

Project 1

Internship @ Active Ai

Vishnu K
176330006
M Des IxD 2017-19
IDC IIT Bombay

Contents

Acknowledgement	3
Introduction	4
Conversational Design	9
Conversation Design Process at Active Ai	13
Explorations	22
Learnings and Conclusions	29
References	30

Acknowledgement

This internship was conducted under the guidance of Mr. Michael Wee, Senior Customer Experience Designer at Active Ai. His guidance and encouragement helped me to complete my work with efficiency.

I would like to thank Mr. Paolo Rodriguez, Customer Experience Designer, Active Ai for helping me out with learning new softwares used in the industry.

My fellow interns, Vedic Pratap from IIT Kharagpur, Animesh Gupta from IIT BHU have helped me to built my understanding about AI systems. Sonali Vaidya, Senior HR and Anjana Raghuram has helped me transition smoothly into the organisation.

I would like to thank IDC for giving me an opportunity to go to industry and gain experience.

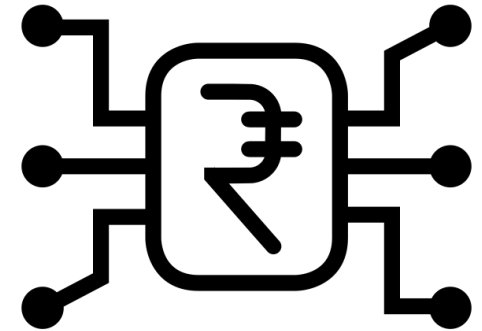
1. Introduction

As part of my Project 1, I worked at Active Ai, a FinTech company working in creating AI based conversational solutions for banking, insurance and capital markets. My internship period was from May 7 2018 to June 30 2018. During my internship tenure, my profile was Intern- Customer Experience Design. I was reporting to Michael Wee, Senior Experience Designer at Active Ai and worked along with Paolo Rodriguez. My work involved creating flows, wireframes, concept videos and video prototypes for conversational systems made by Active Ai for its clients. With my discussions with the Design and AI team, I was able to make an understanding of conversational systems and its design. The culture at the company encouraged me to explore and research my areas of interest in the topic and have discussions with the team.

Financial Technology

Financial Technology or Fintech is an emerging area where new technologies and innovations are used to improve delivery of financial services. They aim to replace or augment traditional technology and practices to make financial services more inclusive and accessible to general public. Use of digital devices for mobile or internet banking, insurance, capital markets, risk management, digital wallets, cryptocurrency, blockchain etc. are examples of FinTech. Global investment in financial technology increased more than 2,200% from \$930 million in 2008 to more than \$22 billion in 2015.

In the past decade, financial sector has seen rapid change in the use of technology. This has made customer expectation high to a point where now they expect seamless onboarding, rapid approvals and free person-to-person payment. According to reports, some of the disruptive changes that led to reshaping of FinTech industry are growth of online shopping, data collection and analytics, shift towards personalised experiences, artificial intelligence and machine learning and use of increased use of middlewares.

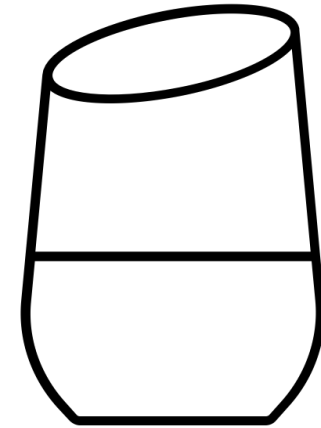


Conversational Systems

Conversational systems combine voice recognition, text to speech and natural language understanding to create effective text or speech interfaces. In text based interfaces, users interact with the system in ways similar to how two humans message each other. In speech systems, users speak to systems to get actions done. Gartner's report names conversational systems as one of the 10 disruptive technologies that will change how we interact with services and products around us.

"Rather than having to train people used to desktop computers to new behaviors appropriate for cell phones, many of them can learn the best ways to use a mobile device from the start.", says Andrew Ng, Professor of Artificial Intelligence, Stanford University.

Conversational systems can be effective in reaching out to users who lack the skills to use web or mobile application based graphical user interfaces as the interactions are natural and effective conversational systems require less learning compared to graphical user interfaces.



Active Ai - Conversational systems in FinTech

Active Ai combines the developments in financial sector with conversational systems to make financial services efficient, seamless. Active Ai is a SaaS(Software As A Service) company which provides artificial Intelligence powered Conversational Banking solutions for banks, insurance companies and capital markets. Financial sector companies can integrate their services over chat, web or IoT channels using core technology developed by Active Ai.

