

# Govt-Assist Chatbot - A *Botpress* chatbot for the official website of the Government of Mauritius

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## 1. Govt-Assist Chatbot

The Government of Mauritius's virtual assistant is designed in a way that improves citizen experience on the national website. This chatbot is AI-powered and serves as a digital guide. Its aim is to help Mauritians navigate government services across technology, infrastructure and healthcare sectors. Govt-Assist Chatbot responds to a wide range of inquiries intelligently to provide personalized support to citizens who are looking for information or assistance with government services. The chatbot uses advanced artificial intelligence together with some pre-determined conditions to understand user needs. It then delivers relevant and accurate responses for each individual's specific situation.

## 2. Workflow Design

The chatbot is made using *Botpress* which is an open-source conversational AI platform to build and manage chatbots. It provides a visual interface along with advanced natural language understanding capabilities.

The workflow starts with a greeting to the user, after which the user gets to choose which area they have a query in. Different queries require different formats for input when making a request - raw input typed in that follow no validation, input typed in in a specific format (e.g. *Person Name*, *Email address*, *Phone Number*) that follow validation rules, single choice or multiple choice etc. that can be stored in variables to be used later. The chatbot uses Natural Language Understanding to understand the user intent and responds accordingly. If the intent is not understood, the chatbot redirects to a Fallback node that informs the user of wrong entry and asks to retry giving an appropriate input. In some cases, a specific knowledge base is used to handle a user query. Once the workflow ends and the user reaches their desired output, they are prompted to ask if they have any further questions - if yes, the process starts again; if no, the conversation ends.

## 3. Intents

Intents are the actions requested by the user. They are the specific purposes behind the users' messages or questions. Intents help understand what people want to achieve when interacting with the chatbot. As such, intents helps the chatbot understand the user queries and allow it to provide appropriate responses or perform certain actions.

Intent no.	Area	Intent	Functional Requirements
1	Healthcare	Register for virtual library for Health professionals	Users should be redirected to a registration form for the virtual library
2	Healthcare	Ask for health advice of specific illnesses	Users should be able to ask for health advice Health advice specific to illnesses that the user asks for e.g. Malaria, Ebola, Gastroenteritis, Dengue Plague Users should be given the option to subscribe to health advice emails
3	Healthcare	Call an ambulance	Users should be able to call an ambulance at their current address
4	Infrastructure	Apply for learner's permit	Users should be able to request an application for their learner's permit
5	Infrastructure	Apply for driver's license	Users should be able to request an application for their driver's license
6	Infrastructure	Register a vehicle	Users should be able to register their vehicle
7	Technology	Apply for digital signature	Users should be able to apply for citizenship certificate 1 year Users should be able to apply for citizenship certificate 2 years
8	Technology	Apply for Mauritian digital proficiency course online Apply for Mauritian digital proficiency course face to face	Users should receive an application form based on which days of the week they are free Users should be able to receive an application form based on which establishment they want to follow the course at
9	Technology	Report a cybercrime on MAUCORS	Users wishing to report a cybercrime shall be redirected to an online form
10	Technology	Find ZIP postal code by address	Users should be provided with their zip code by their address
11	Technology	Subscribe to Home Internet	Users should be able to subscribe to a Home Internet package of their choice

Figure 1: Intents and their corresponding functional requirements

## 4. Entities

Entities are the pieces of information extracted from the user. For example, to apply for a learner's permit or a driver's license, a user should provide their personal details like Person Name, National Identification Number (format: 13 characters), Gender (Boolean: Male or Female) etc. To subscribe to health advice newsletters or communicate by the government, a user should additionally provide their email address (which goes through validation check). To call an ambulance or to find their zip code (from a Knowledge Base of zip codes in Mauritius) or to subscribe to a Home Internet package, a user should additionally provide their address (which will be checked against the Knowledge Base). To be redirected to the right application form for the Digital Proficiency course, a user should choose which learning mode they prefer - if online, they should pick the days of the week when they are free; if face to face, they should pick which establishment they wish to physically attend. These input values are stored in variables. After making a request, the bot urges the user to Confirm or Decline; Confirmation displays the user input details, with the help of variables, to ensure the user wants to follow through.

