Design of Conversational Experiences

BITS Pilani
Pilani Campus

Dr.Bharathi R
Off Campus-CSIS, BITS-Pilani

Slides by :Dr. Shreyas Rao
Associate Prof. (Off Campus), CSIS, BITS-Pilani

Lecture 4 Recap

- Human Involvement
- Designing Bot Conversations
- Demos / Hands-on exercises on designing bot conversations using AIML

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Lecture No. 5

Agenda

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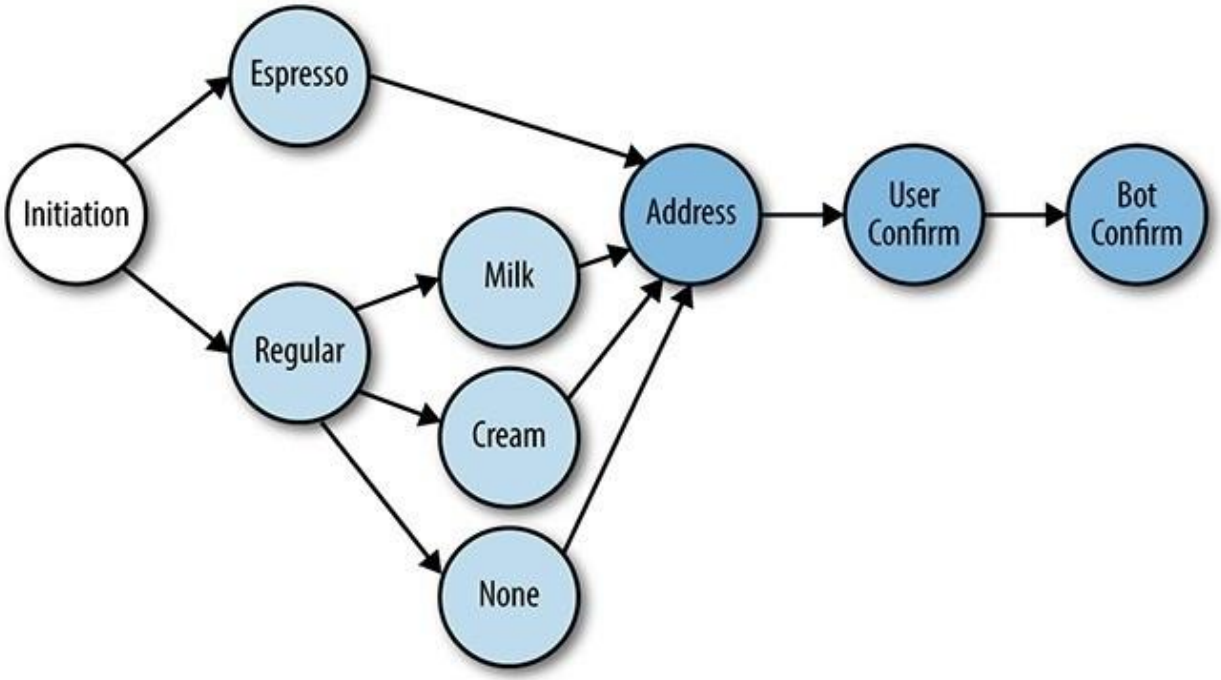
- Writing AIML Script for Coffee Bot and execution
- Entity Extraction
- Intent mapping
- Rich Interactions
- Context and Memory
- Bot Discovery and Installation
- Engagement Methods

Chapter- 8 of T1

Exercise [10 mins]

Design the conversation flow for “Coffee Bot” using AIML based on the below workflow. Make Suitable Assumptions as needed. No need to use wildcards, you can hardcode the patterns.



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Designing Bot Conversation

Vocabulary in Chatbot Design

1. **Entity** - It is a data point or value which you can extract from a conversation/user query. This helps you to customize what kind of information you are collecting
2. **Intent** - Intention/Purpose of the user in the conversational flow.
3. **Context** - Based on the previous conversation of the user on the bot it maintains the relevance of the communication
4. **System defined Entities** - These are commonly used entities that are pre-defined in the system
5. **Custom Entities** - These are the entities that can be defined by the user as per their use case.
6. **Utterance** - Anything that a user says is an utterance

**

Entity

- In bot design, an entity refers to a **key piece of information or data** that the bot needs to recognize and extract from the user's input to fulfill a particular task or respond appropriately.
- Entities represent **specific values** within a conversation that are relevant to the bot's understanding and processing of user requests.
- Generally represented as **"Nouns"**

Examples for entities -> name, age, email, mobile number, type of coffee etc.

**

System Entities

- System entities are **predefined entities** that are built into the chatbot platform or NLP model.

Examples

- Dates and Time: "tomorrow," "next Friday," "5th August"
- Numbers: "twenty-five," "1000," "3.14"
- Email Addresses: "john.doe@example.com"
- Currencies: "50 USD," "€100"
- Locations: "New York," "London"

Ex: A user says - "Schedule a meeting for tomorrow at 3 PM" would trigger the system entities for "tomorrow" (a date) and "3 PM" (a time).

**

Custom Entities

- Custom entities are user-defined entities that are specific to the domain or context of the chatbot application.
- Custom entities need to be defined and trained by the developer.

Examples

- Product Names: "iPhone 15," "Galaxy S23," "Pixel 8"
- Service Types: "standard shipping," "express delivery"
- Employee Roles: "Project Manager," "Data Scientist," "UI/UX Designer"
- Custom Labels: "VIP customer," "Gold member"

Ex: if a bot is designed for an e-commerce store, custom entities like "product names" (e.g., "Nike Air Max," "Adidas UltraBoost") would help the bot understand specific user queries about those products.