The company is based in Singapore with an innovation lab in Bengaluru. Active Ai was founded in 2016 by three FinTech entrepreneurs Ravishankar, Shankar Narayanan and Parikshit Paspulati who have more than 20 years of experience in the finance industry. The company is based out of Singapore with an innovation lab in Bengaluru. They have offices in Singapore, India, United States of America and Australia. Gartner's research organisation recognized Active Ai as *Cool Vendor in AI for Fintech in Asia/Pacific 2018*. Some of the clients include Axis Bank, HDFC securities, FWD insurance, CIMB bank, Uincome, Yes Bank etc and are partnered with TCS, Infosys, Microsoft Accelerator, Silverlake and Inv fintech. They are backed by Kalari capital.



Active Ai - Products

a. Triniti - Conversational AI Engine

Triniti is the conversational AI engine tuned specifically for banking, insurance and capital market services with built in preprocessor, NLP,NLU, NLG and machine comprehension.

It's key strength is to handle context driven conversations. It supports languages such as English, Thai, Bahasa Indonesia and Korean.

Conversation and Context	Classify and Extract	Understand	Response
Query splitter	Fragment detection	Response type and grain detection	Small talk
Context detection	Intent classification	Tense detection	Search knowledge base
Sentiment and Profanity detection	Entity and Modifier extraction	Sentence parsing	Suggest related

b. Morfeus - Middleware

Morfeus is the conversational middleware that acts as an orchestration layer, which has the capability to access trinity ai engine. It has hooks to front end channels such as voice, text, social and IoT and to backend APIs of banks and the financial system. It provides omni-channel front end system, which is AI neutral, conversational and multilingual.

2. Conversation Design

Conversation design is a design language based on how humans converse with each other. Conversational design involves various disciplines including voice user interface design, interaction design, visual design, audio design and UX writing.

Principles of Conversation:

Users rely on existing model of human-to-human interaction and follow the Cooperative Principle even when interacting with the persona of a conversational user interface, and they expect the persona to follow it too.

The Cooperative Principle

Efficient communication relies on the assumption that there's an undercurrent of cooperation between conversational participants.

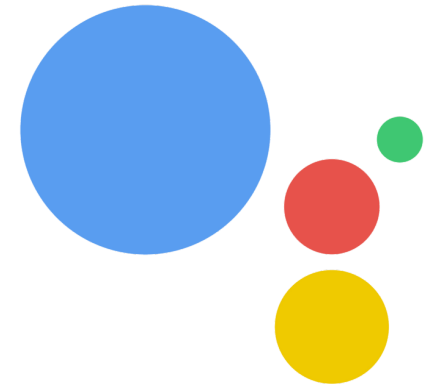
The cooperative principle is based on four laws called Grice Maxims.

Grice Maxims

We instinctively cooperate in terms of

Maxim of Quality - the truth of what we say

Maxim of Quantity - the quantity of information that we provide



Maxim of Relevance - the relevance of what we contribute

Maxim of Manner - the way we strive to communicate clearly, without obscurity or ambiguity

Implicature vs Implication

Humans can read between the lines and understand what the other person suggested. This is known as conversational implicature. This is different from logical implication of sentence. With advances in Automatic Speech Recognition (ASR), it is possible to understand what users said, but understanding what users meant is still a challenge.

Context

Humans converse with the help of pronouns, follow up intents and also using other sensories. It is important for the conversational system to be coherent with the context of the conversation, understand who he or she is or understand if the user is referring to something on the screen.

Other Principles

Effective conversation between two people optimize each other's role based on the context of the conversation, takes turn and use variations in sentences, words or phrases used.



Bots for Messenger

Facebook messenger is the most commonly used platform for chatbots. Facebook lets its users create conversational systems using Wit.ai engine. Along with providing conversational guidelines, facebook has also given Platform Design Kit for download. I studied Platform Design Kit used by messenger chatbots to understand visual design strategies facebook has used in its messenger bots, to enhance the conversational experience.

While designing messenger based chatbots, designers have fewer options for visual cues to choose from in comparison to graphical user interfaces. These visual cues reinforce the way in which the user interacts with the system by telling users what to expect from them. Facebook messenger platforms use six different sign classes to achieve this:

1. Simple Message

User can read the message and reply to it. Represented by black text in grey background.

2. Simple Image

A message with an image. Represented by rounded border and grey outline for the image.

