<Hal 2001>

Special Course in Software Engineering Project Report

Version <1.11>

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(Group 12)

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1. Introduction

1.1 Purpose

The HAL Chatbot project demonstrates the entire process in a structure based on analysing, requirements extracting, designing, developing, and testing. This report considers the ones that are fans of the movie 2001: A Space Odyssey as the target audiences, from which they can fully understand the crucial points of what the chatbot is capable of and how does it doing it.

1.2 Overview

The customer experience in the media and entertainment industry can be measured in two main ways called primary services and additional services.

The primary service is the event, show or display itself that the customer comes to.

Additional services support the primary service, such as the pre and post ticketing experience, readily available information, staff assistance, etc. HubSpot Research reports that 90% of customers consider immediate response time to be very or extremely important in customer service. For sales and marketing inquiries, that percentage drops slightly - to 82 percent. According to Zendesk's Customer Experience Trends report, about half of customers consider 24/7 support to be an important part of good customer service.

And with conversational AI chatbot technology, you can get.

1. Robotic process automation for common tasks

2. 24/7 customer service automation

3. reduced customer service queue times

4. secure self-service options for customers

HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey. The Hal chatbot should engage users on trivial topics and provide responses that HAL from the movie/novel would have provided. These responses are likely to be very sharp, straightforward, smart, but a little dark to a regular human being. In addition, the bot should also help address customer grievances related to the merchandise they purchase from the website.

The industrial domain for Hal is entertainment, and in general chatbots are are designed and developed for a specific domain. These domains are narrow and applicable to to the concern of the organization they serve. Hence chatbots are custom and purpose built as an extension of the organization's operation, usually to allow customers to self-service.

1.3 Definition, Acronyms, and Abbreviations

- *Natural Language Understanding (NLU： without this, bot could not understand dialogues, not to mention intents. It can only be a dictionary, looking through things already in the database, and can not go any further)*
- *Artificial Intelligence (AI, the most important part is nlu)*
- *Slot (Memory to store information the chatbot recieves)*

- *domain.yml (Yaml file that stores the intents, actions, entities, utterance, and forms)*
- *Stories.yml (stories store the path a conversation should stay on, and make the dialogue follow the path, normally the path is like: intent, action, action, action......)*
- *Nlu.yml (Store examples of intents to identify, and leave the nlu core to train the examples)*
- *Utterance(The responses a chatbot would say when identified intents)*
- *Rules.yml (The MUST obey storiy if you can understand, it must only be consisted of only one intent, and the process order should not be changed)*
- *Form (A way to store texts while filling the slots)*
- *Actions (more like methods we use in object-oriented programming language. We can use it to pass information, return needed messages, and operates some kind of calculation if we want)*
- *Html, css,js (we use this to build static web page when to show the onboarding page, which will give the user a tip what a chatbot can do when querying it.)*
- *Rasa (Rasa is an open source machine learning framework for automated text and voice-based conversations. Understand messages, hold conversations, and connect to messaging channels and APIs.)*
- *Visual Studio Code(Visual Studio Code is "a free-editor that helps the programmer write code, helps in debugging and corrects the code using the intelli-sense method)*
- *SQLite (SQLite is an in-process library that implements a self-contained, serverless, zero-configuration, transactional SQL database engine.)*
- *Fallback (When the bot can not identify any intents above the threshold we set, it turns to the default_fallback_action action.)*
- *HTTP API (API Gateway sends the request to the Lambda function and returns the function's response to the client)*
- *NLU-Only Server (You can connect a Rasa NLU-only server to a separately running Rasa dialogue management only server by adding the connection details to the dialogue management server's endpoint configuration file)*
- *TrackerOrder (A way to replace Rasa X, also a way to leave any action the user and bot have left, storing in a database, which can be viewed by in any occasion)*
- *SocketIO: (A way* that includes client-side js and server-side nodejs. Its goal is to build real-time applications that can be used in different browsers and mobile devices.)
- Docker: (We need to seal the chatbot in a docker, then we can upload the docker on a neutral cloud for users to test)
- *Ali Cloud: (Allows the user to run the action and test the bot)*

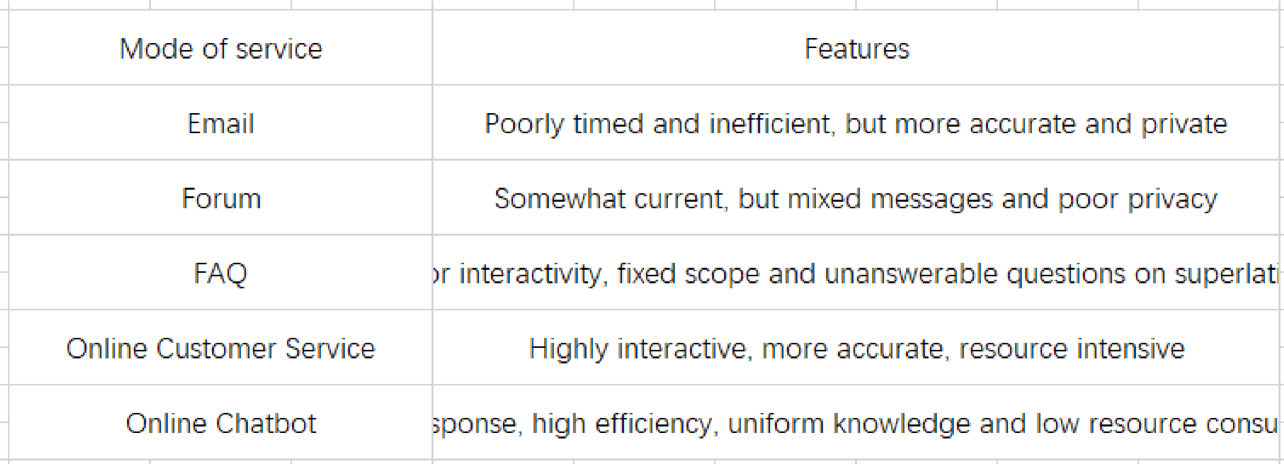
2. Background

This part focus on necessary background information about chatbot development, along with core concepts and implementation, at the same time, those parts stress why developing Hal chatbot is needy for the customer.

2.1 Chatbot Background

The submission chatbot Hal 9001 would develop a domain-specific retrieval-based chatbot, instead, it can only focus on specific questions and answer the questions that the employer specificly asked, some scientic literature below can explain this:

At present, most companies adopt customer service methods as shown in Table x.x. It can be seen from the table that most of them adopt Email, forum, FAQ, online customer service and chatbot or a combination of several methods. With the growth of the company, the number of business is increasing, the complexity is also increasing, the number of customers is also increasing, the enterprise is facing more and more customer service problems, need more manpower to meet the rapid growth of business needs, the cost is also increasing. Although there are a lot of the service mode in the table but now most of the customers is to choose the online customer service, interactive because this way is very strong, but artificial customer service in the case of customer number is, first of all, artificial customer service number will increase in the number of customers, the second is the enterprise business growing rapidly, human customer service cannot penetrate to the change of the business, guide Resulting in a sharp reduction in service quality. To improve the quality of customer service and reduce the cost of service is also the common goal pursued by various enterprises. Therefore, with the improvement of AI technology and the development of NLP technology, it has become an irresistible trend to improve customer service quality through customer service robots. In this way, we can provide customers with unified answers to questions, and the customer service robot can serve 24 hours without interruption, improving the customer service efficiency and saving labor costs.



