Natural Language Processing in our chatbot. NLP, or Natural Language Processing, is a branch of AI that helps computers read and understand natural human language. Its main goal is to improve human-machine communication. There are five major steps involved—tokenizing, normalizing, recognizing entities, dependency parsing, and generation—for the chatbot to read, interpret, understand, and formulate and send a response. Let's take a closer look.

- 1) Tokenizing :
The chatbot starts by chopping up text into pieces (also called 'tokens') and removing punctuation
- 2) Normalizing :
Next, the bot finds common misspellings, slang, or typos in the text and converts these to its "normal" version
- 3) Recognizing Entities :
Now that the words are all normalized, the chatbot seeks to identify which type of thing is being referred to. For example, it would identify North America as a location, 67% as a percentage, and Google as an organization
- 4) Dependency Parsing :
For the next step, the bot splits the sentence into nouns, verbs, objects, punctuation, and common phrases

5) Generation :

: Finally, the chatbot generates a number of responses using the information determined in all the other steps and selects the most appropriate response to send to the user

Artificial Neural Networks

Neural Networks are a way of calculating the output from the input using weighted connections, which are computed from repeated iterations while training the data. Each step through the training data amends the weights resulting in the output with accuracy

As discussed earlier here, each sentence is broken down into individual words, and each word is then used as input for the neural networks. The weighted connections are then calculated by different iterations through the training data thousands of times, each time improving the weights to make it accurate.

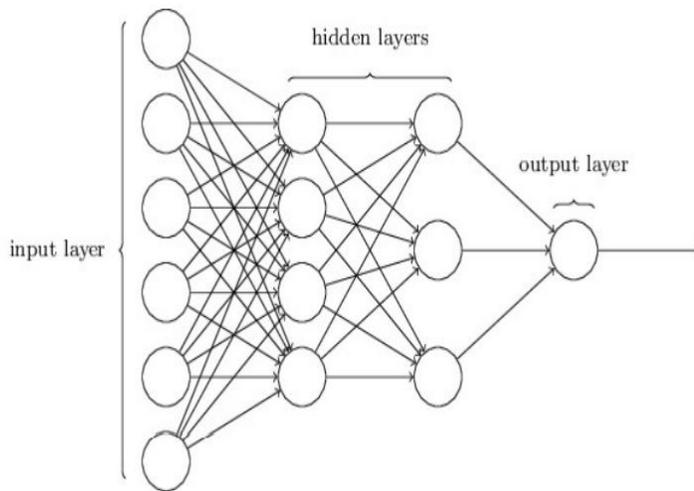


Fig. 3. Artificial Neural Network

IX. CASE EXAMPLES

In Singapore: one in all the oldest POSB (Post Office Savings Bank) banks in Singapore and a part of the DBS Banking Group, a virtual assistant, POSB Digibank Digital Assistant, has been introduced [8].

It is built on the KAI conversational bot / artificial intelligence (AI) system by a brand new York-based fintech start-up, Kasisto.

POSB’s chatbot can answer questions on Facebook Messenger about account balances, utility bill payments, and fund transfer requests. it’ll even be linked to the WhatsApp and WeChat chat networks. because of government funding and accessibility to resources, Singapore is already called the world’s leading fintech center. The year isn’t yet over, but the banking world has already been changed by the industry. The association also established two business models for fintech, namely competitive, which specifically threatens traditional banks and cooperative, which strengthens their

roles. Further momentum was obtained by those within the latter. Investment in collaborative fintech businesses has grown 138 percent, as fintech recognizes existing banks as potential partners slowly. Consequently, through partnering and investing in fintech firms, banks have also grasped the incentives. At 54 percent of fintech firms, those within the banking & payments subsector took the share. DBS has updated its IT system to include big data, biometrics, and AI to create banking safer and more customer-friendly. DBS also launched Digibank on 16 April in India, a paperless, branchless, mobile-only bank that doesn’t include signatures that make it convenient for purchasers. A robotic AI-powered assistant developed unitedly with Kasisto, Siri’s spin-off project, supports clients. No human intervention, the virtual assistant will manage 80requests while the opposite 20talk sessions .

In u. s. of America: because the U.S. market leader in both mobile banking and AI applications, Bank of America launched Erica (AmEricaa) to deliver consumer alerts, provide account data, advise on a way to save cash, provide credit report reports, pay bills, and support basic payments to consumers. As an experienced virtual assistant, Erica’s features have grown since the launch to assist customers make smarter decisions. Erica is included within the mobile banking program of the Bank of America. Customers can use voice or email to assist with banking issues. After evaluating customer data, this banking chatbot can provide personalized recommendations, deals and guidance. Erica can even submit financial education information .

In Hong Kong: Amy may be a customer service forum that takes the form of a company banking HSBC port Virtual Assistant Chatbot. Amy can provide mission for consumer inquiries on 24x7 terms. Available on desktop and mobile in English, Traditional and Simplified Chinese, Amy already spans and expands its reach to several product pages. An integrated customer feedback framework will enable Amy to boost and expand her experience over time to cope with increasingly broad-based queries. Following implementation steps will see Amy merge with live chat to allow smooth human intervention on more complicated issues and improve Amy’s learning process with new AI

CONCLUSION

Based on the research and test cases, it can be concluded that the Contactless Chatbot that was developed was able to provide accurate responses to user queries asked in natural language. Therefore, it is a seamless way of communication in banks during and after Covid-19. The Chatbot tool along with machine learning and natural language processing techniques is a complete data set of questions, that is implemented on daily basis at the “May I Help You” desk of banks. The Chatbot will not only give instructions to the user, but it will also learn with each provided input to it and perform better. The algorithm involves steps like hashing, vectorization,

and tokenization which makes the proposed bot even more efficient.

X. SCOPE FOR FUTURE RESEARCH

The next step to the Chatbot would involve the use of speech to text and text to speech conversion module for further ease of use. The concept could have been extended towards its use for other sectors namely agriculture, defense and stock-broking houses

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