3. Suggestions or quick replies

Suggest messages that user can send to the bot. They disappear as soon as user clicks



or type something. Represented by blue text, white background and blue border.

4. Card

A card contains one heading and few options to select under that heading. This is permanent and remains in the chat. Options are represented in blue text in white background, heading is represented with black text in grey background. Clicking one option leads to webview.

5. Carousel

Collection of cards with one image and one option under the image. User can swipe to see other cards. Clicking on one card leads to webview.

6. Persistent Menu

Set of buttons user can access any time.

3. Conversation Design Process at Active Ai

Active Ai is a B2B, AI first company. Active Ai gets information about the users and their queries regarding financial services and products from the database provided by client companies. Business Development people talk to client companies and client companies give Active Ai details about users. There is no user research done by Active Ai in the design process.

For creating conversations, client companies provide database of queries they have collected over time(through customer care operations etc.) and list of responses to those queries. Based on the services that clients wish to offer through conversational system, use cases are defined. One example of a use case could be this: A user loses his debit card and wants to block it.

For each use cases, flow is defined which considers all the possible variations of that use case. Once flow is defined, conversation expert makes script of conversations. Both the data received from the client company and the persona of the bot is considered while designing conversations. Wireframes are created based on script and flow and handed over to the front end development team.

Even before the actual products are made, business development team have to talk to clients and explain the features provided by Active Ai. For this, video prototypes are made based on the use case, flow and wireframe. Usability evaluation of the interface is limited to heuristic evaluation. The conversational capacities of the system is evaluated through different AI frameworks.

Projects undertaken during Internship

The following projects were done during the period of internship at Active Ai.

- Create flow, wireframes and video prototypes for Axis Bank Aha, conversational assistant for Axis Bank
- Create video prototypes for Active Smart Service, a messenger bot used to explain conversational capabilities
- Create flow and wireframes for HDFC Smart Assistant Arya, conversational assistant for HDFC Securities
- Create script and storyboard for a concept video explaining advantages of using conversational system over traditional methods for HDFC mutual fund order.

Above projects were done in a team of two people; Vishnu K, Customer Experience Design Intern and Paolo Rodriguez, Customer Experience Designer and was guided by Micheal Wee, Senior Customer Experience Designer.

