1. INTRODUCTION

1.1 PROJECT OVERVIEW

AI to digitize the tedious manual tasks, shaping future of economy, reducing strategy cycle, implementing its strategies successfully, thus transforming traditional branch banking into mobile / online banking, pioneered by private sector banks of India. This initiative is adequately supported by technological improvements in computing, its storage, mobile devices and wide spread usage of social media. 'Digital India' focuses on transforming India into a digitally empowered and knowledge economy. The recent developments in Cashless Commerce in India shows that there is an urgent need of Digital Payments in India.

Industries are forced to evolve and update their practices due to technological advances and the contemporary market. The banking sector is one of the most developed sectors and is always looking for the latest technological solutions that improve its efficiency.

Net banking websites are complex and involve navigating through a lot of pages to find the information you need. Bank staff undergoes a lot of stressful situations when communicating with clients directly. Such situations can be avoided gracefully by using chatbots.

Only 32% of companies in the finance industry currently use AI chatbots, and 37% are planning to start using them within 18 months said a report from Salesforce. This results in a potential growth rate of 118% which indicates the demand in the industry.

A smart chatbot takes a query from the user in natural language and gives the appropriate response for the same. This paper aims to discuss the relevance of chatbots in the banking sector and explore how chatbots can be implemented using natural language processing techniques that can be used in the banking industry.

1.2 PURPOSE

In this project, we will be building a chatbot using Watson's assistant. This chat should have the following capabilities.

- The Bot should be able to guide a customer to create a bank account.
- The Bot should be able to answer loan queries.
- The Bot should be able to answer general banking queries.
- The Bot should be able to answer queries regarding net banking

2. LITERATORY SURVEY

2.1 EXISTING PROBLEM

The implementation of chatbot technology is evolving rapidly in the banking industry, yet customer acceptance is behind. The aim of the present paper is to identify the factors that influence consumers' intention to use chatbot technology applied in the banking industry. The measurement development and hypotheses were based on the technology acceptance model extended with compatibility, customers' perceived privacy risk and awareness of the service.

The sample contains 287 respondents, out of whom 24% have previously used a banking chatbot. The measure items were validated by a measurement model and hypotheses were tested using Partial Least Squares-Structural Equation Modeling (PLS-SEM). The findings highlight the importance of perceived compatibility and perceived usefulness in the adoption of banking chatbot technology. Awareness of the service has an effect on perceived ease of use, perceived privacy risk, and it indirectly affects usage intention of banking chatbots through perceived usefulness. Also, perceived ease of use influences perceived usefulness, and perceived compatibility has an effect on both perceived ease of use and perceived usefulness. Perceived ease of use and perceived privacy risk show no effect on usage intention.

This paper [1] presents the use of the RASA framework for building smart context-remembering chatbots, it also describes how Rasa NLU works and how its performance is elevated by using intent recognition and entity extraction. It also compares the accuracies of entity extraction using Rasa NLU and a NN, results show Rasa NLU performs better to extract entities when whole sentences are provided as compared to neural networks which require segmented inputs. This

paper discusses Rasa by implementing a chatbot related to the finance domain, using which the users can inquire about stock-related information.

RASA NLU can introduce a vital component in intelligent chatbot systems. We can compose the system to extract the entity after intent recognition. This can be further improved for complicated sentences and more entities.

This paper [2] briefly discusses advancements in the field of AI and how this has led to major shifts in some organizations about how they operate. It further mentions how the banking industry has moved to use chatbots for providing an interface to customers so that they can have an assistant throughout the day for service. This paper also gauges the ability of current chatbots to provide all the services that a user needs.

It includes several strategies for managing dialogue in the banking and finance industry based on ontology. Although further use of AI can make the chatbot not only respond to questions but also self-learning to improve itself in more stages, improving user service quality and also reducing human load.

2.2 REEFERANCE

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2.3 Problem statement

Create a problem statement to understand your customer's point of view. The Customer Problem Statement template helps you focus on what matters to create experiences people will love. A well-articulated customer problem statement allows you and your team to find the ideal solution for the challenges your customers face. Throughout the process, you'll also be able to

empathize with your customers, which helps you better understand how they perceive your product or service.