**

Intent

- An intent represents the **goal or purpose** behind a user's input or message.
- It captures what the user wants to achieve or inquire about when interacting with the bot.
- Generally represented as **"Verbs"**

Ex: Book a flight, Play me a song etc.

Exercise

For the Doctor Appointment Bot, identify the following

1. Entities
    a. System entities
    b. Custom entities
2. Intents

**Hint - Refer to the AIML file, and identify

Intents for the Doctor Appointment Bot

1. Greeting
2. Booking a Doctor's Appointment
3. Rescheduling an Appointment
4. Checking Doctor Availability
5. Booking After Availability Check
6. Fallback/Default

Intents for the Doctor Appointment Bot

1. Greeting

Patterns: "HELLO", "HI"

Response: Welcomes the user to the Doctor's Appointment App.

2. Booking a Doctor's Appointment

Patterns: "I WANT TO SEE A *", "ON *"

Responses: Prompts for scheduling details, confirms appointment details.

3. Rescheduling an Appointment

Patterns: "I WANT TO RESCHEDULE MY APPOINTMENT", "RESCHEDULE TO *"

Responses: Asks for a new time and confirms the rescheduled appointment.

Intents for the Doctor Appointment Bot

4. Checking Doctor Availability

Pattern: "IS DR * AVAILABLE ON *"

Response: Checks and confirms the availability of a specific doctor on a given date.

5. Booking After Availability Check

Pattern: "YES BOOK APPOINTMENT"

Response: Confirms the booking of the appointment.

6. Fallback/Default Intent:

Pattern: "*"

Response: Handles any input that doesn't match other patterns, prompting the user to rephrase or ask something else.

Entities for the Doctor Appointment Bot

System Entity

- datetime / new_datetime - For patterns like "ON *" or "RESCHEDULE TO *", where the value after "ON" or "RESCHEDULE TO" represents a date or time

Custom Entity

- doctor_type
- doctor_name
- Availability_date

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Topic Led Discussion & Decoration

Chapter 8 –T1

Topic-lead discussion

- The user converses about a set of topics and discusses different aspects of these topics
- More generic than task-led discussion

KEY TAKEAWAY

Task-led conversations need to have the least amount of steps possible to accomplish a task. Topic-led conversations can have more steps, determined by user engagement with the topic.

Topic-lead discussion

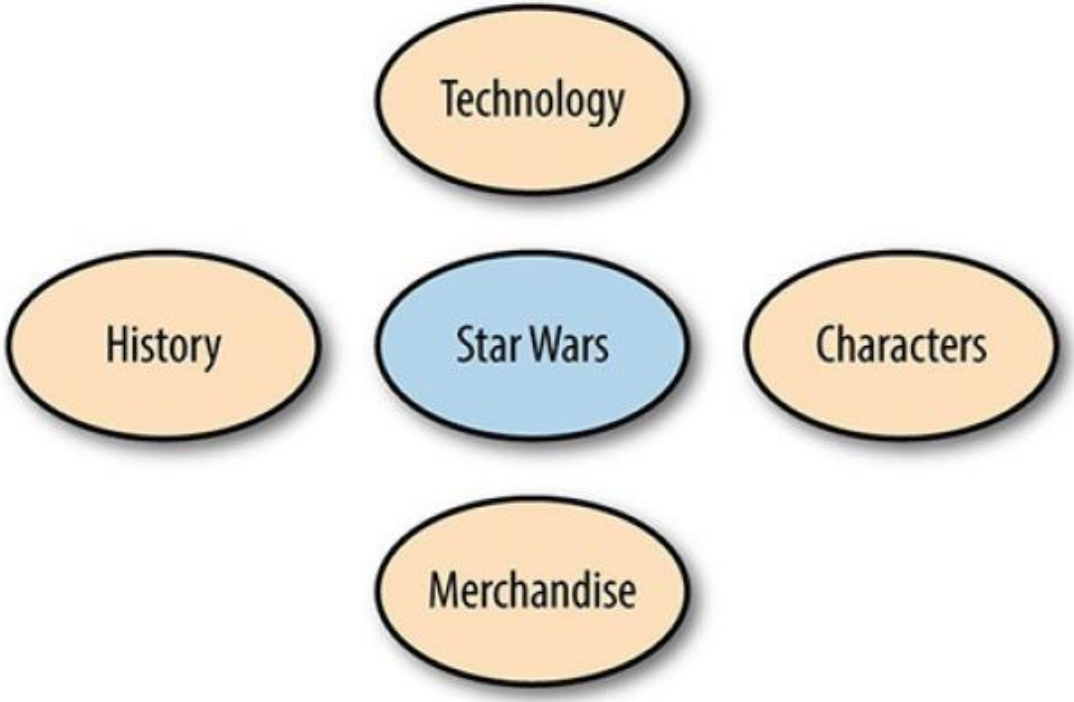

Figure 8-22. Star Wars topics

Topic-lead discussion

A simple conversation could be as follows:

User: @starwars-bot I am SOOO excited about the upcoming movie!
Starwars-bot: Yes! I am excited too! Did you know that there is a new type of spaceship introduced in this movie?
User: No way! I love the star destroyers! Are you going to show those too? And what about Chewbacca? Is he going to show up?

<15 sentences about Chewbacca>
User: Yeah, Chewbacca is great...
Starwars-bot: BTW, did you see the 3-edged sword replica we released to the stores this week? Do you want to see a photo?
User: OMG! Yes!