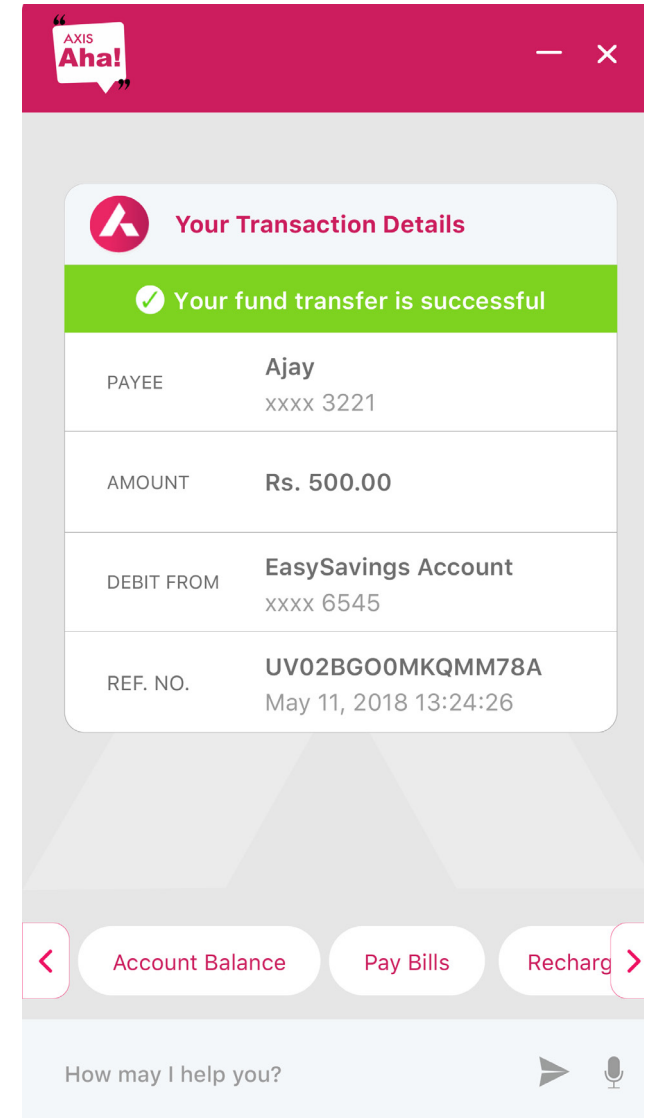
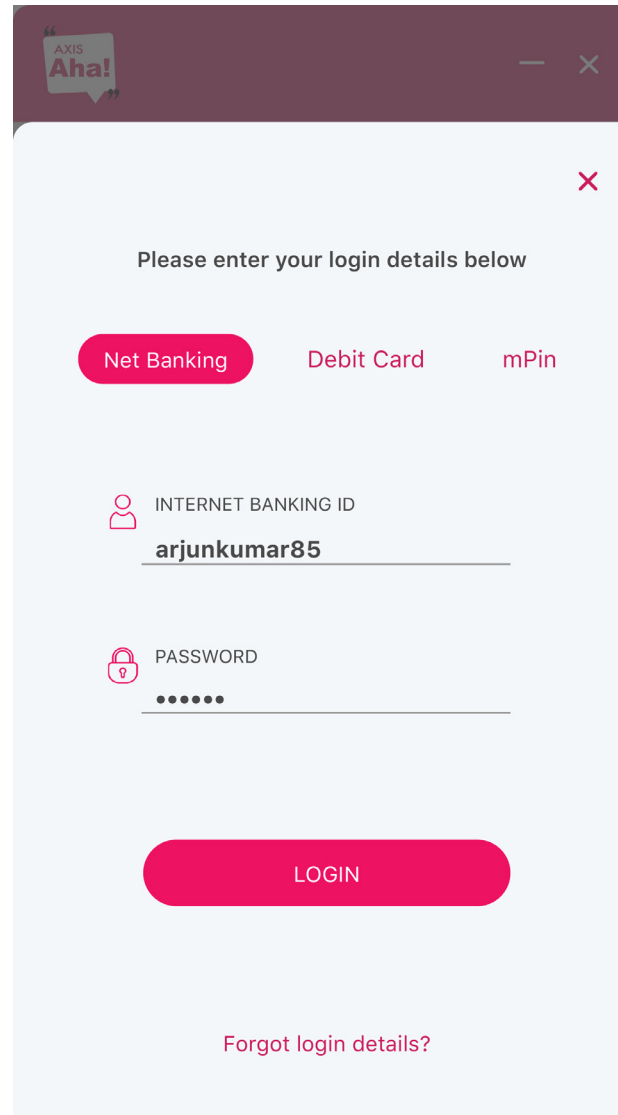
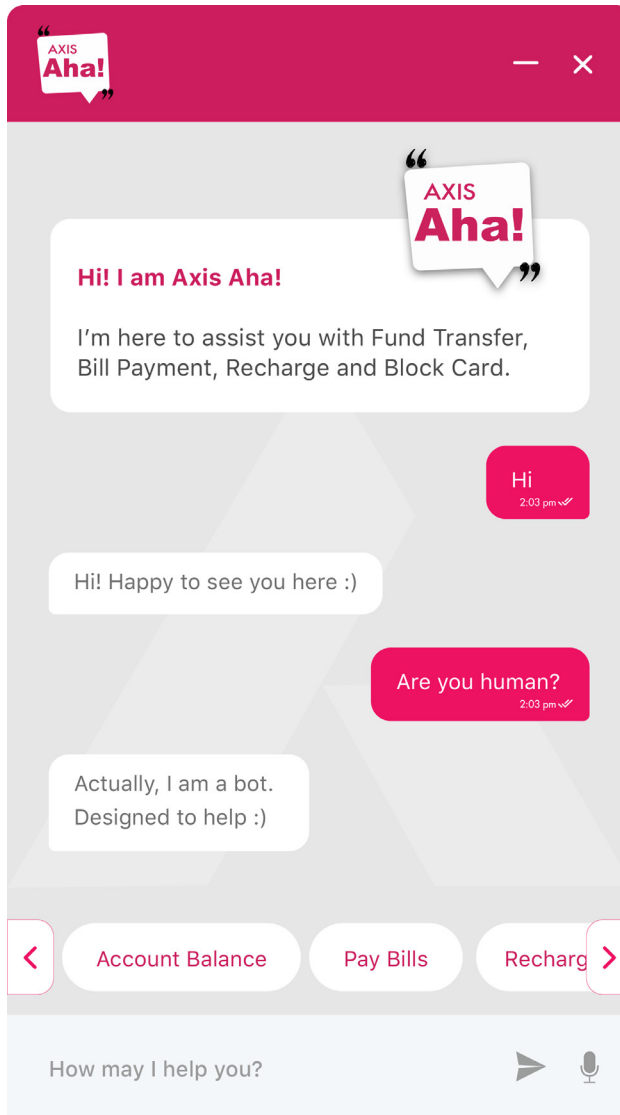
Axis Bank Aha