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A Student	Create the bank account	I have creating account in some quires.	I asked my quires about bank employees.	Irritated
PS-2	Executors and administrators	Understand the available services in the bank.	I have to a waste of lot of time at the bank.	There is always a long queue as bank employees are busy.	Annoyance
PS-3	Illiterates	Check the balance and transfer the money.	I don't know the process of transfer the money	employees Should not response in the bank	Irritated
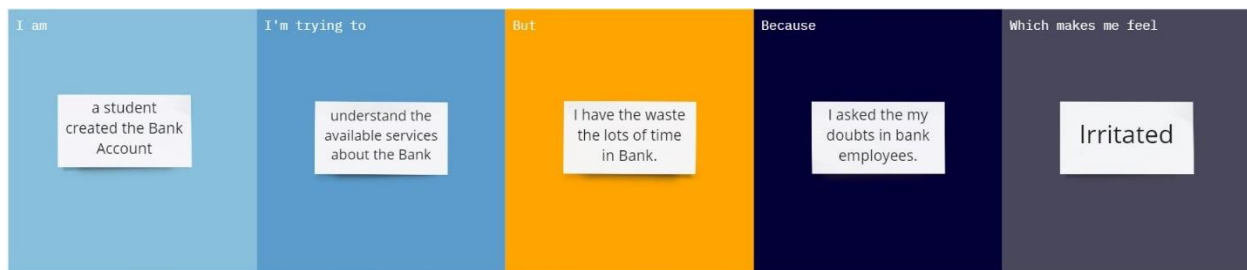
Problem Statement Definition

3. IDEATION & PROPOSED SOLUTION

3.1 EMPATHY MAP CANVAS

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviors and attitudes. It is a useful tool to helps teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenge. It externalizes knowledge about users in order are

1) create a shared understanding of user needs.

2) aid in decision making.

Traditional empathy maps are split into 4 quadrants (*Says*, *Thinks*, *Does*, and *Feels*), with the user or persona in the middle. Empathy maps provide a glance into who a user is as a whole and are not chronological or sequential.

The *Says* quadrant contains what the user says out loud in an interview or some other usability study. Ideally, it contains verbatim and direct quotes from research.

- *"I am allegiant to Delta because I never have a bad experience."*

The *Thinks* quadrant captures what the user is thinking throughout the experience. Ask yourself (from the qualitative research gathered): what occupies the user's thoughts? What matters to the user? It is possible to have the same content in both *Says* and *Thinks*. However, pay special attention to what users think, but may not be willing to vocalize. Try to understand why they are reluctant to share — are they unsure, self-conscious, polite, or afraid to tell others something?

- *"This is really annoying."*
- *"Am I dumb for not understanding this?"*

The *Does* quadrant encloses the actions the user takes. From the research, what does the user physically do? How does the user go about doing it?
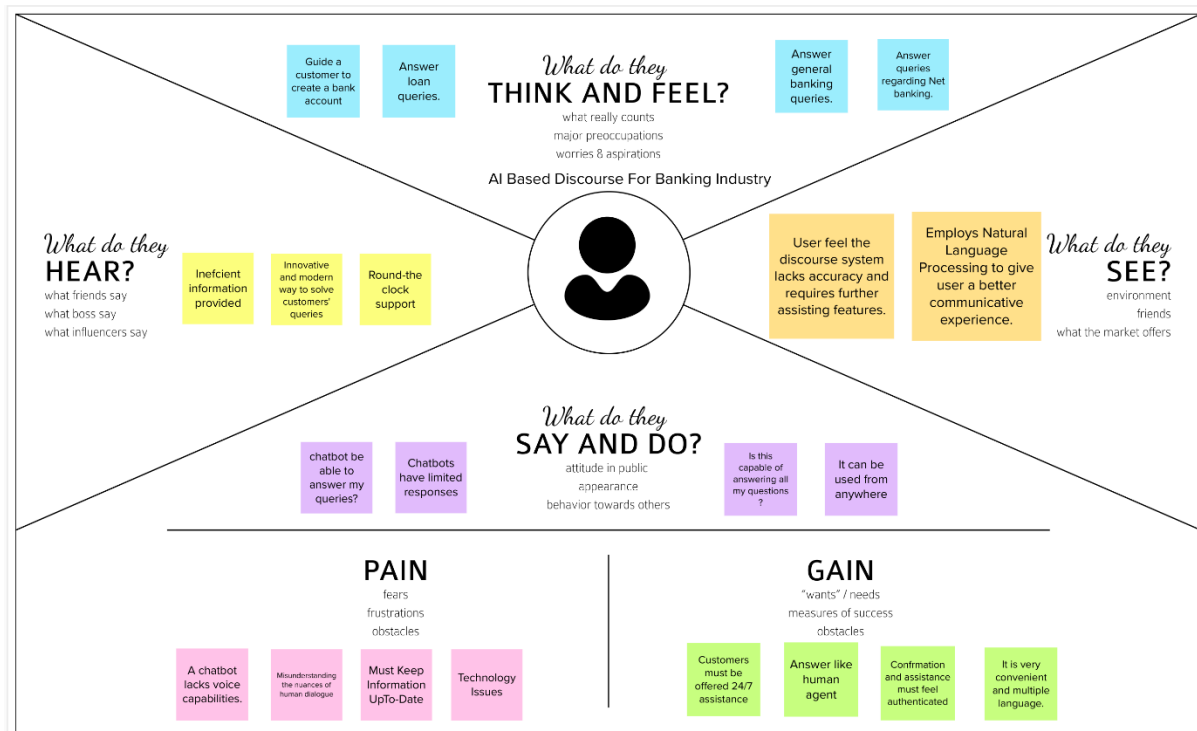
- *Refreshes page several times.*