Mode of service	Features
Email	Poorly timed and inefficient, but more accurate and private
Forum	Somewhat current, but mixed messages and poor privacy
FAQ	r interactivity, fixed scope and unanswerable questions on superlati
Online Customer Service	Highly interactive, more accurate, resource intensive
Online Chatbot	sponse, high efficiency, uniform knowledge and low resource consu

Table 2-1 Comparison on different approaches

2.2 Salient Concepts

Next, describe the following salient concepts that play a major role in the functioning of your chatbot. Besides the concepts listed below, you are encouraged to include other concepts that are relevant to your chatbot:

- *Natural Language Processing (NLP)*
- *Natural Language Understanding (NLU)*
- *Artificial Intelligence (AI)*
- *Deep Learning*
- *Slot (Memory to store information the chatbot recieves)*
- *domain.yml (Yaml file that stores the intents, actions, entities, utterance, and forms)*

- *Rasa (Rasa is an open source machine learning framework for automated text and voice-based conversations. Understand messages, hold conversations, and connect to messaging channels and APIs.)*
- *Visual Studio Code(Visual Studio Code is "a free-editor that helps the programmer write code, helps in debugging and corrects the code using the intelli-sense method)*
- *SQLite (SQLite is an in-process library that implements a self-contained, serverless, zero-configuration, transactional SQL database engine.)*
- Python (Object-oriented, high-level programming language)
- *HTTP API (API Gateway sends the request to the Lambda function and returns the function's response to the client)*
- *NLU-Only Server (You can connect a Rasa NLU-only server to a separately running Rasa dialogue management only server by adding the connection details to the dialogue management server's endpoint configuration file)*
- *TrackerOrder*
- *MitieNLP (MITIE initializer: Initializes MITIE structures. Every MITIE component relies on this, hence this should be put at the beginning of every pipeline that uses any MITIE components.)*
- *RedisTrackerOrder*
- *SpacyNLP (spaCy language initializer)*
- *Tokenizers (Tokenizers split text into tokens.)*
- *WhitespaceTokenizer (Tokenizer using whitespaces as a separator)*
- *JiebaTokenizer (Tokenizer using Jieba for Chinese language)*
- *ConveRTFeaturizer (Creates a vector representation of user message and response (if specified) using ConveRT model.)*
- *LanguageModelFeaturizer (Creates a vector representation of user message and response (if specified) using a pre-trained language model.）*
- *RegexFeaturizer （Creates a vector representation of user message using regular expressions.)*
- *CountVectorsFeaturizer (Creates bag-of-words representation of user messages, intents, and responses.）*
- *LexicalSyntacticFeaturizer （Creates lexical and syntactic features for a user message to support entity extraction.）*
- *Intent Classifiers （Intent classifiers assign one of the intents defined in the domain file to incoming user messages.）*
- *MitieIntentClassifier*
- *LogisticRegressionClassifier*
- *SklearnIntentClassifier*
- *KeywordIntentClassifier*
- *DIETClassifier*
- *FallbackClassifier*
- *Entity Extractors （Entity extractors extract entities, such as person names or locations, from the user message.）*
- *MitieEntityExtractor*
- *SpacyEntityExtractor*
- *CRFEntityExtractor*
- *DucklingEntityExtractor*

- *DIETClassifier （Dual Intent Entity Transformer (DIET) used for intent classification and entity extraction）*
- *RegexEntityExtractor （Extracts entities using the lookup tables and/or regexes defined in the training data）*
- *EntitySynonymMapper*
- *TED Policy （The Transformer Embedding Dialogue (TED) Policy is a multi-task architecture for next action prediction and entity recognition.）*
- *UnexpecTED Intent Policy （UnexpecTEDIntentPolicy helps you review conversations and also allows your bot to react to unlikely user turns.）*、
- *Memoization Policy （The MemoizationPolicy remembers the stories from your training data. It checks if the current conversation matches the stories in your stories.yml file.）*
- *Augmented Memoization Policy （The AugmentedMemoizationPolicy remembers examples from training stories for up to max_history turns, just like the MemoizationPolicy.）*

2.3 Report summary

Part 1 presents the purpose of the document, a general description and some abbreviations

Part 2 introduces the background of chatbot, and based on scientific literature to analyze the industrial domain type.

Part 3 shows the problems the chatbot is going to solve and possible solutions made by the customer,in which the functional and non-functional requirements are met, also along with some constrains and assumptions. At last, there is an use case to demenstrate important interaction message.

Part 4 demenstrates the dialouge and data storage design, also along with the overall structure of the system.

Part 5 displays the developing environment, associated hardware, software, tools and technologies. In addition, it contains two approaches to fullfill the goal which is to integrate the chatbot on channels using TrackerOrder and RedisTrackerOrder.

Part 6 tells from both internal and external view to test the chatbot in seven categories, also to discuss user case views, dialog design, and system operation.

Part 7 concludes the overall report and gives an conclusion.

3. Requirements Specifications and Analysis

This Part shows the problems the chatbot is going to solve and possible solutions made by the customer,in which the functional and non-functional requirements are met, also along with some constrains and assumptions. At last, there is an use case to demenstrate important interaction message.

3.1 Problem Statement

1. What can be done to resolve the issue when a customer becomes upset and agitated?

2. Is there a way or means for the customer to connect to a human service?

3. Is there a certain automatic help function when the customer makes an inquiry?

4. When the customer wants to make a complaint, how to resolve it?

5. if the customer feedback is relatively simple similar to the problem of querying the courier number, how to give a quick answer?

6. if the customer encounters a problem is more difficult, how to further solve the problem?

7. how to solve the customer consultation time if it is not within the time of manual customer service?

8. Can all the questions asked by customers be reasonably solved?

3.2 Proposed Solution

1. Chatbots generally output relatively interesting information or use a HAL-like response mechanism, similar to introducing information about websites and topics such as weather, jokes, etc. that can lighten and enhance the user's mood.

2. chatbots can generally answer all of the user's questions, and when the user's questions are more complex or the customer no longer wants to communicate with the chatbot, the chatbot can connect to a human supervisor who will never take over the next step.

3. The chatbot will respond to the user's needs and will make alternatives for the user to choose from. The chatbot can be helpful and proactive in solving any problem the customer has.

4. When a user wants to file a complaint, the chatbot will reassure the customer and connect to a human supervisor to respond to the user's complaint and display the human supervisor's name for tracking.

5. The chatbot can help the user with simple questions such as delivery numbers, links and addresses, and will automatically provide links to help the customer solve the problem.