Aha is a virtual assistant currently deployed at Axis Bank webpage. Flows, wireframes and video prototypes were made for the following use cases:

- Intro and Small talk: when user first interacts with Aha
- Accounts and Transactions : Logging into user profile and checking balance
- Fund transfer: Transferring funds to other account through NEFT, IMPS etc.
- Bill payment and Blocking card

Flows, wireframes and video prototypes to explain:

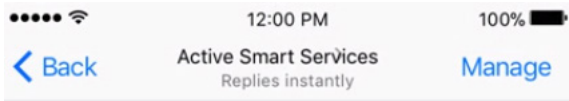
- Natural Language Processing
- Compound Queries
- Context
- Natural Language Generation and Context change



Screens designed for Axis Bank Aha

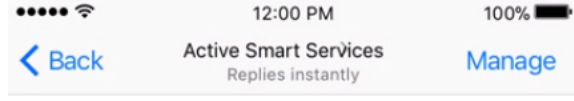
Active Smart Services

Active smart services is a demo conversational agent deployed at Facebook messenger bot platform for insurance and savings schemes. The video prototype explains how Active Smart Services suggest best retirement plan to a user based on the user profile and preferences, in a chat based conversational system.



Login Successful

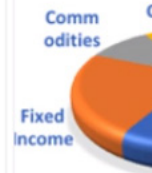
Good Morning Sarah!
What can I help with?



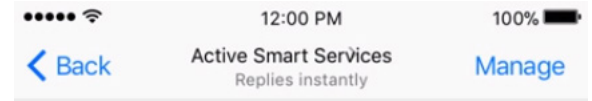
Model PF1



Model PF2



Select



After rebalancing, your
portfolio valuation will be as



Proceed with
rebalancing?