Examples to demonstrate the use of variables

E.g. Subscribing to Health Advice Newsletter through email

```
1 Thanks, your email address @workflow.email has been saved. You
2 shall soon receive bi-weekly medical advice.
```

E.g. Confirmation for a request of application for a Home Internet Offer:

```
1 A request will be made to apply for the offer of @workflow.offer to
2 {{workflow.name.first}} {{workflow.name.last}}
3 (contact: @workflow.email / @workflow.phone). Do you confirm?
```

E.g. Requesting an ambulance at a given address

```
1 An ambulance requested by {{workflow.name.first}} who can be
2 contacted at @workflow.phone is being called to
3 {{workflow.address.city}} as soon as possible.
```

## 5. Validation Checks

Validation checks are important procedures as they verify if the user-provided information meets a specific criteria before it is processed. They prevent errors later on by stopping incorrect data from causing system problems and ensure data quality by maintaining accuracy. Govt-Assist chatbot improves the user experience by providing immediate feedback for corrections using Fallback nodes. Validation methods include format checks (e.g. emails contain "@"), range checks (e.g. Mauritian phone numbers are 8 characters long), type checks to confirm data is of the right type etc. Some format validation checks are already provided by *Botpress*, while others had to be added using Regular Expression.

E.g. Email address Regex

A valid email address has to be in the format X@X.X where X is any text

```
1 const regex = /^[^\s@]+@[^\s@]+\.[^\s@]+$/  
2 workflow.validEmail = regex.test(workflow.email)
```

E.g. Phone number Regex

A registered phone number in Mauritius has to be in the format +2305XXXXXXX where X is a digit from 0 to 9

```
1 const regex = /^+2305\d{7}$/  
2 workflow.validPhone = regex.test(workflow.phone)
```

E.g. ID number Regex

A registered identification number in Mauritius has to be in the format YXXXXXXXXXXXX where X is a digit from 0 to 9 and Y is a letter

```
1 const regex = /^[A-Za-z][0-9]{12}$/  
2 workflow.validID = regex.test(workflow.id)
```

E.g. Citizenship certificates

Certificates can only be applied for either 1 or 2 years

```
1 workflow.years !== 1 && workflow.years !== 2
```

## 6. Fallback

Should the intent of the user input not be clear, there should be a fallback that informs the user of a wrong input and prompts them to retry. If the intent of the new user response is still not clear, they are prompted again until it is understood.

E.g. Fallback for not understanding the intent of a user querying Technology

Intent Options: Apply for digital signature, Apply for digital proficiency course, Report a crime on MAUCORS, Find your postal code, Subscribe to Home Internet

Sorry! We did not understand your request. Do you want more information about Technology and Innovation? E.g. Apply for digital signature or digital proficiency course, Report a crime on MAUCORS, Find your postal code, Subscribe to Home Internet

