

CS 566: Voice Assistants HW3 - Dialogflow

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Step 1 - Select the Use Case

I am continuing with Use Case 1: Create a food cart directory for your city - ice cream ordering application "Cream Crush" that I developed in previous assignments.

Web Demo: <https://bot.dialogflow.com/10a06720-02c8-4078-a0d0-28afb5fd322d>

Step 2 - Intents

Intent 1: OrderIceCreamIntent (Updated from HW2)

This intent allows users to order ice cream by specifying the quantity and dietary preferences. Based on testing feedback, I've enhanced this intent to add intuitive confirmation messages before placing order.

Parameters (Entities)

1. quantity
 - Entity Type: @sys.number
 - Required: Yes
 - Prompts: "How many ice creams would you like?"
2. dietaryPreference
 - Entity Type: Custom (@dietary-preference)
 - Values: regular, vegan, dairy-free, sugar-free, gluten-free
 - Required: Yes
 - Prompts: "What type of ice cream would you like? We offer regular, vegan, dairy-free, sugar-free, and gluten-free options."

Intent 2: FindIceCreamShopIntent(New)

This intent helps users find ice cream shops based on location, specific flavors. It provides information about location, shop hours, and reviews.

Parameters (Entities)

1. location
 - Entity Type: @sys.location
 - Required: No
 - Prompts: "Which area in Portland are you looking for ice cream shops?"
2. dietaryPreference
 - Entity Type: Custom (@dietary-preference)
 - Values: regular, vegan, dairy-free, sugar-free, gluten-free
 - Required: No
3. flavor
 - Entity Type: Custom (@ice-cream-flavor)
 - Values: chocolate, vanilla, strawberry, mint chip, gulab jamun
 - Required: No

Step 3 - Training Phrases

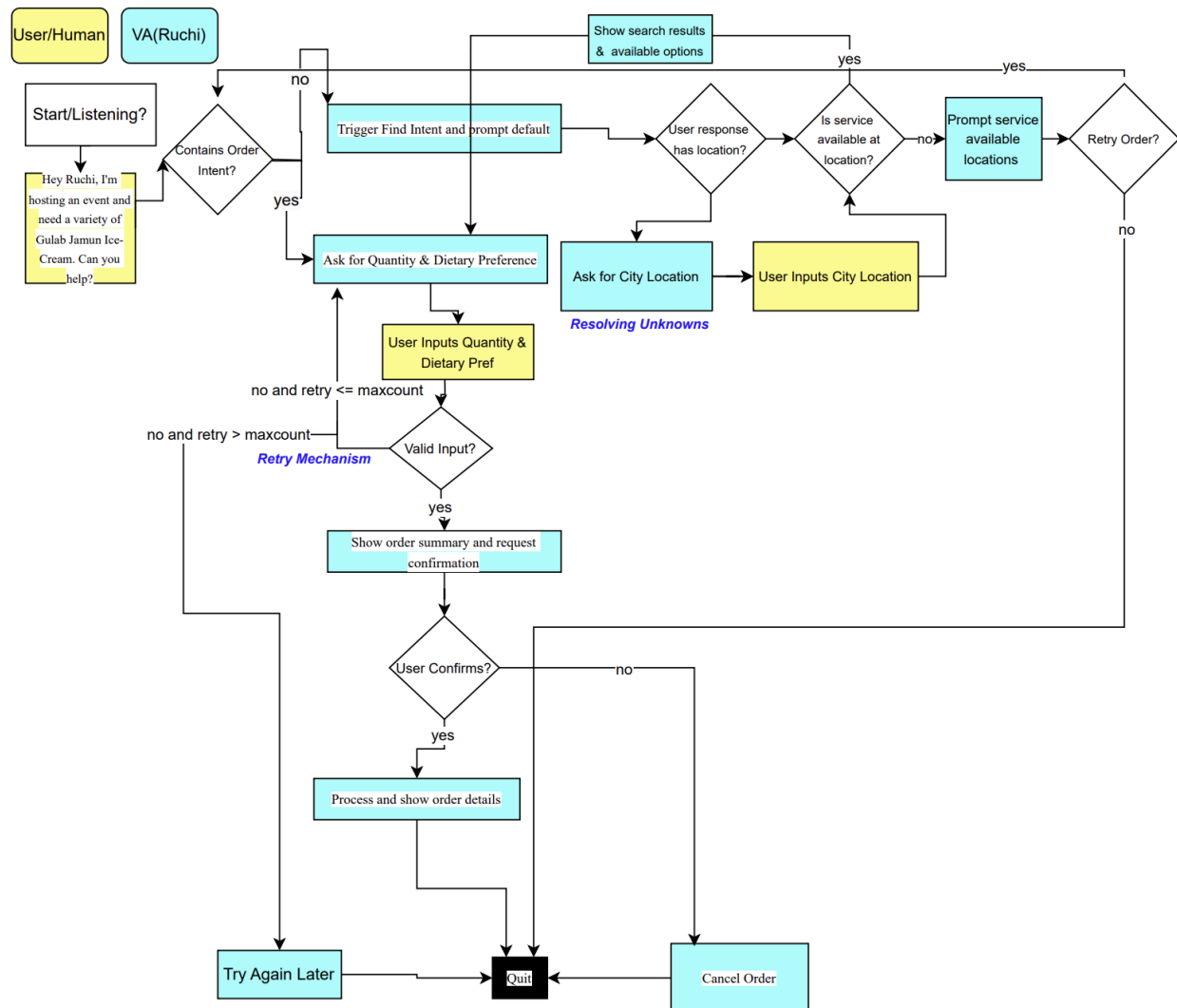
OrderIceCreamIntent (Updated Training Phrases)