Divergence in Topic-lead discussions

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- There is no declared task that needs to be completed in a minimal set of steps.
- The users are not focused on achieving a task; they are focused on exploring a topic.
- Conversations are exploratory
- In a topic-led conversation, a bot can even use conversational divergence as a way to recover from input failure

User: I heard that Chewbacca meets Donatella in the next movie.
Starwars-bot: That is interesting. Did you know you will be able to see Leia again in this movie?

Decoration

- Decoration refers to words that we add to sentences that do not contribute directly to the conversation itself, but rather add color and character
- Makes one feel they are conversing with human, and not bot

Decoration

User: Hello @coffeebot
Coffeebot: What would you like today? We have regular coffee and espresso.
User: I will have espresso
Coffeebot: Where would you like the coffee to be delivered?
User: 155 5th SF USA
Coffeebot: Please confirm - 1 espresso coffee to be delivered to 155 5th SF USA.
User: Confirmed

User: Hello @coffeebot
Coffeebot: Wazzap? What would you like today? We have regular coffee and espresso.
User: I will have espresso
Coffeebot: Awesome sauce! Where would you like the coffee to be delivered? I have the cavalry waiting ;)
User: 155 5th SF USA
Coffeebot: Got to love San Francisco... Please confirm - 1 espresso coffee to be delivered to 155 5th SF USA.
User: Confirmed

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Rich Interactions

Reference- Chapter 9 – T1

Rich Interactions

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- Text-only based bot (Ex: Doctor Appointment bot using AIML and Python)

VS

- Bot using rich controls for interacting with users

Rich controls

- Files
- Buttons
- Audio
- Video
- Templates
- Images
- Links
- Emojis

Files

- Bots can support file uploads , used by both users and bots
- Ex: CT Scan image upload in Medical field, Contract uploads in Legal domain

The LawGeex bot is a legal bot that helps you evaluate contracts. Describing the contract in a conversation would be impossible, and pasting it as text in a chat would be cumbersome as contracts are usually kept in *.doc* files. As an alternative, the LawGeex bot asks the user to upload the file and starts the review process once the file is uploaded (Figure 9-1).

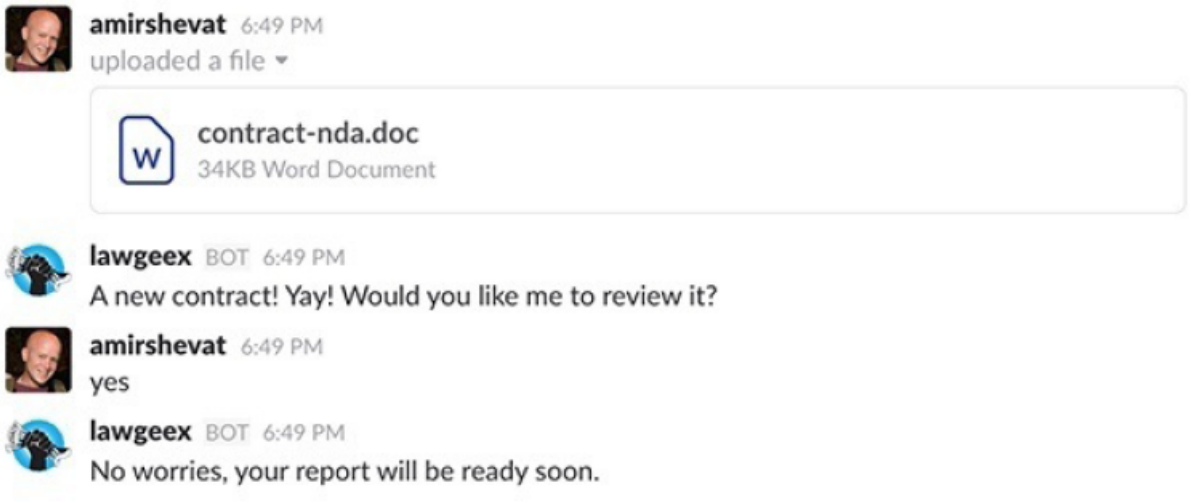

Figure 9-1. LawGeex allows users to upload contracts as .doc files

Audio & Video

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Audio

- Voice Bots use audio like Alexa, Siri, Google Mini
- Useful in conversations where we post recordings
- Ex: Record and replay call recording with a customer

Video

- Used to relay information, entertain, provide a rich user experience

Ex:

1. University bot plays a video showcasing the campus
2. Onboarding script on how to use the bot

Video

Figure 9-3. A short video can be worth a thousand words

Images

- Most common type of rich interactions used in bots
- Need to compact lot of information into the image – photo of headphones, price, rating and text description

Figure 9-4. The Kip shopping bot displaying search results on Slack

Images

- Most common type of rich interactions used in bots
- Need to compact lot of information into the image – photo of headphones, price, rating and text description