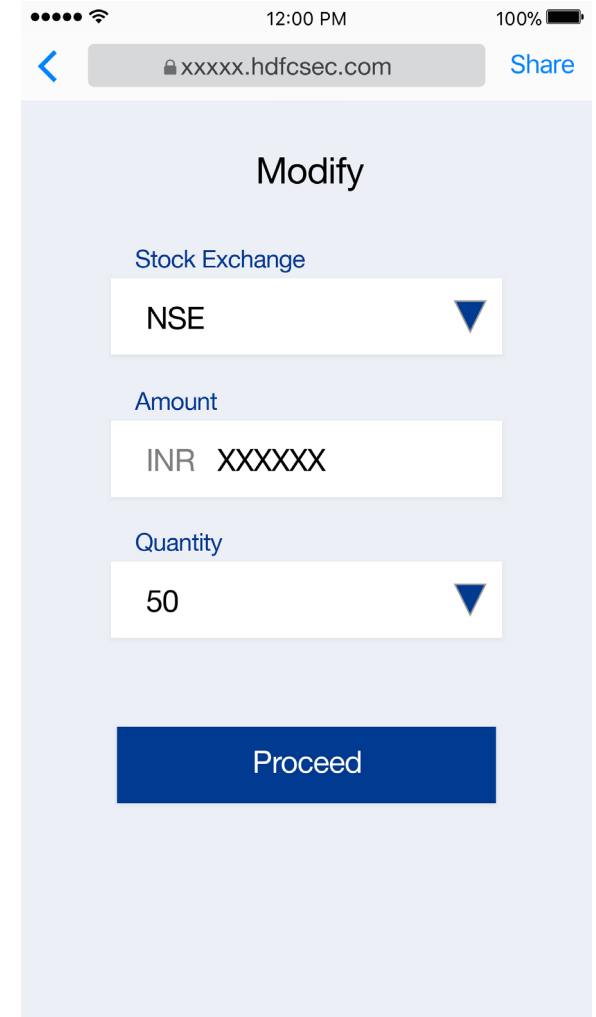
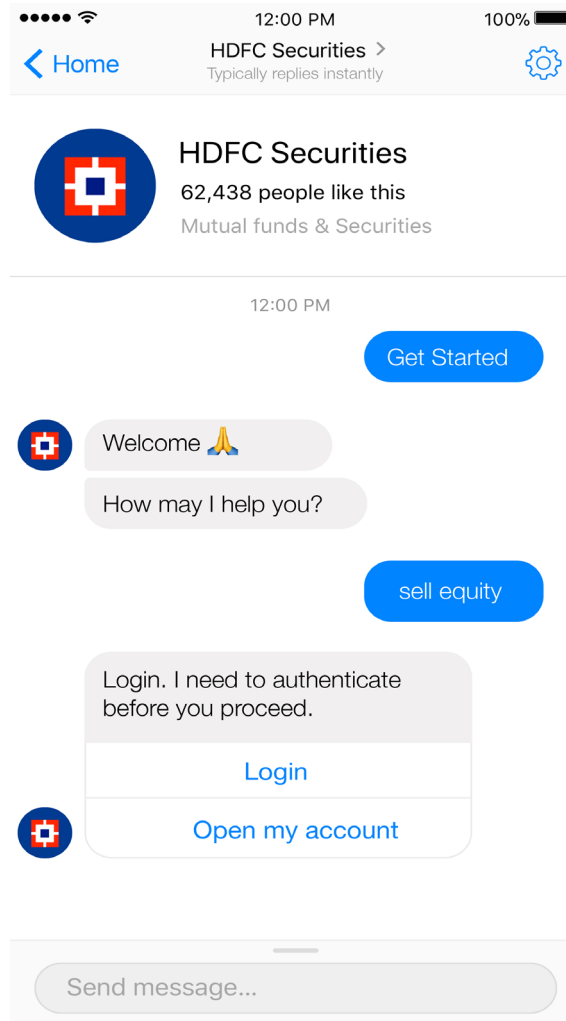
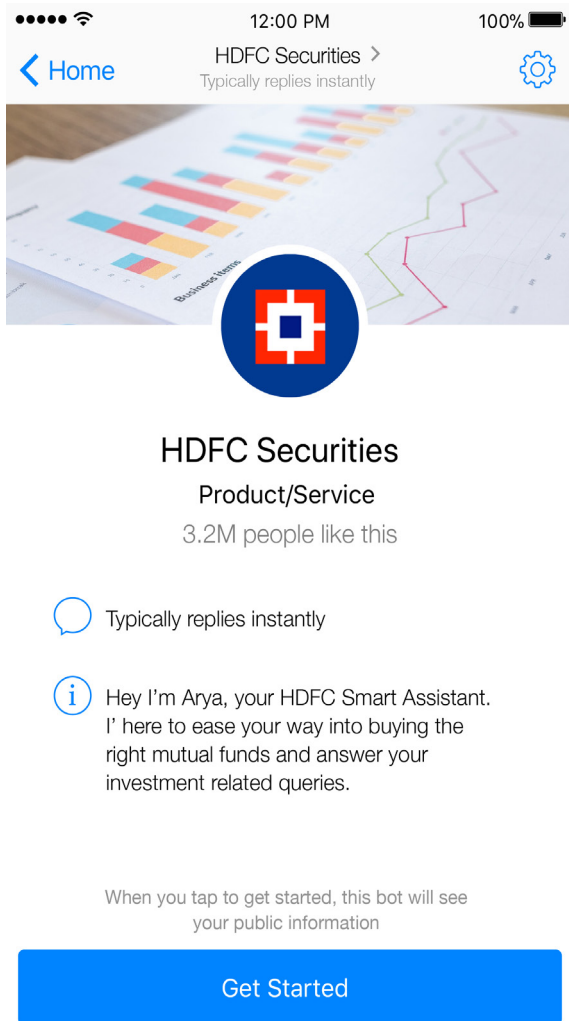


Screens designed for Active Smart Services

HDFC Securities - Arya

This wireframes were designed to explain the process of selling, buying and changing quantity of stocks using a conversational system.

HDFC Securities - Smart Assistant Arya



4. Explorations

Artificial intelligence based conversational systems have been around for many years but last few years have seen lot of companies and businesses experimenting out with such systems. This sudden trend is due to various factors. Most important of them being development in Artificial Intelligence, Natural Language Processing, Automatic Speech recognition etc. Facebook messenger platform for chatbots are filled with personal and company bots but most of them cannot even execute core functions which they are supposed to. Technology is no way near to understanding and speaking human conversations as humans do. There are two important aspects to creating a conversational system that can give a seamless experience.

Focus

Conversational systems which focus on one or few tasks can give a good experience to the users without causing breakdowns. It is also important to let users know what the bot is capable of doing.

