

FINBOT- Chatbot for a Banking Client

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Abstract - Fin-Bots are chat-bots based on computerized choice innovation, expected to work with available banking and to help clients in settling on monetary choices [1]. Chat-bots are expanding in predominance, some of the time even prepared to copy human social standards, assumptions, and standards, diminishing the need for human-to-human collaboration. Customer support is perhaps one of the principal aspects of the client experience for online services. However, with the rise of natural language processing techniques, the industry is looking at automated chat-bot solutions to provide quality services to an ever-growing user base. Chat-bot can help customers make e-commerce purchases, answer customer service questions, monitor employee's or customer's satisfaction, improve response rate from customers, deliver a personalized experience, derive business intelligence, automate repetitive tasks and we can actually come up with a chat-bot use case for every single business or industry. In view of fundamental A.I. (Artificial intelligence) organizing and working for this, System-Chat-bots are made. In the financial business, the presentation of Artificial Intelligence has driven chat-bots and changed the substance of the connection among bank and clients. The financial area assumes a significant part being developed into any country. It additionally investigates the current convenience of chat-bot to evaluate whether it can satisfy clients consistently evolving needs.

Index Terms - predominance, trust, monetary help, connection among banks and clients, satisfy clients, natural language processing, AI.

INTRODUCTION

According to the Oxford English Dictionary, a chat-bot is defined as follows: chat-bot (n.): A computer program designed to simulate conversation with human users, especially over the Internet. In the scientific literature, chat-bots are more formally referred to as conversational agents [5].

This paper focuses on the various aspects and technologies for creation of a Chat-bot for a Banking

client. Chat-bot will act as a communication bridge between the user and the bank. The system should be able to resolve queries of the user, keep track of changes and optimize itself for a better user experience and efficient query solving. This design document presents the designs used or proposed to be used in implementing the idea. The designs described, follow the prerequisites specified in the Software Requirements Specifications document prepared for the bot.

An expanding number of financial organizations are presenting chat-bots as one of their administrations. Their objectives and benefits in doing so are many, including to further develop client accommodation and advance nature of administration, to give a stage to counsel, for example, in speculations, to bring down bank work force costs, to assist with advancing their business or different items and to move towards the heading of option and insightful money. A corresponding headway in FinTech is the idea of Emotional Banking [4], referring to banks contributing and spending assets to examine their clients' sentiments about cash, consequently planning cycles and items to mirror this arrangement. The principle point of enthusiastic banking is to change the financial culture and foster a superior relationship with clients. [3]

This paper investigates the feasibility of the developing utilization of chat-bot by the financial business. The financial area in any nation assumes a significant part in the economy of country.

To the vast majority, finance is a sensitive point and monetary data is regularly not shared daintily. Fin-Bots manage different individual information that can be touchy, including monetary information. However, almost no Fin-Tech related exploration and chat-bot overviews have been led. Thusly, the variables that make clients trust, unveil to and use Fin-Bots more are to a great extent obscure, as are appropriation paces of these bots. In the meantime, banks and monetary

warning stages all seek to make banking chat-bots or update existing frameworks to upgrade buyer trust and selection rates.

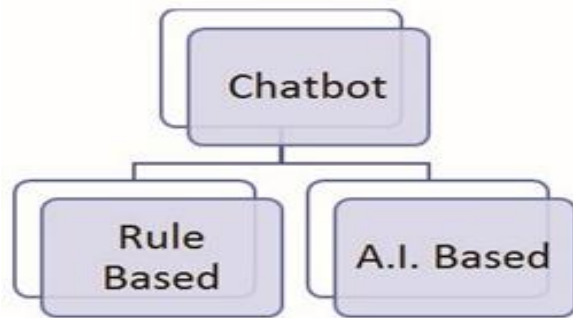


Fig 1.1 types of chat-bot [2]

Chat-bots use natural language processing tools for artificial intelligence (AI). Computers are designed in this system for perusing, handling and dissecting a lot of regular language data. Advances for man-made reasoning likewise incorporate profound learning and calculations for AI. Simulated intelligence bots gain from individuals' discussions and collaborations, extending their data set. Then again, rule-based bots comprise of basic frameworks and in this manner have restricted reactions. The program examines and chooses watchwords and reacts with the fitting order type the client input. Dissimilar to the AI-based chat-bots, when they experience new orders and unnoticed expressions, rule-based chat-bots presently don't react. [2]

Since chat-bots emulate human language, they can be planned utilizing diverse discourse styles to foster their own character. We can likewise comprehend (composed) composed and spoken content and decipher it. Chat-bots controlled by man-made reasoning (or AI chat-bots) can address vague inquiries and can create an answer on their own dependent on handling innovation for normal language. We can gain from their past discussions. All along or scratch, we can likewise produce a unique answer.