- *Shops around to compare prices.*

The *Feels* quadrant is the user's emotional state, often represented as an adjective plus a short sentence for context. Ask yourself: what worries the user? What does the user get excited about? How does the user feel about the experience?

- *Impatient: pages load too slowly*

Confused: too many contradictory prices

Worried: they are doing some

AI Based Discourse For Banking Industry

THINK AND FEEL?
what really counts
major preoccupations
worries & aspirations

- Guide a customer to create a bank account
- Answer loan queries.
- Answer general banking queries.
- Answer queries regarding Net banking.

What do they HEAR?
what friends say
what boss say
what influencers say

- Inefcient information provided
- Innovative and modern way to solve customers' queries
- Round-the-clock support

What do they SEE?
environment
friends
what the market offers

- User feel the discourse system lacks accuracy and requires further assisting features.
- Employs Natural Language Processing to give user a better communicative experience.

What do they SAY AND DO?
attitude in public
appearance
behavior towards others

- chatbot be able to answer my queries?
- Chatbots have limited responses
- Is this capable of answering all my questions?
- It can be used from anywhere

PAIN
fears
frustrations
obstacles

- A chatbot lacks voice capabilities.
- Misunderstanding the nuances of human dialogue
- Must Keep Information UpTo-Date
- Technology Issues

GAIN
"wants" / needs
measures of success
obstacles

- Customers must be offered 24/7 assistance
- Answer like human agent
- Confrmation and assistance must feel authenticated
- It is very convenient and multiple language.

3.2 IDEATION BRAINSTROMING:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions

Design thinking is about applying the design principles to the way people interact with the world, rather than focusing solely on aesthetics. An iterative process in which you try to know the user, challenge your own assumptions and re-define problems in an attempt to identify different solutions that might not be easily apparent using conventional methods. Design thinking revolves around developing a deep interest in understanding users of products and services. This helps you develop empathy with the target user.

This is the complete opposite of how banks and credit institutions traditionally design products and services. Financial institutions tend to develop products based on their own internal processes and operational efficiencies, instead of focusing on the consumers. Finishing up the product with a pretty wrapper and calling it a day.

Financial institutions then wonder why consumers get frustrated with their products and service For example: A customer abandoning the online account opening halfway through the process. The process doesn't meet the user's need or address their problem; to open an account without having to go to a branch. Design thinking, in theory, can help solve that problem.

Design thinking has four or five phases, dispensing upon how you perceive a problem.

1. Empathize: Conduct research in order to develop knowledge about user behaviour. Hypothesize that your goal is to improve the onboarding experience for new users. In the first phase, you talk to varied actual users, you observe what they do, how they think, and what they want. Understand user motivations, discouragements, if they experience frustration at any stage of the process. The goal of the empathize phase is to gather observations, so you can truly start to empathize with your users and their perspectives.

2. Define: Combine your research from the empathize stage and observe where problems exist from a user standpoint. When stating your users' needs, highlight opportunities for innovation. Use data gathered in the above phase to draw insights. Lay down all your observations and draw parallels across users' current experiences. This will help you identify a common pain point or an unmet need.