Figure 9-4. The Kip shopping bot displaying search results on Slack

Images

- Images can be used to display visual charts / analytics

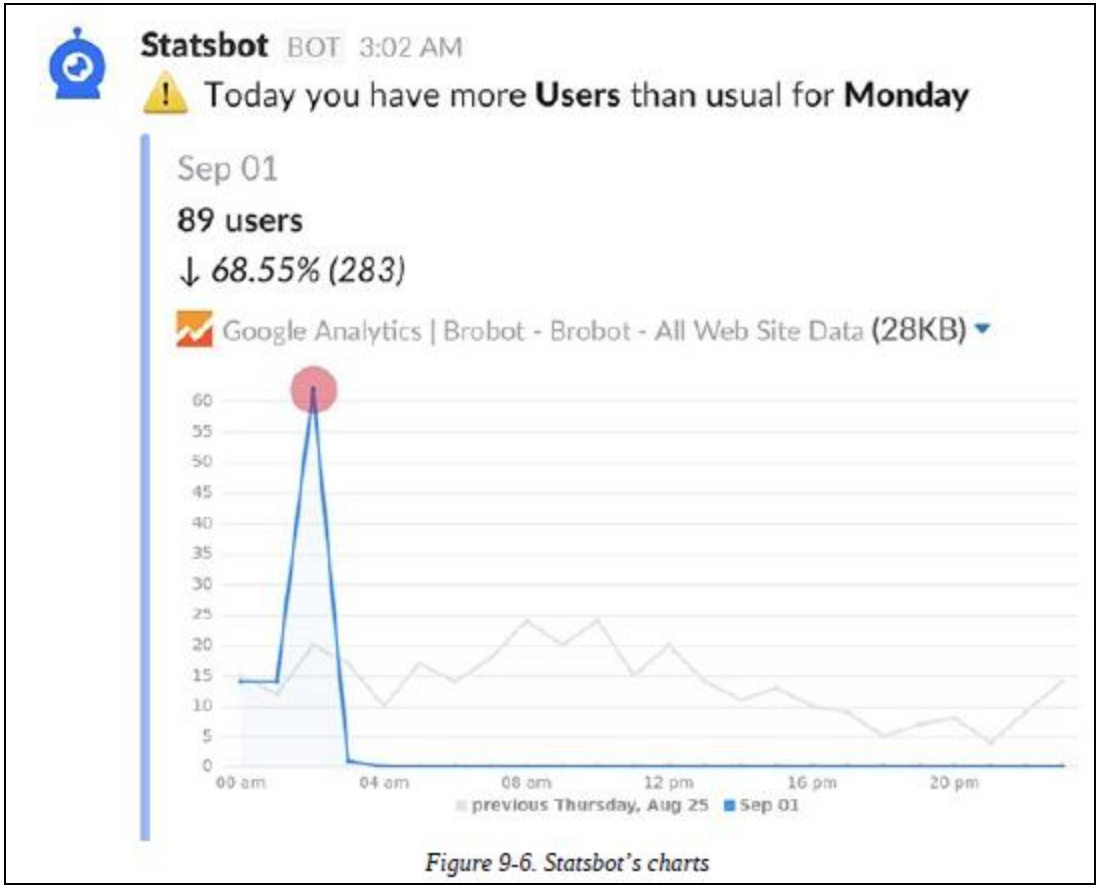


Figure 9-6. Statsbot's charts