The more they talk, the more data they get and the more modest they are their conversational cutoff points. Remote helpers can accomplish something other than talking. For some different reasons, chat-bots are utilized, like information assortment, flight booking or position of requests. They will uphold customers with various errands and produce private conversational associations that can't be refined with sites or applications. [2]

Chabot's are ordinarily utilized as devices for information recovery, for example, item particulars extraction. Remote helpers can assist with further developing business execution, like advising you about arrangements, taking care of the to - do records, taking notes, and so on Both are called interfaces for correspondence, yet both are unmistakable from one another.

A.I. chat-bots can comprehend language past a bunch of prearranged orders and keep on learning dependent on the information sources they get. At the point when they experience new conditions, they can likewise make changes dependent on designs and become more brilliant over the long haul. This type of chat-bot can be reached out to an assortment of employments from examining feelings to foreseeing what a customer is looking for on your website.

1.1 Area of interest

Deep learning is an artificial intelligence (AI) function that imitates the workings of the human brain in processing data and creating patterns for use in decision making. Deep learning is a subset of machine learning in artificial intelligence that has networks capable of learning unsupervised from data that is unstructured or unlabeled. Also called as deep neural learning or deep neural network.

Chat-bots can conduct smart and compelling conversations on behalf of the bank with millions of consumers, at a fraction of the cost of using human customer service staff. The interactive and engaging nature of Conversational AI, and its speed and efficiency go a long way towards enhancing the customer experience and it caters to the needs well. We are building a chat-bot for the banking sector so that the banks can get an upper hand in tailoring user experience. This will help the banks in customer onboarding, and they will get a satisfactory medium to provide their services. It will be a query resolving tool which after taking and comprehending the query, will print the solution or any reference. We are going to bring account related services which the chat-bot can provide like transaction report, balance info, account opening etc.

1.2 Usage of Chat-bot

The formation of chat-bots resembles the example of creating portable applications and site pages and starts with the plan at first. This plan depicts the bot's and client's collaboration. The example likewise

incorporates the structure of the bot that utilizes a characteristic language handling motor to include the information examination. The bots are then broke down and kept up with after the underlying stages.

The advancement of chat-bot can happen on stages given by suppliers of Platform-as-a-Service. The IBM Watson, Snatch-Bot, and Oracle Cloud Platform are among them. Ongoing examinations appear to demonstrate that individuals are investing more energy utilizing informing applications than online media. Thus, informing applications currently give more channels to arrive at numerous clients for organizations and organizations. Chabot's exhibition, particularly those utilizing AI, captivates and urges organizations to put resources into these kinds of administrations.

Organizations across ventures are finding the capability of conversational bots—to help robotize and smooth out business, improve business usefulness, and upgrade representative and client commitment. While the early conversational bots models are fundamental reaction frameworks, the present AI-fueled bots are substantially more remarkable—and will just turn out to be further developed and effective in the years to come.

Chat-bots are programs that utilization Artificial Intelligence (AI) to mirror human discussion. It is worked to be the generally menial helper, amusement work, assisting one with doing job fluctuating from addressing questions, giving driving bearings, turning up the shrewd home indoor regulator, playing one's number one tunes, and so on Chat-bot is currently getting more well known in business bunches as they can limit client care costs and at one time support multiple clients. However, it is as yet important to make chat-bots as proficient as conceivable to achieve most errands.

II. RELATED WORK

The researches have contributed to our understanding of the intention to use chat-bots with different features as financial technology, in particular that socio-emotional support may not be favored when designed independently of financial function. To our knowledge these are the studies investigating the effects of social presence, privacy concern and trust in chat-bots in a financial context. Our findings depict a tension between privacy and trust that is brought into focus by the socio-emotional characteristics of the chat-bot and

raises questions for future research in Fin-Tech [1]. We aim to replicate our work with actual chat-bot prototypes and with socio-emotional cues integrated with financial decisions. While our focus is on automated bots for finance, we offer a comparison for future work in chat-bots in other industries.

2.1 Objective

This document is for the Developers and Delivery leads to use the designs as guidelines to implement the project, understand the critical features to be incorporated in the Chat-bot and tailor our product for specific cases. The features were chosen based on the competitive analysis of the present market of chat bots in the Banking sector.

To design a chat-bot for a user friendly interface for banking and financial firms to reduce a huge gap in communication.

2.2 Intent

Fin-bot is a chat-bot, made specifically for banks and financial firm. Fin-bot gives it's user a list of options related to their queries, which they can opt accordingly. If the user is not clear about their needs or chat-bot is unable to attend to their requests, ultimately, it connects the customer to the human agent.

The main idea originated from the e-Commerce websites using chat-bots for their user's queries.

The intention of this idea is to bridge or minimize the gap between the user and the bank in case of any queries.