3. Ideate: Brainstorm and collate a range of crazy, creative ideas that address the user's pain points or unmet needs. There should be total freedom while ideating, quantity trumps quality. Bring all your team members together and share ideas with one another and build on each other's ideas.

4. Prototype: The goal of this stage is to understand what parts of your ideas work, and which do not as you start to weigh the impact versus feasibility of your ideas through feedback on your prototypes. Your ideas should be as real and tactile as possible (not always easy in a service industry like banking). Change your concept based on feedback, prototyping again and again quickly.

5. Test: Return to your users for feedback. With questions like 'Does the solution meet users' needs?' and 'Is there an improvement in how they feel, think, or do their tasks?' Put your prototype in the hands of real people and see if it achieves everyone's goals. Even after you start executing your vision, you should continue to test.

Brainstorm, Idea Listing

VALLIYAPPAN

Understand the users query and deliver meaningful answer using predefined knowledge base.

Most of the people, especially the first-timers, struggle to know various bank procedures and processes.

People have queries about many bank policies, ATM, fixed deposits. This results in unnecessary crowd in banks for inquiry.

Chatbots reduce human error as well as personalize the client service.

AI chatbot can help you provide exceptional customer services as it is available24/7.

Chatbots can be useful to spread word of mouth to the customers.

knowledge and talent while reducing support costs and increasing customer retention rates.

chatbots to offer their customers timely reminders and regular notifications regarding their bank accounts.

Chatbots can also alert customers if their account balance is in danger of falling below an average balance.

KISHORE

Provide a chat bot interface for users which could be available on the web and on any hand-held devices.

Saving time to user by providing chatbot to all platforms.

AI that communicates with users and performs basic tasks through chat or speech interfaces

chat communication between a human user and a computer using natural language.

Intranet-based chatbots help banks get more specific customer feedback. It can help them improve their services

loyalty back into banking and to counter these issues, many institutes have adopted AI chatbots.

use chatbots to pay bills, set or cancel payments, and track monetary transactions.

Chatbots can answer several fundamental questions regarding accounts of customers or banking products.

chatbot used to recover their account details and make changes such as updating their current address or phone number.

MANIKANDAN

prepare our own data set as questions and answers that banking services.

Chatbot will secure the user information and authentication.

Provide the user friendly interface on the customer queries.

This banking bot is built using artificial algorithms that analyses user's queries.

provide the customers with personalized services, banks can accomplish this particular goal by deploying chatbots.

Chatbots act as helping hands in sending you push notifications proactively. to updated about your transactions done on your account in real-time.

Chatbots do not need to a risk to human agents, as their role is not to replace workers, but rather boost their productivity by allowing employees to focus on more complex tasks.

Chatbots can track the location through mobile GPS, thus providing correct answers every time.

AI chatbot allows customers to complete the entire process without waiting on the phone.

MUTHUKUMAR

Chat bot will be used to give information or answers to any question asked by user related to bank.

design system for banks where users can ask any bank related questions like loan, account, policy, etc.,

Banking bots are proving seamless customer service.

Chatbots cannot hold the conversation which means it cannot answer multiple question at the same time.

all sorts of financial information and are also capable of keeping this information safe and secure

Banking Chatbots will enable simple and easy transactions with just a few clicks on finger impressions to ensure that these transactions are safe.

Banking chatbots can also create personalized brand experiences that increase acquisition, conversion, retention, and loyalty.

chatbots to provide them with account balance details under their names.

Chatbots in banking industries can help customers with issues that can be non-complex but urgent.

Grouping ideas.

AI chatbot can help you provide exceptional customer services as it is available24/7.

AI that communicates with users and performs basic tasks through chat or speech interfaces

all sorts of financial information and are also capable of keeping this information safe and secure

Chat bot will be used to give information or answers to any question asked by user related to bank.

Prioritize Ideas

AI that communicates with users and performs basic tasks through chat or speech interfaces

all sorts of financial information and are also capable of keeping this information safe and secure

AI chatbot can help you provide exceptional customer services as it is available24/7.

Chat bot will be used to give information or answers to any question asked by user related to bank.

3.3 PROPOSED SOLUTION:

Banks are increasingly deploying technology-intensive solutions for growing their revenues, enhancing customer experience, optimizing cost structure and managing enterprise risk. With internet and mobile banking, banks are now focusing on enhancing services like accepting deposits, mortgage lending, giving consumer loans, and basic investment services like savings account, term deposits. But, there are several external and internal challenges that are impacting the banking industry.