Buttons

Button controls are used for:

- Guiding the conversation
- Frame the interaction
- Limit the user to a set of responses

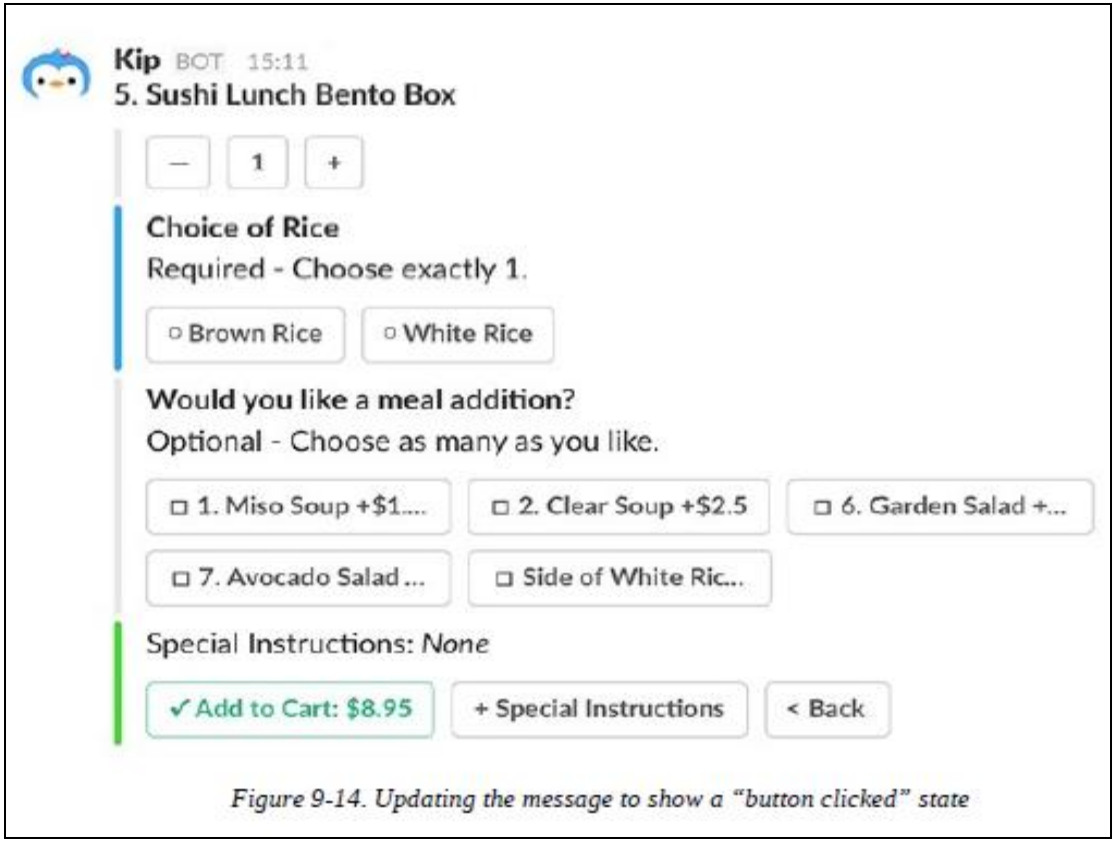
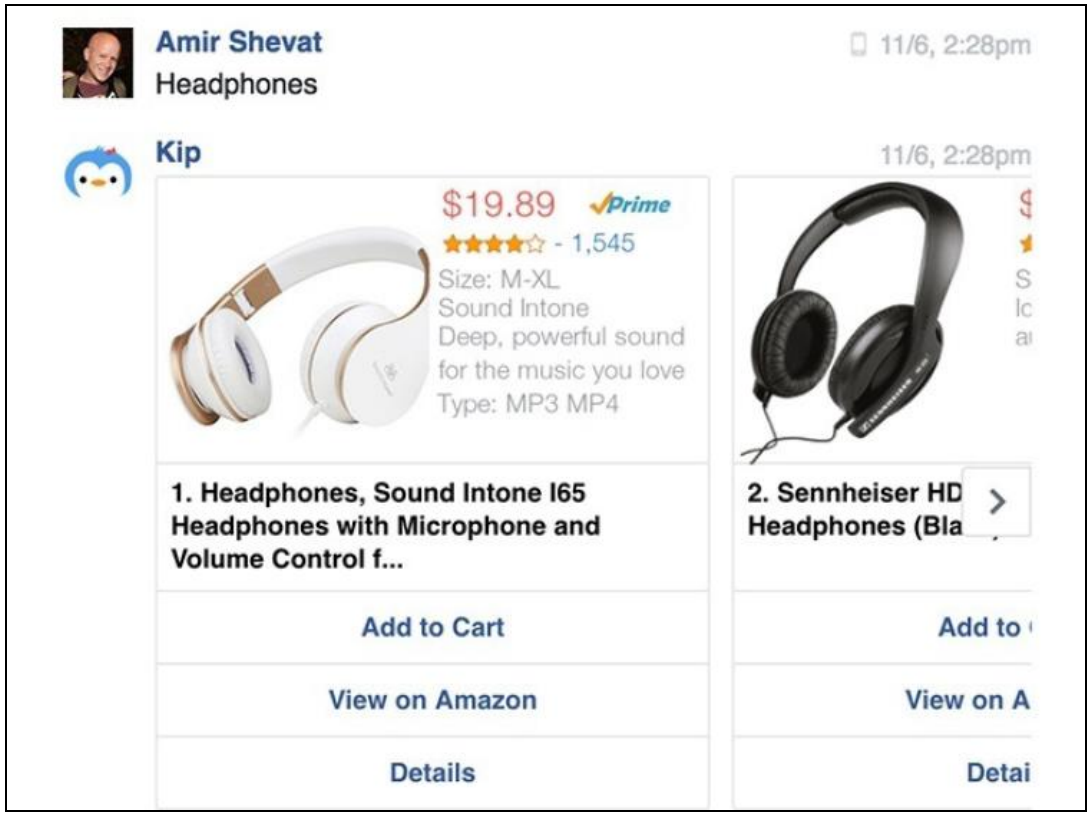