We will create a chat-bot with the help of AI, train it with the help of NLP, deploy in the front-end.

It will be feasible with respect to time of customers.

2.3 Functional Requirements

- Real time application of the chat-bot replying to the user as per the queries.
- Connecting the user to the agent if the user isn't satisfied.
- Creating and adding the 'Agent side' to the same chat box window where the user was chatting to the Fin-bot previously.

2.4 Features

Agent Dashboard

Authentication based sign in & register

Agent can take queries of client through chat

Agent can store and see all the chat history
 Security Pin for intent page
 Online/Offline Status feature for agent

2.5 Fin-bot Page

Client can interact with chat-bot
 Client can also interact with multi agents
 Chat-bot give responses from intent page (customizable for each bank).
 Clients can send themselves chat history via mail.

2.6 Intent page

Agent can create, read, update, and delete the custom intents.

Customizable Chat-bot interface.

Each bank can create their own chat-bot with desired replies through their agents easily, without any coding.

2.7 Chat History

Customers can interact with chat-bot, agent and are provided with a feature to email that complete Session chat for future reference. Agents can save chat history with customer and it will be recorded with case number at end of their chat.

2.8 Easy to Use Interface

The Interface is built in a simple way that both chat-bot users and creators doesn't need any prior experience with the webpage or coding. Chat-bot asks MCQ to users that allows them to select their requirements easily and Agents can add/update intents of chat-bot by entering intents and responses alone.

2.9 Multi-agent

Each bank is not limited to a single agent and are mapped with multiple agents who will be connected to Their respective bank customers only. For each session of user, an active session agent will assigned.

2.10 Security

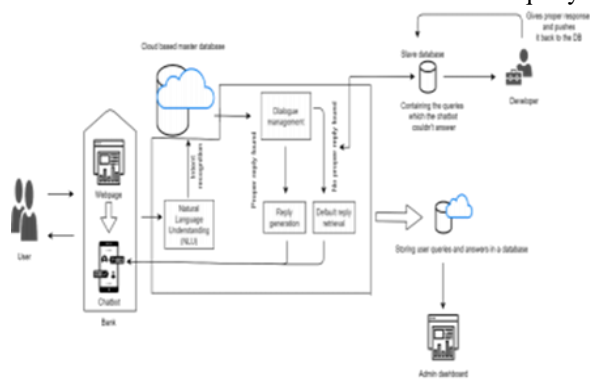
The response from Chat-bot and connection with agent plays an important role in customer satisfaction. It is the main feature which has to be securely maintained in Fin-bot. So, Secret Key of Bank is requested for any agent to register and access the portal. This ensures only respective agent of the banks can sign up and access the portal. Also, the agent page request Security PIN (additional security) for accessing the intent page where entire chat-bot responses are customized.

III. PROPOSED SYSTEM

In this paper, we have mentioned the implemented latest technology,

1. For backend integration, python programming language for training the modal and responses
2. For web framework Flask is used for Web Server-Side Scripting.
3. For frontend JavaScript, HTML, CSS is used.
4. For storing chat conversion between client and agent MongoDB is used.

A client types in chat-bot it generates a pusher and it will connected with the agent dashboard. Agent can resolve the client issues and move to next client query.



3.1 Sub System Architecture flow diagram [6]

3.1 System Design

3.1.1 Default Reply Retrieval: This bot considers the message and context of the conversation to deliver the best response from a predefined list of messages.

3.1.2 Master-Slave principle: Bot that interacts with users via multiple channels while maintaining a consistent experience and context. It understands the user's questions and responds to frequently asked questions and routes the rest to the appropriate slave both (retrieval based or generative) for response and to facilitate the required intelligence services or capabilities

3.1.3 Reply Generation: Once the chat-bot understands the user's message, the next step is to generate a response. If the default reply is not found, developers handle methods for generating the response.

3.1.4 Agent for Dialogue Management: It manages the actual context of the dialogue. For example, the user might say "He needs to block his card" and the bot

might take the order. Then the user might say “he needs to issue a new card”, here the user refers to the order he has placed earlier, the bot must correctly interpret this and make changes to the order he has placed earlier before confirming with the user. Dialog management plug-in enables us to do this.

3.2 Design Considerations

3.2.1 Assumptions and dependencies:

- User is somewhat specific with his/her query
- Queries are not account specific i.e. login not required for now
- OS Compatibility: Any

3.2.2 General Constraints

Key words must match with at least some words in the query. All responses of the chat-bot are hard coded

3.2.3 Goals and Guidelines:

- A reliable tool with a clean interface, a guide for the user
- Fast computation
- Specificity in answering to the queries

3.3 Use-Cases

3.3.1 Chat-bots have the potential to:

- Personalize the customer’s experience.
- Send the customer related notifications or updates while they are logged into their accounts on the bank’s website.
- Gather and analyze customer feedback, allowing customer service teams to address emerging issues.
- Taking customers through the sales path, increasing conversion rate and revenue.