1. "I want to order 2 vegan ice creams"
2. "Can I get 3 dairy-free ice creams?"
3. "Order 1 sugar-free ice cream for me"
4. "I'd like to order 5 regular ice creams"
5. "Get me 2 gluten-free ice creams please"
6. "I want to buy 4 vegan ice creams for delivery"
7. "Order 3 sugar-free ice creams for pickup"
8. "I need 2 dairy-free ice creams delivered tonight"
9. "Can you order 6 regular ice creams for my party?"
10. "I'd like to get ice cream right now"
11. "Place an order for ice creams"
12. "Help me order ice creams"
13. "I'm craving dairy-free ice creams"
14. "Get me 5 regular ice creams from Salt & Straw"
15. "Order 3 gluten-free ice creams for tomorrow"

FindIceCreamShopIntent (New Training Phrases)

1. "What's the nearest ice cream shop to me?"
2. "Find vegan ice cream shops in Portland"
3. "Where can I get sugar-free ice cream near downtown Seattle?"
4. "Show me ice cream places with good reviews"
5. "Are there any gluten-free ice cream options in San Francisco?"
6. "Find shops that serve chocolate flavor"
7. "Which ice cream places are open now?"
8. "Where can I find Salt & Straw in Portland?"
9. "Show me ice cream shops with outdoor seating"
10. "Find shops that offer dairy-free options near SLC"
11. "What are the highest-rated ice cream places?"
12. "Where can I find seasonal flavors right now?"
13. "Show me ice cream shops within 2 miles"
14. "Find places that have Gulab Jamun ice cream"
15. "Which shops offer delivery options?"

Step 4 - Conversational Flow Diagram



Step 5 - Logic for Each Intent

1. OrderIceCreamIntent (Updated Logic)- Added Confirmation step

Initialize retry counter to 0

Initialize max retries to 5

WHILE retry counter < max retries:

 Extract slots: Quantity and DietaryPreference

IF DietaryPreference or quantity is missing:

 Add 1 to retry count

 Tell the user: "Can you provide both the number of scoops and your dietary preference?"

 Wait for user response

 Continue loop

IF quantity is missing:

 Add 1 to retry count

 Tell the user: "How many ice creams would you like? Please choose between 1 and 50."

 Wait for user response

 Continue loop

IF quantity is not between 1 and 50:

 Add 1 to retry count

 Tell the user: "We can only process orders between 1 and 50 ice creams. Please choose a valid quantity."

 Wait for user response

 Continue loop

IF both quantity and dietary preference are valid:

 Tell the user: "You're ordering {Quantity} {DietaryPreference} ice cream(s). Is that correct?"

 Wait for user confirmation

IF user confirms:

Tell the user: "Great! Your order for {Quantity} {DietaryPreference} ice cream(s) has been placed. Thanks for using Cream Crush!"

Exit loop

IF user denies:

Tell the user: "I've canceled your order. Feel free to try again when you're ready."

Exit loop

IF retry counter >= max retries:

Tell the user: "I'm having trouble understanding your order. Please try again later or contact customer support for assistance. Goodbye!"

End conversation

2. FindIceCreamShopIntent:

Starting location, dietary_preference, flavor = NULL

Starting should_show_hours, should_show_reviews = FALSE

Extract entities from user query:

IF location entity exists:

Set location = extracted location

IF dietary_preference entity exists:

Set dietary_preference = extracted preference

IF flavor entity exists:

Set flavor = extracted flavor

Parse for keywords "hours", "reviews", "ratings"

IF found:

Set corresponding flags to TRUE

IF location is NULL:

Ask the user: "What area in Portland are you looking for ice cream shops?"

Set location = user response

Search database for shops matching criteria:

Base query on location

IF dietary_preference is not NULL:

Add filter for dietary_preference

IF flavor is not NULL:

Add filter for flavor

IF results found:

Tell the user: Ask if user would like to proceed with order:

If user confirms:

Redirect to order intent and continue the flow

ELSE:

Thank user and exit

IF no results found:

Tell the user: "I couldn't find any ice cream shops matching your criteria. Prompt operational store locations. Ask for "Would you like to try a different search?"