Figure 9-14. Updating the message to show a "button clicked" state

Templates

- Templates are a structured way to collect different UI elements in a pre-formatted, standard way, and to expose in a conversational interface



Carousel control

Templates

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Same content, different template format

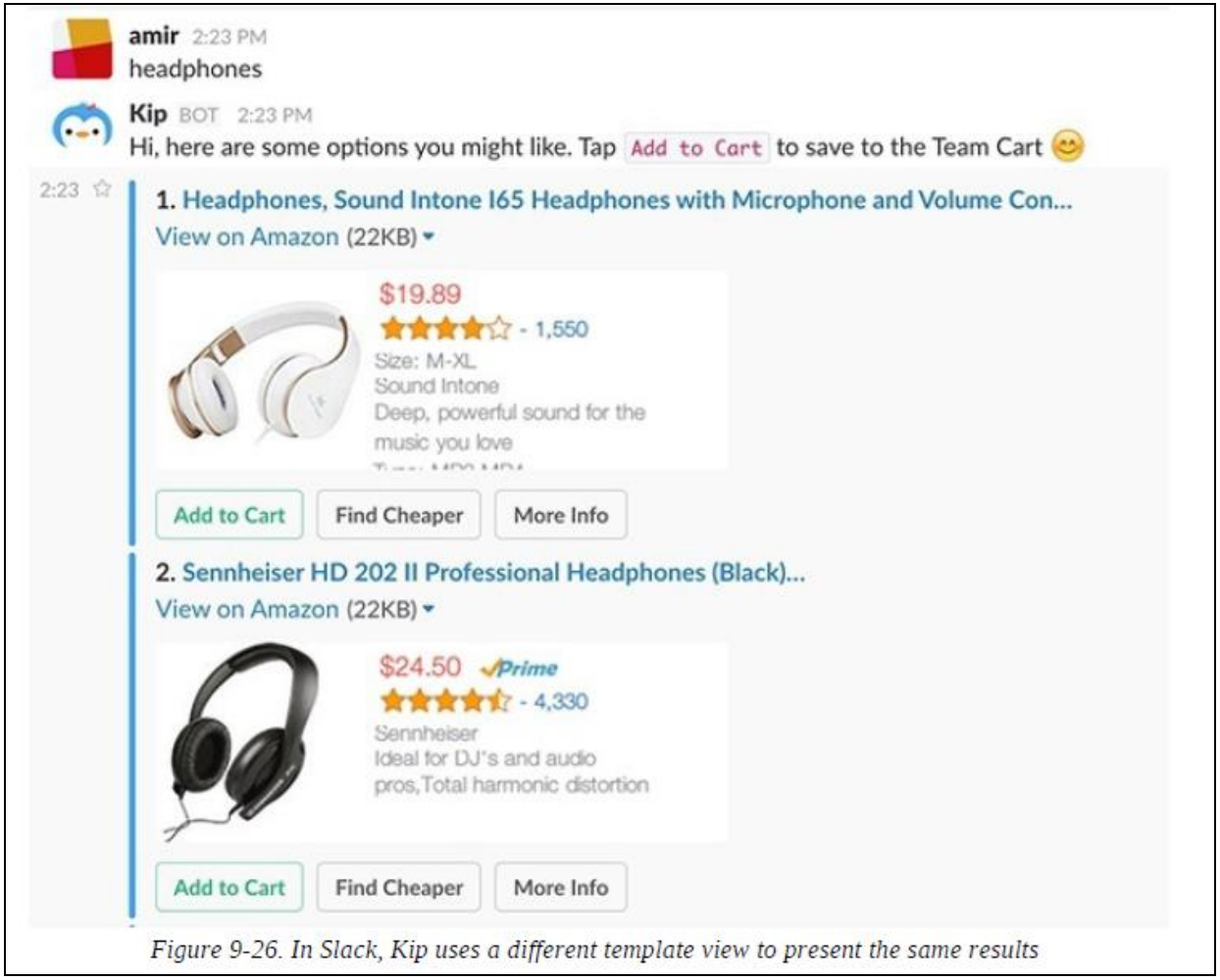

Figure 9-26. In Slack, Kip uses a different template view to present the same results

Links

- Links are easy way to send the user out of the conversation, into the Web
- **Unfurling** - Refer something on the Web, and surface a preview of it on the conversational interface

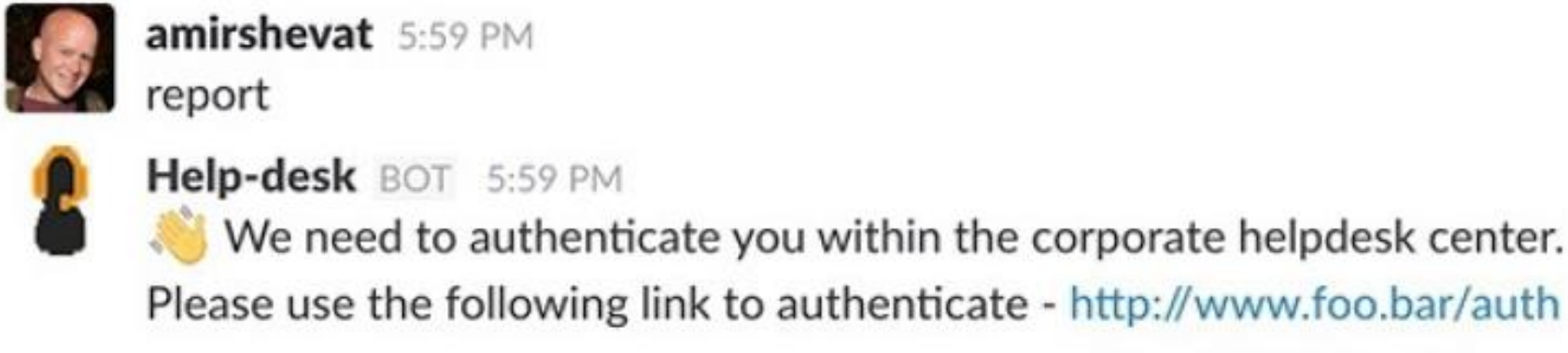

Figure 9-35. Using links for authentication

Links

Important use cases for Links in a bot

- Unfurling – Sharing a link on FB, Twitter to redirect user from the conversation
- Expanding on the given information
- Promoting Web Content

Figure 9-36. Using links to direct users to expanded information

Putting it all Together - DEMO

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- Demo of "**Dhriti**" - a Multilingual ChatBot that provides information on "Mental Health" during Covid
- Supports English, Kannada and Hindi languages

Observe

1. Design of Conversational Paths
2. Onboarding
3. Stories
4. Intents
5. Rich User Controls -> Buttons, Images (Covid Info - Prevention), Video, Links (Helplines), Carousel / Templates (Directory of Therapists) etc.

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Context and Memory

Chapter -10 (T1)

Types of Conversations with Computers (Recap)

Type of Conversation	Description	Example
Simple Request-Reply Interactions	Single question/answer	What is weather today Google search
Form-filling dialogues	One-way questions	Flight booking Restaurant reservation
Multi-turn dialogues	Multi-way interactions	Issue resolution Schedule a meeting
Contextual and Adaptive Conversations	multi-way interactions remembering context	Order coffee will remember 'cappuccino' from previous conversation


how tall is Barack Obama?
6 feet 1 inch.
and how about his wife?
Michelle Obama is 5 feet 11 inches tall.
and how tall are their kids?
This came back from a search
How Tall Is Malia Obama? | News One
NewsOne › how-tall-is-malia-obama

Context

- Context and Memory is a natural part of Human Conversation
- Humans can weave a thread of thoughts tied to a Conversation

Bot Amnesia [Focus on word “them”?