6. If the user encounters a problem that the chatbot cannot solve, the chatbot will provide feedback to the human supervisor and follow up with him/her. Even if the customer is not willing to accept the alternative solution provided by the chatbot, he/she can follow up by asking for the user's phone number and having the human supervisor make a phone call.

7. The chatbot is online 24 hours a day to help users solve problems and communicate with them, assuming the human supervisor is not online.

The chatbot is online 24 hours a day, and if the user is not satisfied with the solution provided, the chatbot can contact the human supervisor for the next step.

3.3 Information gathering

When communicating with the customer, RE have to question in a row, which contains:

- Introduce RE, and explain the purpose of the interview.

- Start the interview with some light questions, something like web information, chatbot message.
- Find out what the chatbot wants to do: 1.Web information 2.Track orders. 3.chat about movies and jokes. 4. Query weather condition

When moving to the end of the interview, the RE asked about whether the customer has anything like to add and say. Remember, confirm each time always!

As a user, I want to check the web information, so I can know better understanding of the web and its build purpose.

As a customer, I want the chatbot to provide interesting and "HAL-like" responses to relevant information entered by the user, information about the website such as weather, jokes or other light-hearted topics, or even philosophy.

As a customer, I want the chatbot to resolve customer grievances in a typically "HAL-like" manner.

I want to be able to resolve complaints about products such as delayed orders, damaged packaging, incorrect packages, etc.

As a customer, I would like the chatbot to be able to provide an alternative solution to the customer's query or even in some cases connect to a human supervisor and chat with them to resolve the issue, should the chatbot encounter any problems while handling any of the above user requests.

As a customer, I would expect that once the user chooses this alternative, the chatbot should indicate that it is connecting to the

human supervisor while also displaying the supervisor's name or asking the user to provide their detailed query in an email.

As a customer, I would expect that after choosing this alternative, the chatbot should provide the user with an email id and the chatbot could send their query to ask the user if they would like to speak with the executive over the phone immediately.

As a customer, I would like to see that in this alternative, the chatbot should first ask the user for their phone number and then ask permission for one of the human executives to call that number.

As a customer, I would like the chatbot to be hosted in the cloud, just like the company's main application

As a customer, I would like the company to integrate the chatbot into its main application, so the necessary terms should be done to make future integration possible, and this is a requirement that must be met.

As a customer, since the company expects customers from all walks of life, I would expect that the chatbot should have a simple, dignified tone and be able to use formal language. However, a chatbot will always be objective, even if it means to offend.

Questions.

1. When communicating with customers, does the chatbot make the communication easy?

2. How does the chatbot solve the user's problem?

3. When a chatbot is unable to solve a problem, what method is used to continue the problem?

4. Can chatbots be hosted in the cloud?

1) Yes. --Are there terms and conditions that dictate where chatbots can be located and integrated?

2) No. -- How do you implement such a full-featured intelligent chatbot?

5. Is there a provision for the tone and language used by the chatbot

Answer.

1. Yes. Chatbots can be very sharp, direct, and clever, but a bit dark for the average person. The chatbot will provide funny, "hal-like" responses to user input on jokes, other light-hearted topics, and even philosophy.

2. The bot is also supposed to help resolve customer dissatisfaction with the items they purchase from the site. Merchandise dissatisfaction is mainly related to order delays, damaged packages, incorrect packages, etc. Chatbots resolve customer grievances in a typical "HAL" fashion.

3. If any problems are encountered in processing any of the above user requests, the chatbot should be able to provide an alternative solution to the customer's query. If the chatbot connects to a human supervisor and chats with them, the chatbot should indicate that it is connected to a human supervisor and display the supervisor's name. If the chatbot asks the user to provide details of the query in an email, the chatbot should provide the user with the email id to which they can send the query. If the chatbot asks the user if they would like to call the executive immediately, the chatbot should first ask for the user's phone number and then ask permission for one of the executives to call the number.

4. Right. The company will integrate the chatbot into its main application, so the necessary provisions should be made to enable this integration in the future. This requirement is non-negotiable.

5. The chatbot should have a direct and decent tone, using formal language. However, it is always objective, even if this means offending someone.

3.4 Functional Requirements

1. Check information about the website

2. Chat Pleasantries

3. Query Weather

4. Ask jokes

5. Ability to respond to user questions 24 hours a day

6. the ability to have chatbots integrated into the application

7. the ability to send emails to users

8. send the user's phone number or provide a link to the user

9. the ability to provide a chat tone similar to HML

10. the ability to send timely information about movies, scripts, and actors for HAL 2001

7. allow users to participate in trivial topics

3.5 Non-functional Requirements

1. memory footprint, without taking up too much memory

2. precise language of the chatbot, with the corresponding HAL style, even if to some extent offensive

3. the corresponding time, when the user asks a question, to be able to give a timely answer

4. the number of users, to be able to correspond to the number of users for certain statistics, statistical planning chart

3.6 User classes and characteristics

Most of the people who visit the website are fans of HAL 2001, so we can classify them according to the frequency of using this movie. Those who have primary knowledge or want to know about the movie HAL 2001, and who generally do not use it very often, are classified as user category A.

Characteristics of user category **A.**

1. want to know about the movie HAL, have some interest in the plot of the movie and the comprehensive information of the actors, but have not yet made more understanding.

2. have watched the movie HAL 2001, have a relatively vague understanding of the specific information of the movie, and want to explore more information. 3.

3. did not have a clear memory of the lines in the movie and was not able to directly accept or respond to the chatting atmosphere guided by the chatbot's lines.

4. not very receptive to the trivial discussions about the movie on the website.

Users who like the movie, visit the site at certain times, visit the site a certain number of times, and have some potential purchasing power for the products on the site are classified as User Category B.

Characteristics of user category **B**:

1. they want to know more about the plot of the movie, comprehensive information about the actors and actresses, as well as film footage and behind-the-scenes information, and want to get more information about the movie HAL 2001.

2. people who have a desire to buy products on the website, who can generate some spending power on the website, and who are interested in the peripheral products of the movie.

3. people who have a certain degree of knowledge and memory of the classic lines from the movie/novel, who can respond to the specific lines sent by the chatbot, and who understand and adapt to the chatting atmosphere of the chatbot on the website.

4. have a willingness to participate in and speak up on trivial discussions about the movie on the website.

People who love the movie, visit the site regularly, and buy products on the site are classified as User Category **C**.

Characteristics of User Category C:

1. they know the plot of the movie, comprehensive information about the actors and actresses, as well as the movie highlights and behind the scenes.

2. they buy products on the website frequently and love the peripheral products of the movie/novel

3. have a good understanding of the lines in the movie/novel, and like and enjoy the chatting atmosphere provided by the chatbot with HAL's specific environment.

4. are very involved in the trivial discussions on the site about the movie, and often speak in the topics.