3.3.2 Facilitating Core Banking Activities:

In some cases, chat-bots can handle core banking activities, such as loans and payments, within a chat window. Customers could transfer money from one account to another, pay invoices, apply for a mortgage, and more by conversing with a chat-bot.

3.3.3 Answering Frequently Asked Questions:

- Frequently asked questions, such as how to freeze an account when they lose a credit card, how to add a cardholder to an account.

- Product inquiries and information about loan interest rates, the best credit cards.
- Quick and accessible links to FAQ pages so they can look up answers on their own.
- Banks could save on call center overhead by integrating chat-bots that can handle these types of questions.

3.3.4 Analyzing Customer Tone and Sentiment:

Sentiment analysis features could allow CUIs to report on how a customer is feeling while it is engaged with a customer. Sentiment analysis results could trigger a chat bot to route the customer to a human customer service agent who then knows to handle their concern with more care.

3.3.5 Natural Language Processing (NLP)

Natural language processing (NLP) is a subfield of linguistics, computer science, and artificial intelligence concerned with the interactions between computers and human language, in particular how to program computers to process and analyze large amounts of natural language data.

In other words, NLP in a wide sense to cover any kind of computer manipulation of natural language. At one extreme, It could be as simple as counting word frequencies to compare different writing styles. At the other extreme, NLP involves understanding complete human utterances, at least to the extent of being able to give useful responses to them

3.4 Development Method

In this paper, we have proposed our ultimate goal that is to build a reliable banking chat-bot which will be embedded in the website of a bank and can be operated from a browser. With a smart conversational AI technology and clean User Interface, our project will succeed in giving a more personalized user experience. The chat-bot is having a cloud database over AWS Lambda. The web layer has the frontend built using Flask (python). The chat-bot is working on the bag of words, Machine Learning model with tensor-flow for the computation. The web framework is having the essence of Vanilla-JS as well. It will also pre-populate fields. The chat-bot has its database where a NoSQL database program, MongoDB has been used.

IV. CONCLUSION AND FUTURE WORK

Fin-bot not only have AI based responses to client queries but it can also connect with multiple agents for customer satisfaction. Fin-bot also have custom intent feature. Multiple responses can be stored which wants to be showed to client while talking to chat-bot. These things make fin-bots different from other chat-bots.

The innovative features mentioned previously are:

Multi-agent

Each bank is not limited to a single agent and are mapped with multiple agents who will be connected to their respective bank customers only. For each session of user, an active session agent will assigned.

Intent Page

Agent can create custom intent that response chat-bot give to client

Agent can create, read, update and delete the custom intents

Customizable Chat-bot Interface

Each bank can create their own chat-bot with desired replies through their agents easily, without any coding. This paper discusses about systems for taking care of discourse in the banking and money region dependent on philosophy. Albeit this work has not yet been widely tried, it is promising the current accomplishments. The future work includes the fulfillment of the system and improvement of chat-bot. The future framework would be a venturing stone in the execution of a clever inquiry the board program equipped for reacting as well as of self-figuring out how to work on itself in the following stages, in this way expanding the nature of client administration as well as lessening human burdens, expanding usefulness and, obviously, expanding the quantity of fulfilled clients.

Customers are getting specialized help in all parts of their lives in the quickly developing universe of AI. The web gives various methods of getting data and has profoundly changed how we impart.

With more freedoms, development has improved our lives and everything is really straightforward for us.

Everybody likes to cooperate and thus expects quick results.

- [1] Newcastle University School of Computing, Newcastle University Business School, UK, 3 July 2020. <https://arxiv.org/abs/2006.15449>
Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language
Conversation to Automation in Banking Through Chatbot Using Artificial Machine Intelligence Language
- [2] Conversation to Automation in Banking through Chat-bot Using Artificial Machine Intelligence Language.
- [3] Simulating the Effects of Social Presence on Trust Privacy Concerns & Usage Intentions in Automated Bots for Finance [https://www.researchgate.net/publication/342548131_Simulating_the_Effects_of_Social_Presence_on_Trust_Privacy_Concerns_Usage_Intentions_in_Automated_Bots_for_Finance]
- [4] D. Blomstrom, "What is emotional banking," in Emotional Banking. Springer, 2018, pp. 71–83.
- [5] Master thesis: Design and implementation of a chat-bot in the context of customer support [https://matheo.uliege.be/bitstream/2268.2/4625/6/Thesis_PETERS_Florian.pdf]
- [6] Sub System Architecture flow diagram [<https://www.elprocus.com/chatbot-design-process-and-its-architecture/>]

REFERENCES