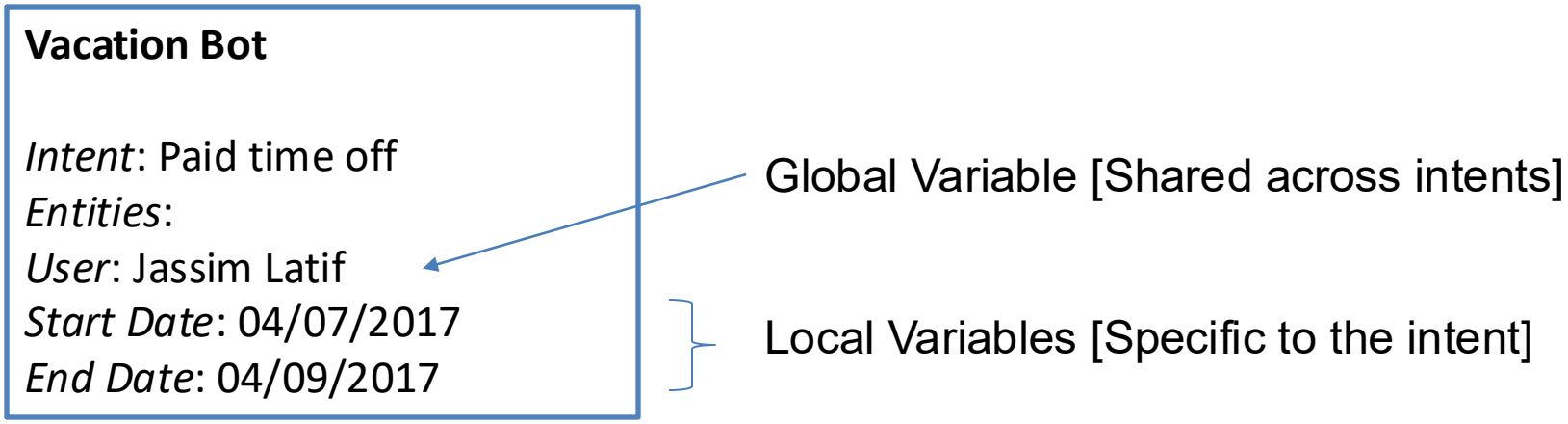
Figure 10-1. Bots often have trouble maintaining context

Context

How does a chatbot understand Context??

Context

- Bot should understand context based on the earlier conversations with the user
- Get the context from the Intent and Entities used in the conversations



Context - Example 1

Intent 1

User: Book a flight
Travel-bot: Where would you like to go?
User: Rio Brazil
Travel-bot: On which dates?
User: 4-6 of November 2017
...

Intent 2

User: Book hotel
Travel-bot: Would you like me to book a hotel in Rio Brazil, 4-6 of November 2017?
User: Yes! Thanks!

Context - Example 2

...

Travel-bot: Great, you are booked for bungee jumping on Oct 3rd at 4 p.m.

User: Fantastic. Remind me of our return flight time? We might want to do something on the 4th.

Travel-bot: Your return flight (Trip to New Zealand) is at 6 p.m. on Oct 4th.

Inferring Context from Pronouns

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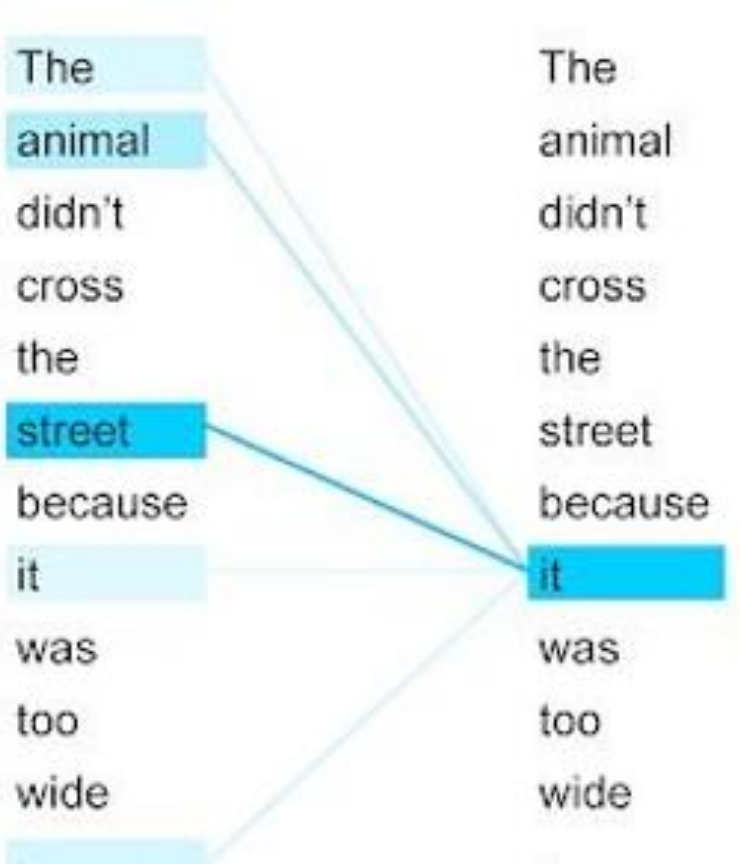
- Another big challenge is inferring what pronouns in the user inputs are referring to
- Users use pronouns all the time to refer to context variables
- Words like “his,” “hers,” “this,” and “it” serve as pointers in a conversation, pointing to particular context variables.

User: When is my meeting with John Agan?

Travel-bot: Oct 3rd at 4 p.m.

User: Can you please move **it** to 4 p.m.?



Is the Animal too wide or the Street?