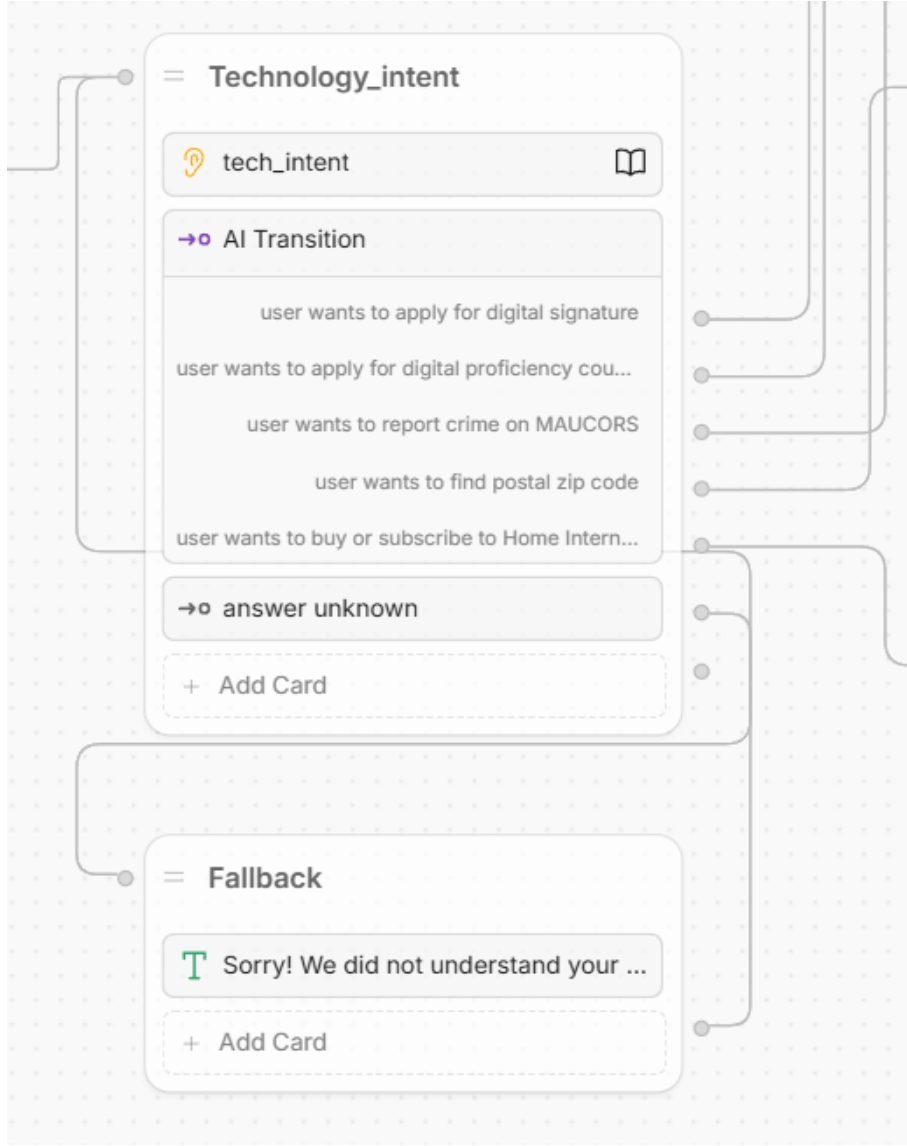


Figure 2: Fallback Node

## 7. Chatbot Responses

These are the questions( $Q$ ), valid answers( $A_v$ ), invalid answers( $A_i$ ), successful( $R_s$ ) and unsuccessful( $R_u$ ) responses from the chatbot.

[See Appendix for Screenshots]

Case 1: Understanding Intent

$Q$ : Infrastructure: What do you wish to apply/register for?

$A_v$ : Register vehicle

$R_s$ : Registration of vehicle. Please provide your full name.

$A_i$ : Emergency ambulance

$R_u$ : Sorry! We did not understand your request. Do you want more information about infrastructure? E.g. Apply for learners permit, drivers license or register a vehicle. Infrastructure: What do you wish to apply/register for?

#### Case 2: Input email address

*Q*: Please provide your email address.

*A<sub>v</sub>*: janedoe@gmail.com

*R<sub>s</sub>*: OK. Please provide your phone number.

*A<sub>i</sub>*: janedoe.com

*R<sub>u</sub>*: Invalid email, try again please. A valid email address has to be in the format X@X.X

#### Case 3: Input phone number

*Q*: Please provide your phone number.

*A<sub>v</sub>*: +23051234567

*R<sub>s</sub>*: A request will be made to apply for the offer of 50 Mbps, 1TB, Rs 1,100/month to Jane Doe ( janedoe@gmail.com / +23051234567 ). Do you confirm?

*A<sub>i</sub>*: 51234567

*R<sub>u</sub>*: Sorry! This does not match the format of phone numbers registered in Mauritius. Please retry. (e.g. +2305XXXXXXX)

#### Case 4: Applying for citizenship certificate of more than 2 years

*Q*: The citizen certificate will be for how many years?

*A<sub>v</sub>*: 1

*R<sub>s</sub>*: Link to Apply for Citizen Certificate 1 Year

*A<sub>i</sub>*: 3

*R<sub>u</sub>*: Sorry! Citizenship certificates can only be applied for either 1 or 2 years. Please retry.

#### Case 5: Knowledge base Fallback - No address

*Q*: To find your postal code, please provide your address.

*A<sub>v</sub>*: What is the post code of Pailles?

*R<sub>s</sub>*: The postal code of Pailles is 11219.

*A<sub>i</sub>*: What is the post code of Berlin?

*R<sub>u</sub>*: We couldn't find the postal code for that address. Could you please retry?

#### Case 6: End of a request

*Q*: Request made for application. Would you like any more information?

*A*: Yes

*R*: How may we assist you—which area do you need information on?

*A*: No

*R*: Ok, goodbye. Let us know if you ever have any more questions!

## 8. Appendix

Screenshots from conversations with the Govt-Assist chatbot.