Non-banking companies are constantly presenting a challenge for banks. Online payment portals remain popular ways for consumers to pay for goods online and digital wallets are gaining traction. Traditional and unstructured business models used by banks do not support such customer centricity. Also, they don't align well with today's digital goals.

Banking channels largely remain disconnected. For instance, products and different geographies vie against each other so that customers often perceive that they are confronting a jumble of processes. One of the biggest challenges in banking is that it lacks the implementation of integrated channel distribution that standardizes customer information and aligns all the disconnected systems across the channel. Due to lack of integrated channel distribution, banks are unable to track their customer's journey and channel performance accurately.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Bot should be able to guide a customer to create a bank account, answer loan queries, general banking queries & regarding net banking.
2.	Idea / Solution description	chatbots will predict human behaviour more accurately and use this information for self-

		learning/Answer natural-language questions from customers.
3.	Novelty / Uniqueness	It will secure the user information and authentication for banking transaction. Chatbots allow businesses to connect with customers in a personal way without the expense of human representatives / chatbot has features like no code deployment, omnichannel messaging support, fall back options, sentiment analysis to add value to conversations.
4.	Social Impact / Customer Satisfaction	It provides the seamless customer service. **Reduced cost for customer support.** **Saves the customer time**/ It Provide the exceptional customer service at 24/7 available and multiple languages.
5.	Business Model (Revenue Model)	chatbots is to provide the customers with prompt service and to improve the operational efficiency of the bank and its employees. Integrating chatbots can help your business deliver automated smart responses and achieve marketing goals efficiently.
6.	Scalability of the Solution	Prevent fraud with transaction verifications and messaging-based "badges". customer service chatbots is their ability to help businesses grow and scale with ease, especially when web traffic volume increases.

3.4 PROBLEM SOLUTION FIT

Problem-solution fit is a term used to describe the point validating that the base problem resulting in a business idea really exists and the proposed solution actually solves that problem. The problem-solution fit is when you are Validate that the problem exists: When you validate your problem hypothesis using real-world data and feedback. That is, you gather information from real users to determine whether or not they care about the pain point you're trying to solve. Validate that your solution solves the problem: When you validate that the target audience appreciates the value your solution delivers to them. The problem-solution fit precedes the product development and forms the foundation upon which a company is built. It helps you answer the basics startup-related questions before you even start your startup.

- Do people actually have the problem that you think they have?
- How do they solve the problem now?
- Does your proposed solution make a meaningful difference?

Once you're satisfied with the answers, you use this solution to develop a saleable product and start acquiring customers.

Problem-Solution fit canvas 2.0

1. CUSTOMER SEGMENT(S) `CS`	**6. CUSTOMER CONSTRAINTS** `CC`	**5. AVAILABLE SOLUTIONS** `AS`
Credit/Debit Card Fund Transfer Bank Account Fixed Deposit Loans Bill Payment	Long waiting times. Inconsistency. Can't find the answer on the website. An exponential increase in the number of new applications.	unlocking or locking cards. resetting.

Define CS, fit into CC — *Explore AS, differentiate*

2. JOBS-TO-BE-DONE / PROBLEMS `J&P`	**9. PROBLEM ROOT CAUSE** `RC`	**7. BEHAVIOUR** `BE`
Customer to create a bank account. Bot answer loan queries. Bot answer general banking queries. Bot answer queries regarding net banking.	Automate customer support. Handle numerous customer interactions at a time. Assist customer queries 24/7.	Making payments Verifying recent transactions Checking account balances, Reporting fraud Transferring funds Provide credit report updates Downloading bank statements

Focus on J&P, tap into BE, understand RC — *Focus on J&P, tap into BE, understand RC*

3. TRIGGERS `TR`	**10. YOUR SOLUTION** `SL`	**8. CHANNELS of BEHAVIOUR** `CH`
Instant Notifications Easy Data & Documents Collection and Verification 24×7 Assistance	optimize conversion rates, improve customer experiences, contribute to direct revenue	**8.1 ONLINE** Transfer money to internal or external bank accounts Pay bills, manage direct debits. Send money internationally.
4. EMOTIONS: BEFORE / AFTER `EM`		**8.2 OFFLINE**
Long Waiting Times in Customer Services Limited Channels and Separate Strategies		Offline payment indicates that money is transferred at a later date

Identify strong TR & EM — *Extract online & offline CH of BE*