According to the above classification, it can be found that the user A chatbot only serves as a relative introduction to the movie details and provides some links to the users of this category to facilitate their inquiries about the movie/novel, while the chatbot atmosphere with HAL style is not used very often and does not make certain purchases for the products offered on the website. Therefore, I think that chatbots with HAL chatting atmosphere will make this type of users uncomfortable because of the dark atmosphere in the plot, so I think chatbots should use an introductory and enthusiastic tone for this type of users. User B can accept and have some understanding of the lines, and can participate in trivial topic discussions. This type of user is the one who should have a HAL tone, and the chatbot should guide them for carrying out topic discussions, and push some goods in time, they have some interest in the goods, and are potential buying customers. User C should be the most important group of customers, they enjoy the HAL chatting atmosphere and can actively answer the chatbot's questions, this group of people has a strong interest in the products, in pre-sales and after-sales issues, the chatbot should produce a satisfactory response mechanism for these customers. For this type of users, the chatbot should use a HAL chat atmosphere and push new products in a timely manner.

3.7 Constraints

Describe any items or issues that would limit the options available to chatbot developers. These may include: company or regulatory policies; hardware limitations (time requirements, memory requirements); interfaces with other applications; specific technologies, tools, and databases to be used; parallel operations; language requirements; communication protocols; security considerations; design conventions or programming standards (e.g., if the customer's organization will be responsible for maintaining the delivered software.

Chatbots with HAL style cost more

Because of the need to carry the unique linguistic atmosphere of the HAL 2001 movie/novel in the HAL website, even chatbots based on artificial intelligence and machine learning can be difficult to implement, even if they seem to be the next stage of evolution. Algorithms and frameworks can be sourced from service providers, but aligning them with the features in the entire HAL 2001 movie/novel requires providing the chatbot with relevant information about the entire movie in a predefined format, a massive undertaking, and the task of fine-tuning the AI chatbot for the website to take advantage of all its offerings is a task for experts, which requires significant investment and time.

Limited database and limited responsiveness to customers

In that since most Bots are either support chatbots or service-based chatbots, the number of responses to end users is limited to the scope of their messages. Similar to the three categories of users ABC of HAL 2001, since menu-based chatbots are limited to their queries and try to classify users, but they cannot deviate from other domains or accumulate information from current external scenarios into their responses. As a result, it is limited to the majority of users and is not fully accurate in categorizing customers accordingly

Machine Learning Security Vulnerabilities in Chatbots, Vulnerable to Attacks

Chatbots are particularly vulnerable to machine learning attacks, and because of the different classifications of customers in the HAL2001 website, chatbots often interact with each other as users, and these interactions are often completely unsupervised. Data poisoning is a machine learning attack in which hackers contaminate the training data of a machine learning model. They do this by injecting adversarial inputs that are intentionally altered data samples with the aim of inducing the system to produce incorrect outputs. Systems like customer service chatbots that are continuously trained with user input data are particularly vulnerable to such attacks. Most modern chatbots can operate automatically and answer customer queries without human intervention. Typically, the conversation between the chatbot and the user is never monitored unless the query is escalated to a human. This lack of oversight makes chatbots a prime target for hackers to exploit.

Language Complexity in HAL 2001

Modern conversational interface applications rely heavily on advances in artificial intelligence and the proliferation of connected devices to provide users with shortcuts to perform simple tasks, such as getting answers to simple questions (e.g., who is the female star of HAL 2001) or completing a quick task (e.g., alerting the user that a package of purchased goods will arrive the next day), among other simple tasks. But as with software, language is based on a set of rules that evolve and develop over time. But speaking humans, unlike computers, are not constrained by these rules and are free to form words and sentences as a way to convey a message. Similar to regional dialects aside, what is needed for the HAL 2001 website is the unique language approach of the movie/novel, which traditionally would make it more difficult for a computer to understand a similar discourse. While machine learning has improved the computer's ability to recognize language, we have not yet developed artificial intelligence to the point where it can keep pace with the rapid evolution of language and understand each particular way of speaking at the right time.

3.8 Assumption and Dependencies

Assumptions.

1. the chatbot in this project requires a specific language environment for HAL 2001 movies/novels, for which certain development conditions are required by the third party developing the chatbot. Assuming that no specific language environment is constituted, then the language environment that is wanted to be developed cannot be formed. It will cause some loss to the user's experience.

2. Whether the chatbots in HAL2001 website have consistent and rich personalities: for chatbots to be like credible people, they must be able to simulate the assumption of having unique personalities.

3. The environment in which the chatbot operates is also a hypothetical factor, and the pairing of different environments can affect many aspects of the chatbot.

Since AI chatbots rely on natural learning processing (NLP) to understand the semantics of incoming messages, unless a natural learning processing (NLP) parser is trained on the domain, the accuracy of identifying the intent and topic of interest will be unacceptable."

No chatbot implementation will understand domains. Developers need to train chatbots on custom domains to recognize scenarios