#### Case 1: Understanding Intent

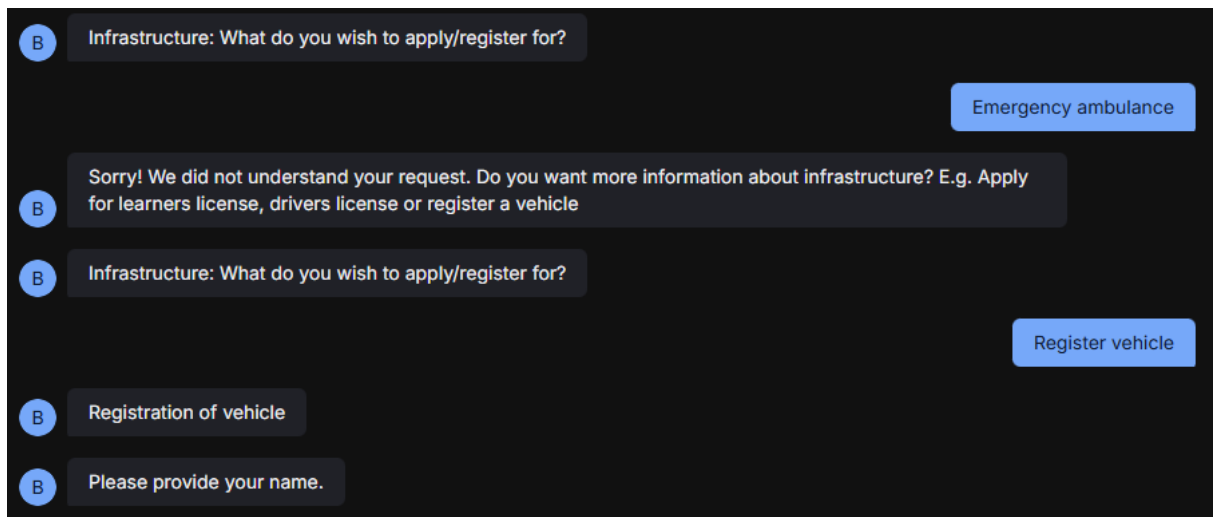


Figure 3: Case 1

Case 2: Input email address

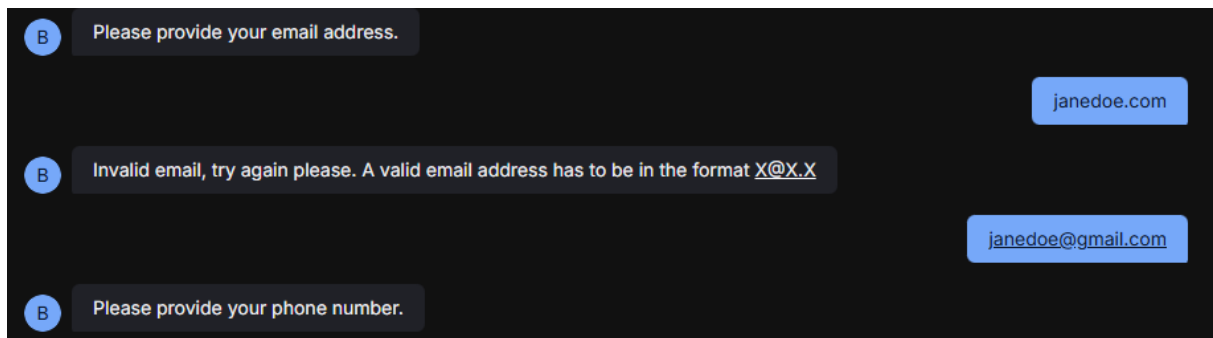


Figure 4: Case 2

Case 3: Input phone number

