Building Practical Chatbots

Session 1
Introduction

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Plan for today... (1/2)

• Session 1: Introduction
  – We'll get a hang of what the hype is all about
  – Setup our laptops for the later sessions
  – We'll discuss a sample use case, for which we'll build solutions later

• Session 2: Google Dialogflow
  – We'll discuss the salient features of Google's Dialogflow Platform
  – We'll build a working chatbot over Dialogflow for our discussed use case
Plan for today... (2/2)

• Session 3: IBM Watson Assistant
  – We'll get to know Watson Assistant better
  – We'll build a working chatbot with the help of Watson Assistant for the same use case, and will see how the process differs in comparison to Dialogflow

• Session 2: Amazon Lex
  – Finally, we'll also look at how Amazon Lex differs from Dialogflow and Watson Assistant
  – To complete the trilogy, we'll also build another chatbot for our use case, using Lex as well
What are "chatbots"?

• There's no "universally accepted" definition

• A working definition is
  A software component that can interact with users using Natural Languages (like English or Hindi)

• Examples:
  – When you say "Ok Google", you are essentially interacting with a Virtual Assistant chatbot
  – Go to SBI's website, you can interact with their Helper chatbot, Sia
Chatbots are nothing new!!

- *ELIZA* was probably the first working prototype of a Chatbot, built in 1966!!
- Eliza was built using simple pattern matching, and pre-defined templates to categorise and answer user queries
- It's positive reception started a race to build solutions that could pass *The Turing Test*!
- You can still try talking to it if you wish at [https://www.masswerk.at/elizabot/](https://www.masswerk.at/elizabot/)
Did they work?

• Even though Eliza was succeeded by multiple sophisticated solutions, they never really came close to getting adopted in industry.

• They failed because
  – It is hard to come up with patterns and regular expressions that can cover all possible scenarios.
  – Humans use sentences with sarcasm and hidden meanings.
  – Converting *speech* to *text* and vice-versa is difficult.
Then why are we discussing them?

• Recent advances in Natural Language Understanding (NLU) has made it easier to tackle some of these problems
• The success of Deep Learning techniques have played a major role in these improvements
• The temptation to engage users by "talking to them" is too much to give up!!
• So chatbots are popping up everywhere!!
This is only the tip of the iceberg!
Let us warm ourselves up for this marathon !!

CHATBOT BASICS
Intents – aka "What"? (1/3)

• *What* will the chatbot you are building do?
  – It may *answer* user's queries, e.g. What time does the school start?
  – Or, it may *do* something for on behalf of a user, e.g. booking a flight, with provided details.

• These are called the "intents" that a chatbot can cater to

• Intents can be of two types – *Information Retrieval* or *Real-world Actions*
Intents – aka "What"? (2/3)

- *Information Retrieval* intents try to figure out what the user is asking, and provide them with a suitable response

- Example:
  User: How's the weather right now?
  Bot: It's raining!!
Intents – aka "What"? (3/3)

• *Real-world Actions* take inputs from a user, and perform some action in the real world based on that

• Example:
  User: *Set an alarm* for tomorrow 5 AM.
  Bot: Done. I've also added a reminder to your Google Calendar!!
Entities – aka "Who"? (1/2)

• What to do is just one part of the puzzle.

• The bot should also know about people, things, places etc. which will pop-up in conversations with the user.

• Knowing who will be these "entities", is a part of building the bot.

• Entities could range from names or addresses to quantities and food choices.
Entities – aka "Who"? (2/2)

• Examples

User: How's the weather at **Delhi** right now?
Bot: At **Delhi**, the sun is shining bright

User: Set an alarm for **tomorrow 5 AM**.
Bot: Done. Alarm set for **5 AM, tomorrow**.
Fulfilments – aka "How"? (1/3)

• After figuring out what is to be done, and having information about everything that is required, bot needs to respond to the user

• How should the response be prepared, is the next question to ponder!

• Is the response "static" or "dynamic"? Does it involve invoking some "external logic", or can the bot prepare the response on its own?
Fulfilments – aka "How"? (2/3)

• "Fulfilments" are the ways in which a response is prepared.
• They can be presented from a predefined template, or built dynamically for every query.
• It may be required to communicate with other subsystems to build the response, or the bot may be smart enough to give it on its own.
Fulfilments – aka "How"? (3/3)

• Examples:

User: Hi there!
Bot: Hey.. How are you?  
[preset reply]

User: Is there a direct flight from Lucknow to Amritsar?
Bot: Doesn't look like. However, there are 1-stop options through Delhi  
[prepared after contacting an external service]
This will be the example we'll use throughout the day !!

EXAMPLE USE CASE
Let's sell some fruits (1/4)

• This will be our sample problem, for which we will build a chatbot using different platforms

• The problem involves building a bot that receives two types of queries
  – A User may ask about the name and price of the fruits that the store sells
  – A User may wish to order some fruit from the shop, by supplying quantity and shipping address
Let's sell some fruits (2/4)

Intents

Enquiry

Purchase
Let's sell some fruits (3/4)

Entities

Fruit Name
Quantity
Address
Let's sell some fruits (4/4)

- Fulfilments
  - Internal (Price Catalogue)
  - External (Initiate Purchase)
AGENDA FOR NEXT SESSIONS

What are we really going to do?
What will we learn?

• We'll get to know about three "chatbot-building" platforms
  – Google's Dialogflow
  – IBM's Watson Assistant
  – Amazon's Lex

• The sessions will be divided into three sections
  – Building bots with the GUI
  – Your queries
  – API Overview (if we have time)

• We'll build a chatbot in each session for the example use case
Do I need to setup anything? (1/2)

• If you want to try out the steps discussed in the Workshop (strongly recommended), you'll have to do some setup

• You'll be required to have following:
  – A Gmail Account
  – An AWS Account (this is different from your Amazon Retail Account)
  – An IBM Cloud Account

• We can provide you the links to these portals, if you have any confusions
Do I need to setup anything? (2/2)

• If you also want to write some code (it is not required), you should also have the following:
  – Java 8 or later (JDK not JRE), remove any previous versions of Java, in case you have them
  – Eclipse IDE

• The last session will be code-heavy, the sessions before will not discuss much coding
Feedbacks

• We'll take your feedback for each session (except this one)
• Session feedbacks will only take 2-3 minutes
• At the end of the last session, we'll also take an Overall feedback (encompassing what you felt across all sessions)
• Overall feedback should take 5-10 minutes of your time
We'll meet in about 10 minutes

LET'S START !