3.9 Example use cases

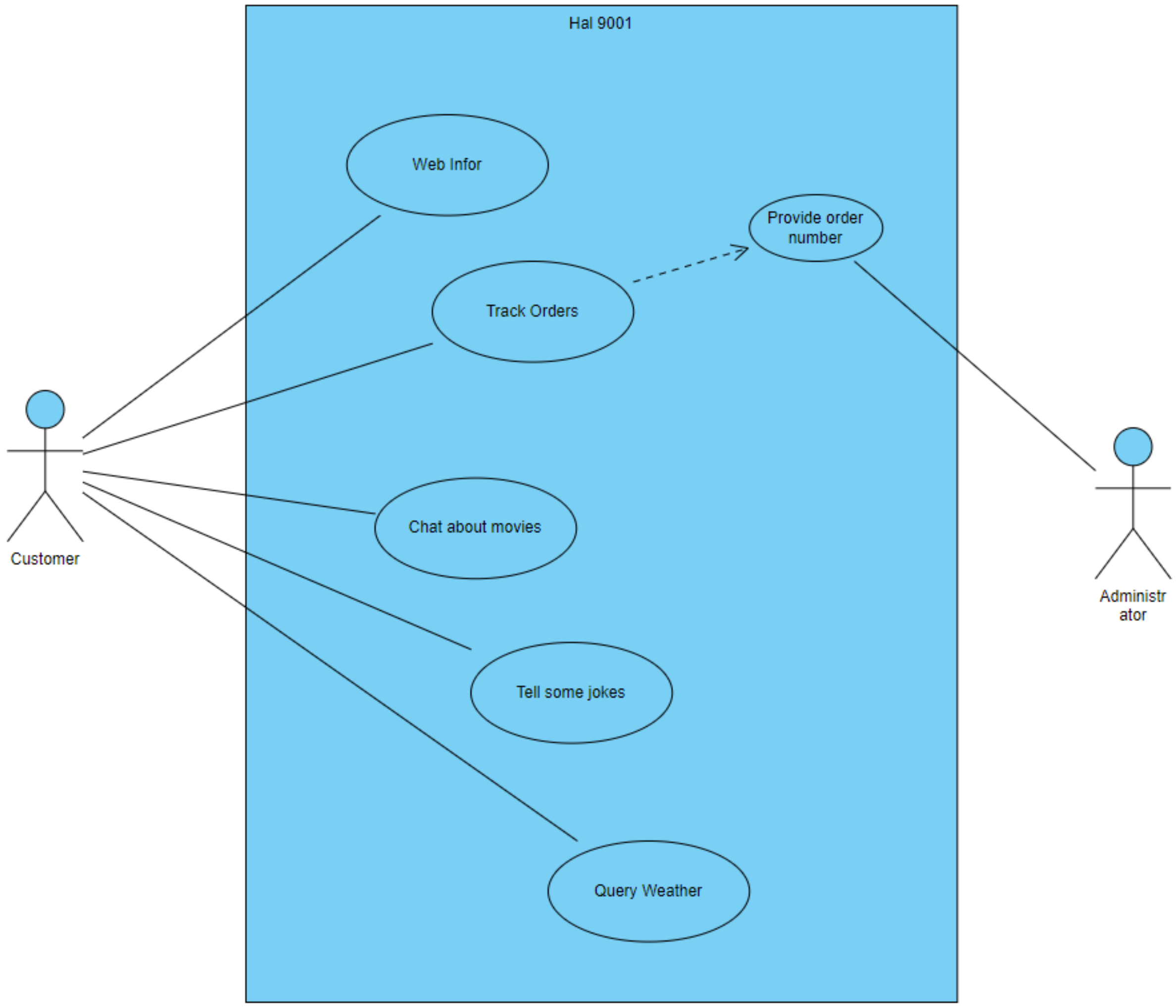


Figure 1 Use Case

4. Chatbot Design

4.1 System architecture

In 1950, alan turing put forward the Turing Test ("Can Machines Think"), and the first known chat robot was Eliza developed in 1966, with the purpose of responding to users through dialogue and question-and-answer as a psychological trainer. She uses simple pattern matching and template-based response mechanism [1]. Of course, as an earlier chatbot, her conversation ability is relatively poor. In 2000, ALICE won the "Most Humanized Computer". This chatbot relies on a simple pattern matching algorithm, and the underlying intelligence is based on Artificial Intelligence Markup Language (AIML)[2], enabling developers to define the building blocks of chatbot knowledge [3].

Pattern matching is a typical stimulus-response block. Input information (stimulus), the chatbot produces an output response consistent with the user's input. In this mode, the chatbot's dialogue is relatively rigid, repetitive, predictable and impersonal. Without storing past information, it is not suitable for project development.

NLP (Natural Language Processing) is a field of artificial intelligence. It explores the manipulation of natural language texts by computers, collects, understands and uses human language knowledge to develop technologies, so that computers can understand and naturally express the tasks to be performed [5]. Natural language understanding NLU is the core of any natural language processing task, and it is a technology to realize natural user interface, which can make appropriate response according to the user's intention [6]. The machine recognizes the user's intention, and extracts entities in specific fields.

At present, there are three mainstream chat robot models: rule-based model, retrieval-based model and generation-based model.

The rule-based model is more of the architecture type of early chat bots. The corresponding system is selected based on a set of fixed predefined rules, and there will be no new text content based on the recognition of the vocabulary form of the input text. The knowledge used is manually coded and presented in a dialogue mode. Expanding the scale of rule database will allow more types of user input, but chatbots will not give too many corrections to user errors and grammatical errors.

Based on the retrieval, it provides greater flexibility. Before the matching method is applied, the robot will select some corresponding candidates from the index, and finally choose the best choice. [7]

Compared with the other two models, the chat robot based on the generation model is more like a human being, using machine learning algorithm and deep learning technology, so the cost of construction and training will increase relatively.

We will use rasa architecture. rasa has an extensible architecture, and its main components are NLU and dialogue management.

NLU is the part that deals with intention classification and corresponding retrieval. The dialogue management component decides the next action of the dialogue according to the context, and the dialogue history of the robot will be stored in tracker store.

4.2 Dialog Design

First, get the functions that users want from the demand, and determine the basic functions of the chat robot: it can respond to users' questions at any time, send emails and phone numbers to customers, send information about Hal2001 movies, chat with customers, and expect to participate in trivial topics. After determining the basic functions, determine the character and tone of the chat robot, which will be explained in detail later. After the basic intonation is determined, the conversation design will be carried out. The design should simulate possible users and special situations as much as possible, and finally the user test will be carried out.

Chat Robot According to the big five personality theory, chat robot will be an understanding and extroverted robot with a humorous tone. For instance:

0. what can you do

User: what can you do? (Intent: what_can_do）

Bot: I should remind you what I am capable of:

1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1）

User: Thank you （intent: thank)

Bot: Always pleasure to help you

1. Greetings

User ：Hi/Hey/Hello/Hiiiii/Heyyyyy **--greet**

Bot:How should I address you**---utter_fill_name**

2. Entertain users

User: What can you do -- intent:what can you do

Bot: I can remind you what I am capable of:

1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1） **---utter_option1**

User: Entertain me/ amuse me/ make me laugh/ tell me a joke/ fancy me/ **--entertain_me**

Bot:

Here's one: What's the shark's favorite two words?

Man Overboard!! **---utter_entertain**

What else can I do for you? **---utter_anything_else**

User:no/nope/n/none/not **-- intent: deny**

bot:I will be back(thumbs up). **--action: utter_goodbye**

3. Track order

user: I wanna check my order/where is my order/how do I check my order/please check my order （**intent: my_order**）

bot: **utter_order_query**： please provide your number with 6 numbers:

user: xxxxxx （**intent: order_infor**）

bot: sure. Displayed as follows: (**utter_order_infor)**

If there anything I can do for you sir? （**utter_what_else**

user: （**intent: deny**

no/ nope

bot: （**utter_goodbye**

……

More dialogues will be shown in the appendix.

4.3 Data Design

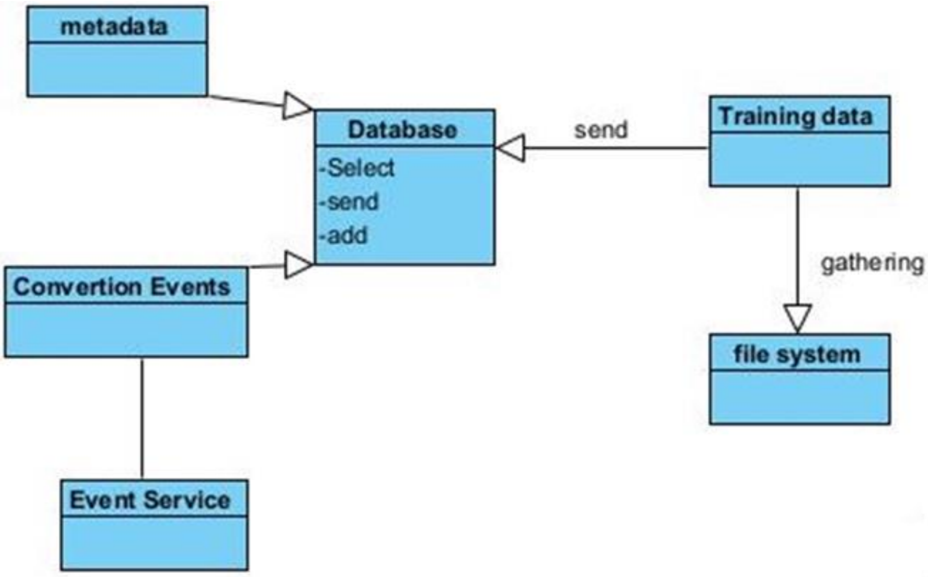


Figure 2 Data memory design

The database will accept metadata, training data and dialogue events, and can select and add them. The training data will eventually be collected in the file system, and the dialogue events will be transmitted by the event service module.