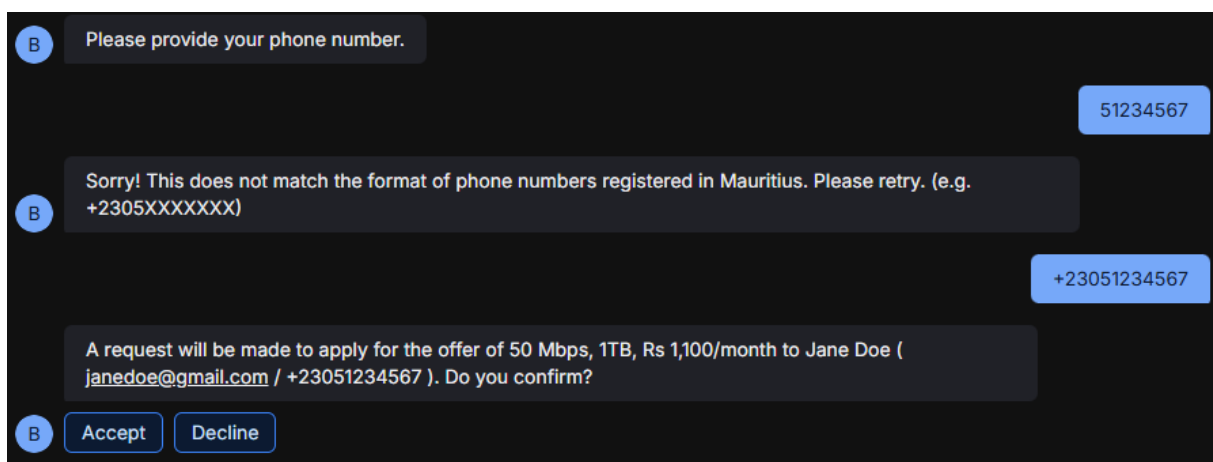


Figure 5: Case 3

Case 4: Applying for citizenship certificate of more than 2 years

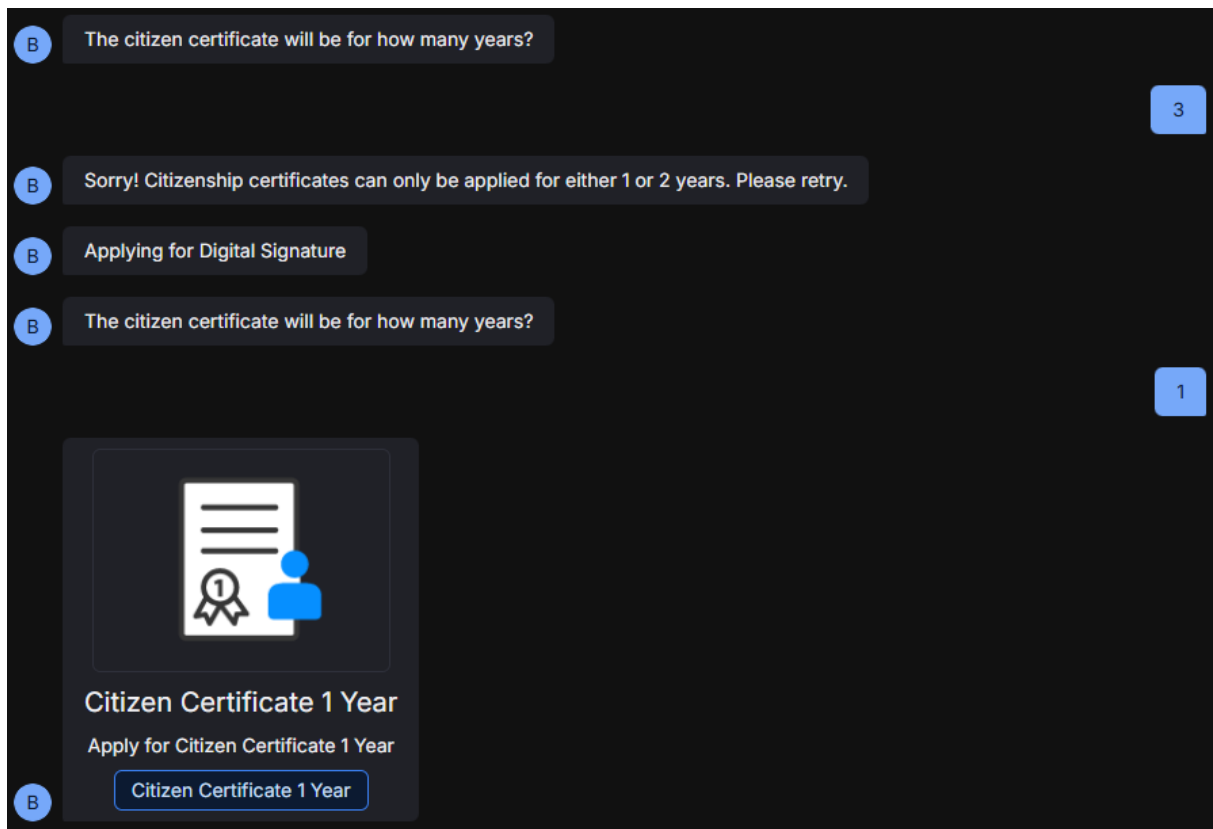


Figure 6: Case 4

Case 5: Knowledge base Fallback - No address