Training

Training is one of the most important aspects in creating any AI based system. The best prediction models can give poor results with inadequate training. If the area of focus has

open source data available for training, the bot can create good results.

For e.g. A chatbot which gives only weather data about a location for a particular time can give conversations without breakdowns as there are lot of weather APIs available.

Difference between Conversational UI and GUI

Conversational UI	Graphical UI
Intuitive, natural interactions	Interaction is not natural. Learning curve associated with interactions
Conversation is the object of design	Service or features are hidden behind the interface
Design is an interpretational task	Design is an explanatory task
Attention always towards user requirements	Attention often towards interface and thus missing out on user goals
System and user personas	Only user persona

When to use conversational UI

Whether Conversational system is good for any service or product can be decided by understanding user interactions with current systems and comparing them with conversational system. Conversational systems is a better alternative if:

- The action is brief with minimal back and forth actions
- If for doing an action in the GUI, user has to tap multiple times
- Feature is difficult to find in GUI
- Navigating in GUI is cumbersome
- GUI has high information hierarchy
- Users can multitask while doing this task in Conversational system
- No sensitive personal information has to be provided (in case of voice interfaces)

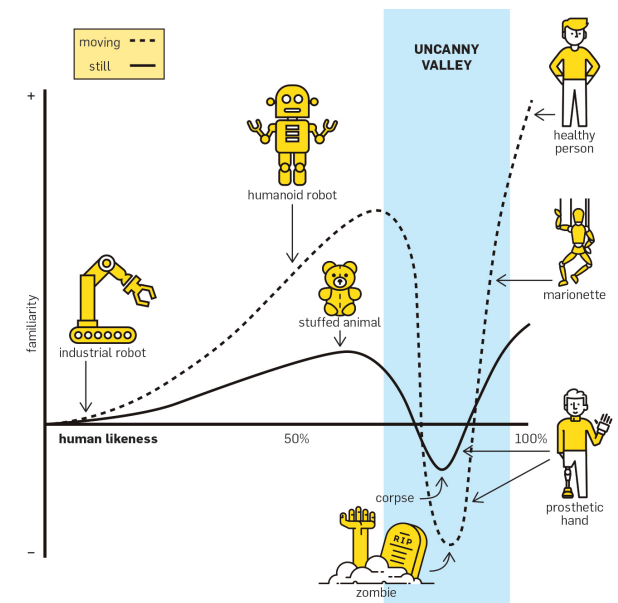
Microinteractions for conversational systems

Conversations are inherently multimodal. When humans talk with each other, all the sensories are involved. While designing for conversations, visual elements should help create the conversations natural. One way that can be achieved is by creating microinteractions(visual/conversational) that can behave the same way humans behave during conversations.

A chatbot which changes its facial expression based on the context of the conversation; a sad face when the card is lost, a happy face when an investment is done etc. can create the feeling that the chatbot is more empathetic towards the user.

Uncanny valleys in human chatbot interaction

Uncanny valleys in human robot interaction is a well studied concept. While interacting with chatbots, it is important to let the bot have a persona which conveys its capabilities. A mismatch would let users expect beyond the capabilities of the bot and thus causes breakdowns.



Conversational systems and their implications in HCI

Current technology is immature to create effective experiences with conversational systems. Artificial general intelligence is far from reality. It might take years before we can confidently create conversational systems that can replicate human conversations, the way humans do. But, lot of opportunities lies in conversational systems in the field of HCI.

Latest technological advancements are generally known to create divide between people; less tech-savvy people takes time to adopt to technology because of various reasons. Language barriers(In Indian context) creates further divide as technology develops first in English and is then forced into Indian languages without much thought.

Conversational systems stand at an advantage as they require very less understanding of technology to interact with. Conversations are natural ways of interactions and learning curve associated with such interactions are not as steep as the one with graphical user interfaces. With effective use of both NLP based and rule based models, efficient systems can be created with narrow field of focus. In contexts where IVRS are preferred over Graphical User Interfaces, conversational systems can create much better experiences to the users. Inclusivity of conversational systems across gender, age digital literacy and language can create great opportunities for creating personalised systems that cater to the needs of everyone.

Rise and Fall of Chatbots?

Chatbots exploded at around 2016 and many predicted that chatbots would replace apps. But now technologists are coming to the realisation that conversational systems should augment the capabilities of GUIs, not replace them. Conversational products that solve problems which GUIs couldn't solve are the ones that are making progress.