4.4 System Operation

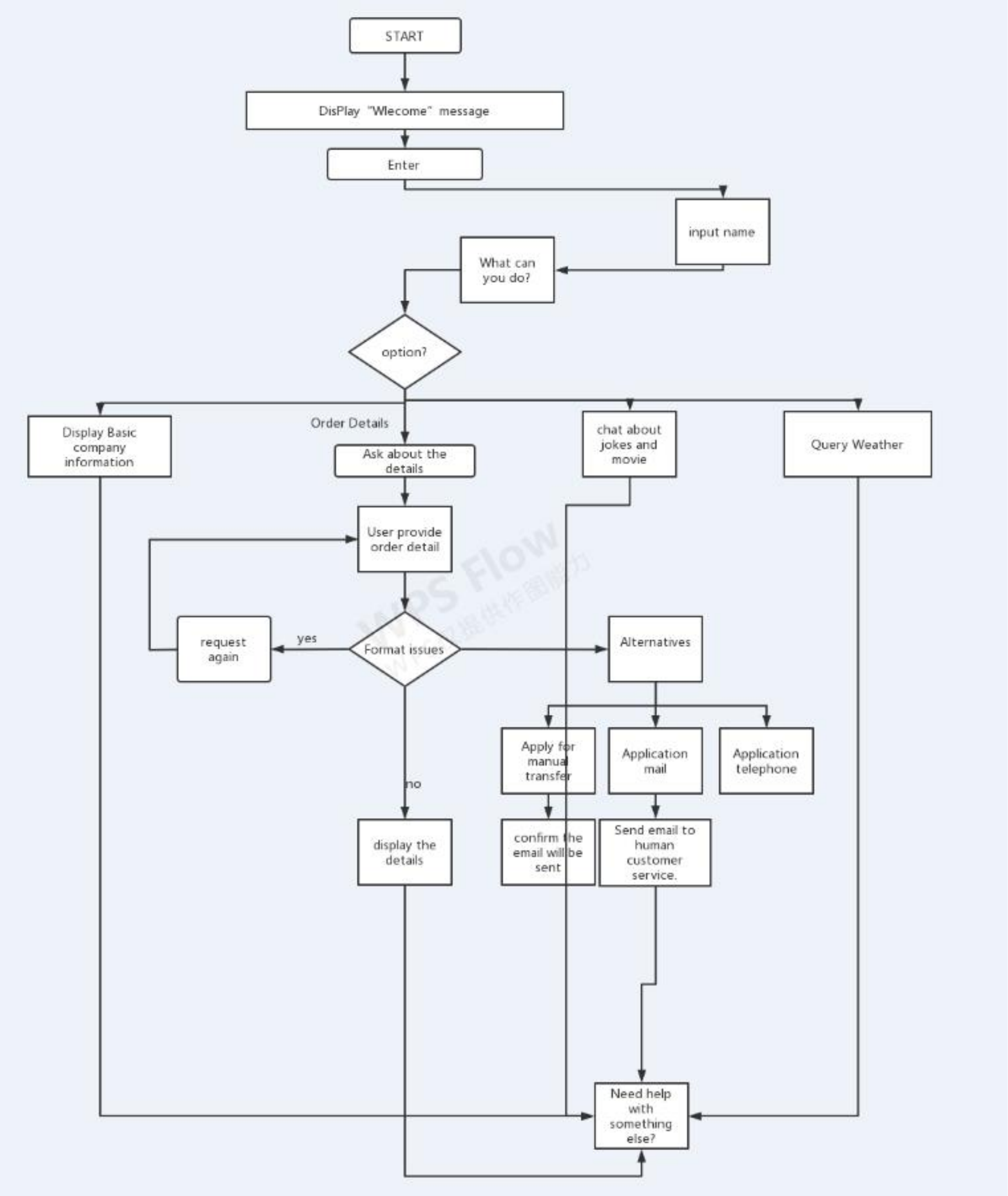

START
DisPlay "Wlecome" message
Enter
input name
What can you do?
option?
Display Basic company information
Order Details
Ask about the details
chat about jokes and movie
Query Weather
User provide order detail
request again
yes
Format issues
Alternatives
Apply for manual transfer
Application mail
Application telephone
no
display the details
confirm the email will be sent
Send email to human customer service.
Need help with something else?

Figure 3 General system operation flow

When entering the chat robot, the robot will ask who you are. After introducing yourself, you will have a variety of functions to choose from if you ask for help. Of course, it can also be triggered in small talk. If the user is in a bad mood, the robot will tell jokes to make the user happy. If the user tries to chat with the robot on some movies, the robot will try to respond. When the customer asks to inquire about product information, if the chat robot can handle it, it will continue to handle it. If the relevant information can't be processed, it will be given to the user to choose three manual takeover schemes.

5. Chatbot Development

This section will describe the overall development efforts, including integration, undertaken for your chatbot. This section should not take more than ***five to six pages.***

5.1 Development Environment

Depending on the way used, describe your development environment, which includes both hardware and software specifications.

Development environments are as follows:

For the software:

Processor Intel (R) Core (TM) i7-9750H CPU @ 2.60GHz 2.59 GHz

Tape RAM 16.0 GB (15.8 GB available)

System type 64 bit operating system, x64 based processor

For the hardware:

Using PC server.

For the developing tools:

Visual Studio Code + SQLite

Rasa Version : 3.2.8

Minimum Compatible Version: 3.0.0

Rasa SDK Version : 3.2.1

Python Version : 3.7.13

Operating System : Windows-10-10.0.19041-SP0

Python Path : E:\Anaconda\Ana\envs\installingrasa2\python.exe

[1]. Necessary components like stories, intents, slots, entities, custom actions are vital, but it's also necessary to add some more rules, forms, and fallbacks as we need to build a more powerful chatbot. All of which could be for either retrieving information from an external source, or storing user-provided information on external database, or a combination of both.

[2]. Secondly, tools like rasa-core and rasa-nlu are obviously needed because of different training models and natural language process to comprehend intents and fixes slots.
Rasa NLU: used to understand user messages, including intention recognition and entity recognition. It will convert user input into structured data.
Rasa Core: It is a dialogue management platform for holding dialogues and deciding what to do next.
Rasa x is also used, which is a tool that helps you build, improve, and deploy AI Assistants supported by the Rasa framework. Rasa X includes user interfaces and REST APIs.