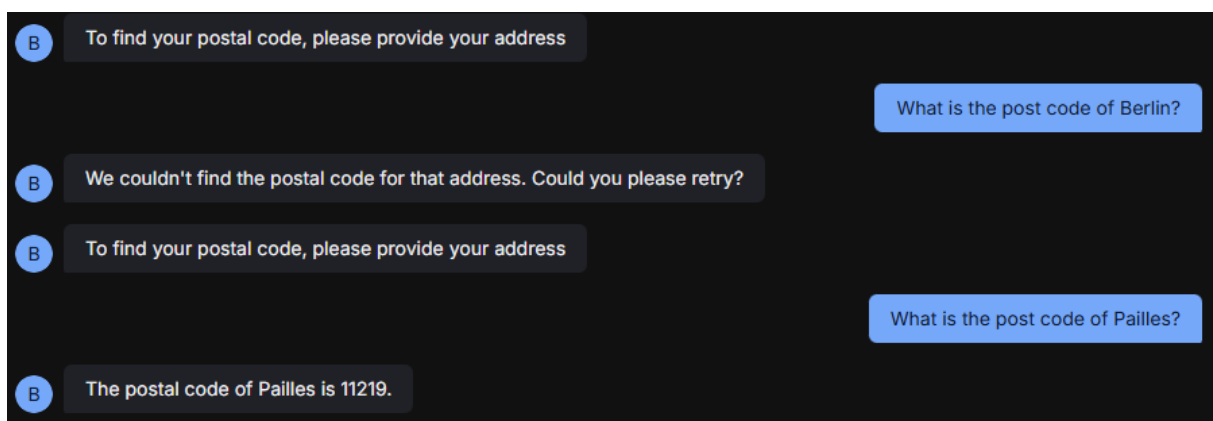


Figure 7: Case 5

Case 6: End of a request

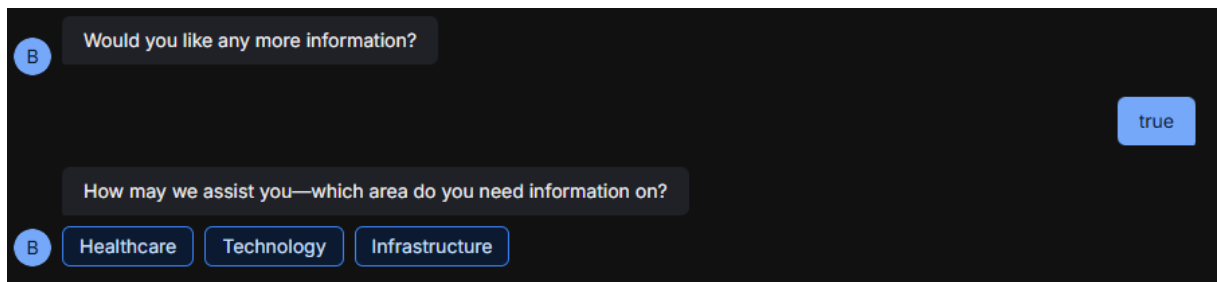


Figure 8: Case 6 - true

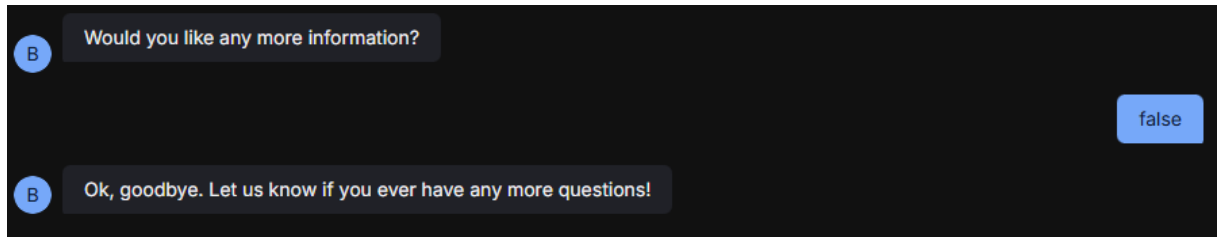


Figure 9: Case 6 - false