IF user confirms:

Restart intent with new criteria

ELSE:

Exit with farewell message

Step 6 - Code Attached

Step 7 - Testing

Test 1:(Success Flow) - New Intent

User: Hey there

Agent: Greetings! How can I assist?

User: Find me ice cream shops in Portland

Agent: 🍦 Here are some ice cream shops in Portland that match your criteria: 1. ****Salt & Straw**** (Pearl District) 🕒 Hours: 11am-11pm ★ Rating: 4.8/5 🏷️ Options: vegan, dairy-free, regular 2. ****Fifty Licks**** (Division) 🕒 Hours: 12pm-10pm ★ Rating: 4.6/5 🏷️ Options: regular,

gluten-free 3. ****Kulfi PDX**** (Downtown) 🕒 Hours: 12pm-9pm ★ Rating: 4.7/5 🏷️ Options: regular Would you like to place an order? 😊

User: Where can I get ice cream in Seattle?

Agent: 🍦 Here are some ice cream shops in Seattle that match your criteria: 1. ****Molly Moon's**** (Capitol Hill) 🕒 Hours: 12pm-11pm ★ Rating: 4.9/5 🏷️ Options: vegan, regular 2. ****Frankie & Jo's**** (Ballard) 🕒 Hours: 12pm-10pm ★ Rating: 4.8/5 🏷️ Options: vegan, gluten-free Would you like to place an order? 😊

Test 2:(Error Handling Flow)- Invalid Location

User: Hi

Agent: Hello! How can I help you?

User: Find ice cream shops in SLC

Agent: ❌ I couldn't find any ice cream shops in Salt Lake City that match your criteria. Would you like to try again with different options?

Test 3:(Error Handling Flow)- Out of bounds Scoop Count

User: Hi

Agent: Greetings! How can I assist?

User: order ice cream

Agent: ? Can you provide both the number of scoops and your dietary preference?

User: 88 regular

Agent: 😓 Sorry, we can only handle orders between 1 and 50 scoops. How many would you like?

User: 12 regular please

Agent: You're ordering 12 regular ice cream. Is that correct?

User: correct

Agent: ✅ Confirmed! 12 regular ice creams ordered!

Test 4: (Resolving Ambiguity Flow) - If no slot value(Location) is given

User: Hola

Agent: Greetings! How can I assist?

User: I am craving for ice cream

Agent: ? Which city are you looking for ice cream in?

User: oh yeah I'm in San Francisco

Agent: 🍦 Here are some ice cream shops in San Francisco that serve ****: 1. ****Bi-Rite Creamery**** (Mission District) 🕒 Hours: 11am-10pm ★ Rating: 4.8/5 2. ****Humphry Slocombe**** (Ferry Building) 🕒 Hours: 12pm-11pm ★ Rating: 4.7/5
Would you like to place an order? 😊

Test 5: Conversation following Test 3 Integrating Intent 2 with Intent 1

User: Yes

Agent: Great! How many scoops would you like and what's your dietary preference (regular, vegan, sugar-free, gluten-free, dairy-free)?

User: 2 vegan

Agent: You're ordering 2 vegan ice cream. Is that correct?

User: correct

Agent: ✅ Confirmed! 2 vegan ice creams ordered!

Step 8 - Review and Reflection

Impressions:

It was quite an experience working on DialogFlow. The parts that were more enjoyable for me were writing code logic, thinking about potential control flows, and handling success and error cases. There were quite a few tricky things I ran into while working on the task. It was hard to debug how to make DialogFlow pick up the right intent, even with sufficient training phrases. I spent a significant amount of time reading documentation about contexts in DialogFlow, playing with it, and trying out different cases.

Platforms:

I felt that Alexa Skills were relatively simple to work with compared to DialogFlow. From my experience, I think DialogFlow is intuitive, and the user has control over how the flow should work. On the other hand, in Alexa, if a similar intent was present in Alexa's built-in context, it was somewhat difficult to disable it and modify the code to trigger the user's desired intent. Another reason is that to help Alexa remember contexts, I had to store the information in the session, and I'm uncertain how reliable that would be. Even though DialogFlow felt difficult at first, I kind of enjoyed it more than Alexa because of the user control over the flow that I mentioned above. I will most likely prefer working with DialogFlow for the project for these reasons.

Feedback:

Yes, I incorporated the feedback from testing. My feedback comments included displaying order details and asking for acknowledgment before placing the final order. To handle this, I created a separate intent called Handle Order Confirmation. Additionally, I integrated the HW2 Order Intent with the new FIND intent. This integration provides a seamless end-to-end flow for my application, from finding shops to order fulfillment.

Next Steps:

One thing I envisioned during my design but is missing in the application is payment verification for validating card details/payment during order transactions and integration with delivery services like DoorDash. I believe this verification and integration go beyond the scope of my application, as they involve real-time payment processing and third-party API integrations. If I have more time in the future, I may continue working on it.