Deriving Context through Rich Controls

- Exposing the context (intent and entities) with rich controls is another way toclearly capture intent

Intent: Eat Meal

Entity: Sushi (food type)

Derive the Context and provide contextually relevant controls

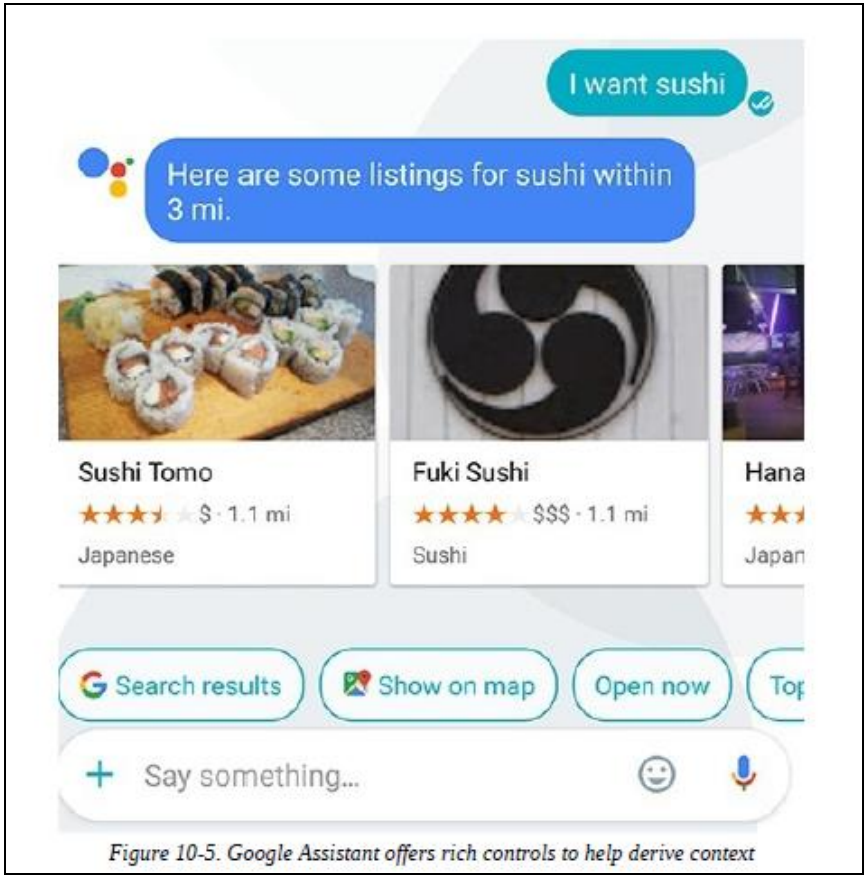


Figure 10-5. Google Assistant offers rich controls to help derive context

Context Errors and Ambiguity

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Conversation

Pizza-bot: Do you want to add extras? You can add olives or pepperoni.

User: How much would **it** cost?

How would you resolve this??

Context Errors and Ambiguity

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Conversation

Pizza-bot: Do you want to add extras? You can add olives or pepperoni.

User: How much would **it** cost?

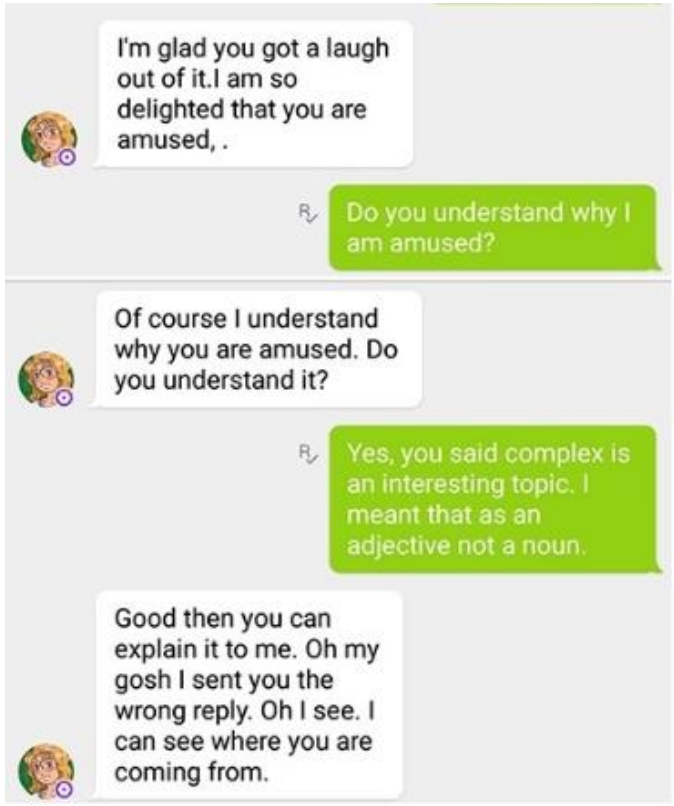
Approach A

Pizza-bot: Do you want to add extras? You can add olives or pepperoni.
User: How much would it cost?
Pizza-bot: Olives ($2), Pepperoni ($4)

Approach B

Pizza-bot: Let's talk about extras. Would you like to add olives?
User: No
Pizza-bot: Pepperoni?
User: How much would it cost?
Pizza-bot: $4
User: OK, let's do that.


Mitsuku
Glad to hear it. What's new? not much what's new with you?
Writing a book, work hard.
You sound creative. How is your writing going so far?
Ok. The topic is complex.
Aw. complexis an interesting topic.
Ha, that is funny.


I'm glad you got a laugh out of it.I am so delighted that you are amused, .
Do you understand why I am amused?
Of course I understand why you are amused. Do you understand it?
Yes, you said complex is an interesting topic. I meant that as an adjective not a noun.
Good then you can explain it to me. Oh my gosh I sent you the wrong reply. Oh I see. I can see where you are coming from.

Memory

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- The ability of bots to pull up intents and variables, or even full conversations (transactions), from storage is called “Memory” of the bot
- In today’s world, LLMs like ChatGPT can store entire conversations upto GBs, but this was limited earlier

Thank You!