"We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don't let yourself be lulled into inaction"

- Bill Gates

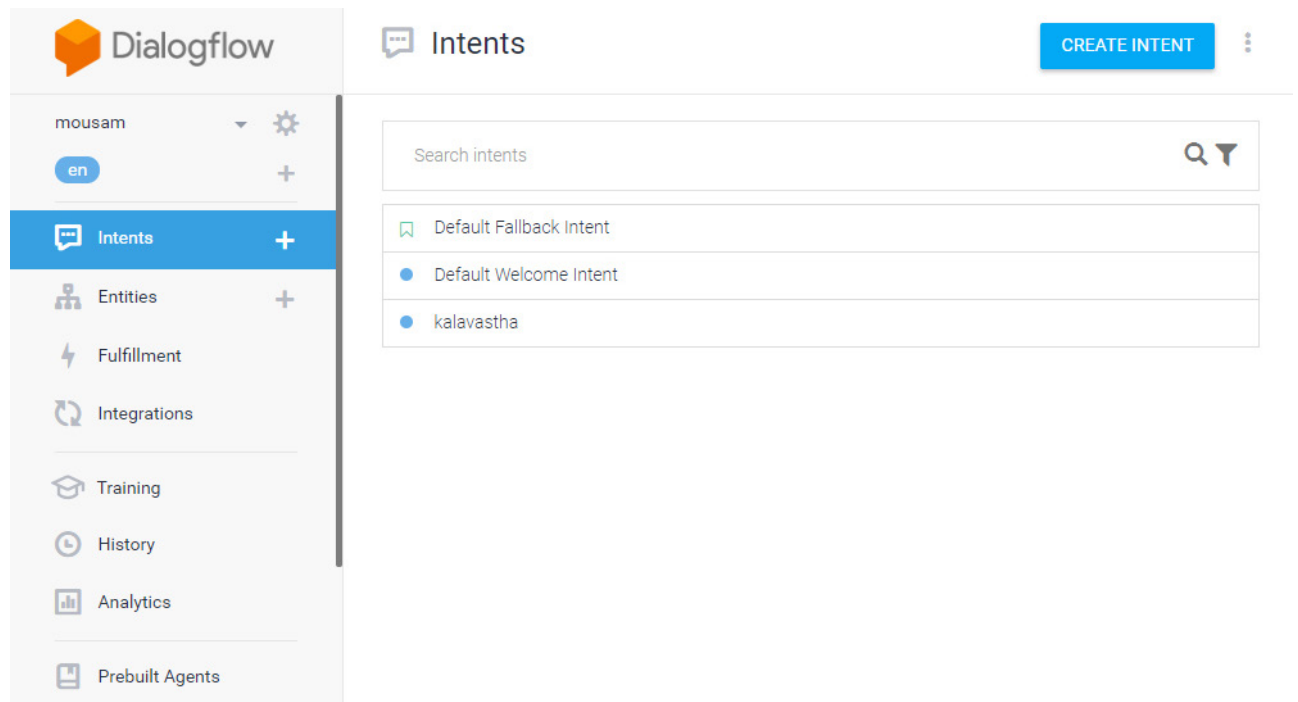
In 2018, conversational systems are crossing the trough of disillusionment. It can only improve with improvements in research and technology.

Mausam - the weather bot

To understand how dialogflow bots work, I created a conversational bot named Mausam, which provides information about weather at different cities in the world. I used yahooWeatherForecast API to access weather data. Instead of Google Cloud Platform, I used Heroku as webhook as it was free.

Mausam has the following features

- provides information about weather of any city in the world for any day
- If either city or date is not mentioned, it will ask the user again for the missing details.



5. Conclusions and Learnings

Conversational systems are at very early stage of development. Lot of research has to be done to understand user behaviour and patterns with conversational systems. During my internship, I have gathered an understanding of conversational systems and what goes into making a good one. I have gained confidence in considering conversational systems as a medium in further design and research explorations.

I also learned how products are made and deployed in teams in Industry, what are the drawbacks and advantages. This internship also helped me improve my prototyping skills apart from gaining knowledge about a totally new field of design.

5. References

1. Here's What I Can Do: Chatbots' Strategies to Convey Their Features to Users.
Francisco A. M. Valério
2. The Edge of the Uncanny. DOI:10.1145/2967977
3. Chatbots and the New World of HCI. DOI: 10.1145/3085558
4. Rise of the chatbots: Finding a place for Artificial Intelligence in India and US. Jennifer Zamora
5. www.dialogflow.google.com
6. www.actions.google.com
7. www.facebook.com/developer