[3]. Technologies.
Firstly, it has a multi-channel customer experience. Rasa includes 10 built-in messaging channels, plus endpoints for custom channels. Engage customers across messaging platforms, powered by a single backend assistant.
Secondly, High performance architecture, making overwhelmed call centers a thing of the past. Rasa's robust architecture scales up to meet high traffic demand, without putting pressure on human support agents.
Lastly, Versatile, reusable infrastructure. Avoiding reinventing the wheel with every new virtual assistant. Rasa's technology is transferable across use cases, so you can re-use skills and apply work from previous projects to new opportunities.

To act more vivid and more like a personal assistant, we decided to add one more function to fill the slot which saves the users' name as an entity, and will be added in the next conversation flows with the name on.

[4]. APIs：

Enabling the HTTP API

By default, running a Rasa server does not enable the API endpoints. Interactions with the bot can happen over the exposed webhooks/<channel>/webhook endpoints.

To enable the API for direct interaction with conversation trackers and other bot endpoints, add the --enable-api parameter to the run command: rasa run --enable-api

Note that starting the server with an NLU-only model, not all the available endpoints can be called. Some endpoints will return a 409 status code, as a trained dialogue model is needed to process the request.

By default, the HTTP server runs as a single process. We can change the number of worker processes using the SANIC_WORKERS environment variable.

NLU-Only Server

You can run an NLU-only server and use the HTTP API to connect to it. Connecting to an NLU server# You can connect a Rasa NLU-only server to a separately running Rasa dialogue management only server by adding the connection details to the dialogue management server's endpoint configuration file: endpoints.yml

nlu: url: "http://<your nl u host>:<your nlu port>"token: <token> # [optional] token_name: <name of the token> # [optional] (default: token)

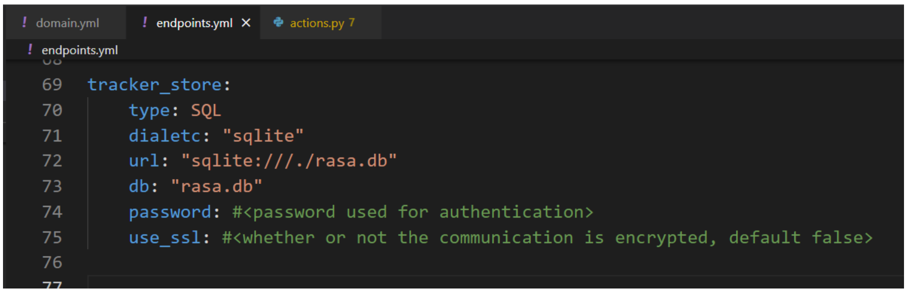
The token and token_name refer to optional authentication parameters. The dialogue management server should serve a model that does not include an NLU model. To obtain a dialogue management only model, train a model with rasa train core or use rasa train but exclude all NLU data. When the dialogue management server receives a message, it will send a request to http://<your nlu host>:<your nlu port>/model/parse and use the parsing information returned.

5.2 Integration

Since we are using RASA core(3.x.x) from the start, and it's not easy to downgrade the core to 2.8.x to adapt to Rasa X. Therefore, we choose to use Tracker store be our only viable alternative, even though it can be quite annoying. Also, I tried to use to use RedisTrackerStore, which occasionally work but not full functional, those tries are attached in 5.2.2.

5.2.1 Tracker Store

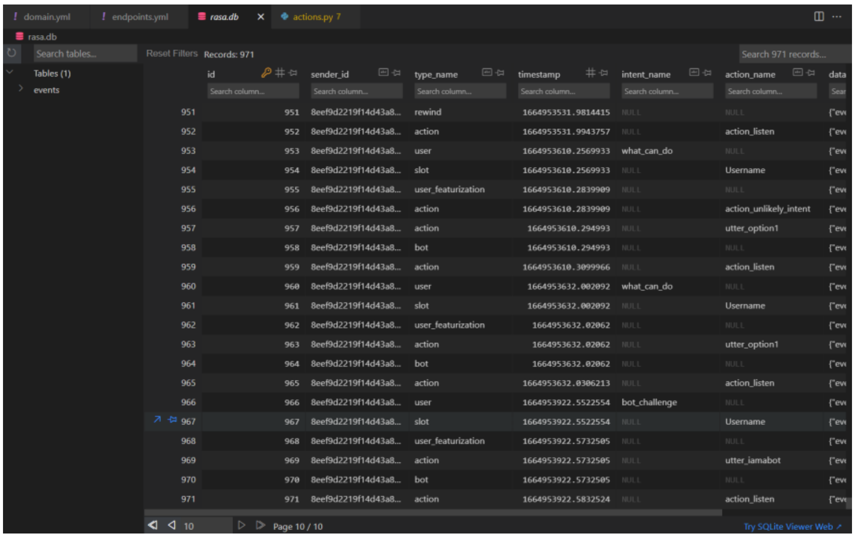
Implementing Tracker Order is easy, there are three files need to be edited. First, of course endpoints.yml:



```
tracker_store:
    type: SQL
    dialetc: "sqlite"
    url: "sqlite:///./rasa.db"
    db: "rasa.db"
    password: #<password used for authentication>
    use_ssl: #<whether or not the communication is encrypted, default false>

```

Figure 4 Setup in endpoints.yml

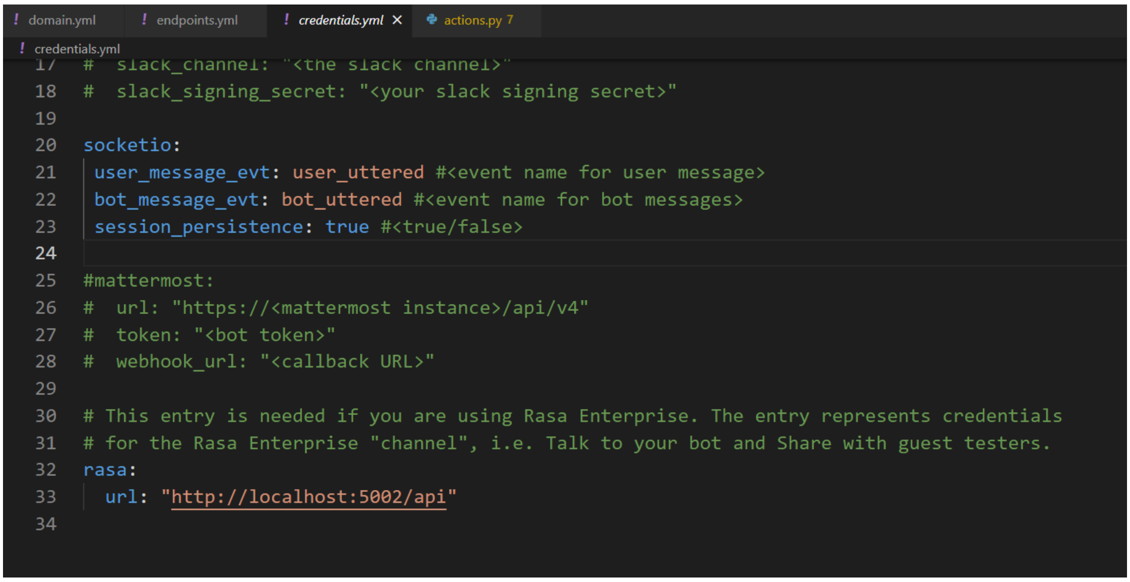
In which ,we used SQLite to store the tracker data, and we use the self-contained SQLite Viewer to check the dialogue data:



	id	sender_id	type_name	timestamp	intent_name	action_name	data
951	951	8eef9d2219f14d43a8...	rewind	1664953531.9814415	NULL	NULL	{"ev
952	952	8eef9d2219f14d43a8...	action	1664953531.9943757	NULL	action_listen	{"ev
953	953	8eef9d2219f14d43a8...	user	1664953610.2569933	what_can_do	NULL	{"ev
954	954	8eef9d2219f14d43a8...	slot	1664953610.2569933	NULL	Username	{"ev
955	955	8eef9d2219f14d43a8...	user_featurization	1664953610.2839909	NULL	NULL	{"ev
956	956	8eef9d2219f14d43a8...	action	1664953610.2839909	NULL	action_unlikely_intent	{"ev
957	957	8eef9d2219f14d43a8...	action	1664953610.294993	NULL	utter_option1	{"ev
958	958	8eef9d2219f14d43a8...	bot	1664953610.294993	NULL	NULL	{"ev
959	959	8eef9d2219f14d43a8...	action	1664953610.3099966	NULL	action_listen	{"ev
960	960	8eef9d2219f14d43a8...	user	1664953632.002092	what_can_do	NULL	{"ev
961	961	8eef9d2219f14d43a8...	slot	1664953632.002092	NULL	Username	{"ev
962	962	8eef9d2219f14d43a8...	user_featurization	1664953632.02062	NULL	NULL	{"ev
963	963	8eef9d2219f14d43a8...	action	1664953632.02062	NULL	utter_option1	{"ev
964	964	8eef9d2219f14d43a8...	bot	1664953632.02062	NULL	NULL	{"ev
965	965	8eef9d2219f14d43a8...	action	1664953632.0306213	NULL	action_listen	{"ev
966	966	8eef9d2219f14d43a8...	user	1664953922.5522554	bot_challenge	NULL	{"ev
967	967	8eef9d2219f14d43a8...	slot	1664953922.5522554	NULL	Username	{"ev
968	968	8eef9d2219f14d43a8...	user_featurization	1664953922.5732505	NULL	NULL	{"ev
969	969	8eef9d2219f14d43a8...	action	1664953922.5732505	NULL	utter_iamabot	{"ev
970	970	8eef9d2219f14d43a8...	bot	1664953922.5732505	NULL	NULL	{"ev
971	971	8eef9d2219f14d43a8...	action	1664953922.5832524	NULL	action_listen	{"ev

Figure 5 Dialogue data stored by Tracker Store

Secondly, to connect with HTML5, I choose to use the Socket.IO, since Socket.io provides event-based real-time bi-directional communication that is a very important requirement for real-time data transfer between Browser and Webserver. WebSocket is a new communication protocol in HTML5, featuring a server that can actively push information to the client and a client that can actively send information to the server, which is a true two-way equal dialogue and belongs to a kind of server push technology. And for this specific case, it should be filled with event name for both user message and bot message in order to save enough data to analyze. Meanwhile, the session_persistence should also be turn on, which directs a client's requests to the same backend web or application server for the duration of a "session" or the time it takes to complete a task or transaction.(quate What is Session Persistence? - NGINX)

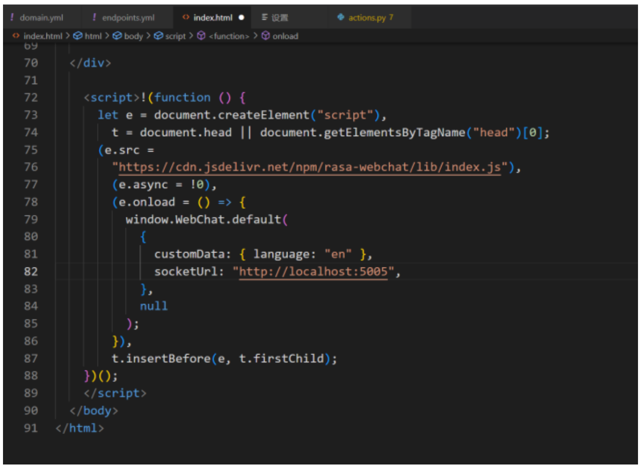


```yaml
#  slack_channel: "<the slack channel>"
#  slack_signing_secret: "<your slack signing secret>"

socketio:
  user_message_evt: user_uttered #<event name for user message>
  bot_message_evt: bot_uttered #<event name for bot messages>
  session_persistence: true #<true/false>

#mattermost:
#  url: "https://<mattermost instance>/api/v4"
#  token: "<bot token>"
#  webhook_url: "<callback URL>"

# This entry is needed if you are using Rasa Enterprise. The entry represents credentials
# for the Rasa Enterprise "channel", i.e. Talk to your bot and Share with guest testers.
rasa:
  url: "http://localhost:5002/api"

```

Figure 6 Socket IO—a way to connect web

Thirdly, I added some elements in index.html ,there are some crucial points should be pointed out.

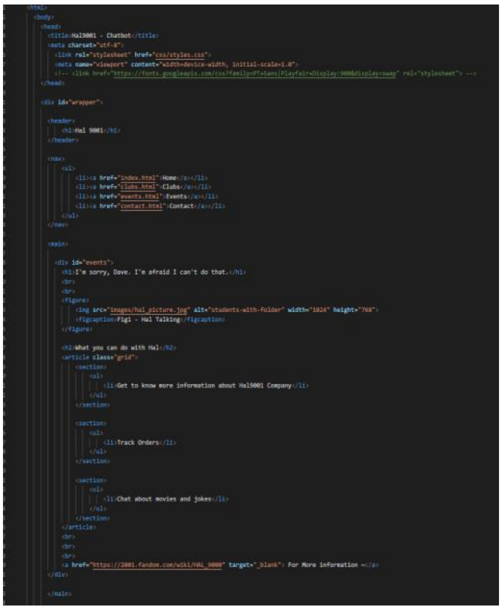
- The **Header** to communicate with each other is very small, probably only 2Bytes
- socketUrl should point ar localhost. And can be changed to other channels if needed.



```
  </div>

    <script>!(function () {
      let e = document.createElement("script"),
        t = document.head || document.getElementsByTagName("head")[0];
      (e.src =
        "https://cdn.jsdelivr.net/npm/rasa-webchat/lib/index.js"),
        (e.async = !0),
        (e.onload = () => {
          window.WebChat.default(
            {
              customData: { language: "en" },
              socketUrl: "http://localhost:5005",
            },
            null
          );
        }),
        t.insertBefore(e, t.firstChild);
    })();
    </script>
  </body>
</html>
```

Figure 7 connecting to localhost through rasa-webchat

I added some elements to the index.html and css file in order to make the interface more beautiful and to meet the testing requirements at the final delivery.

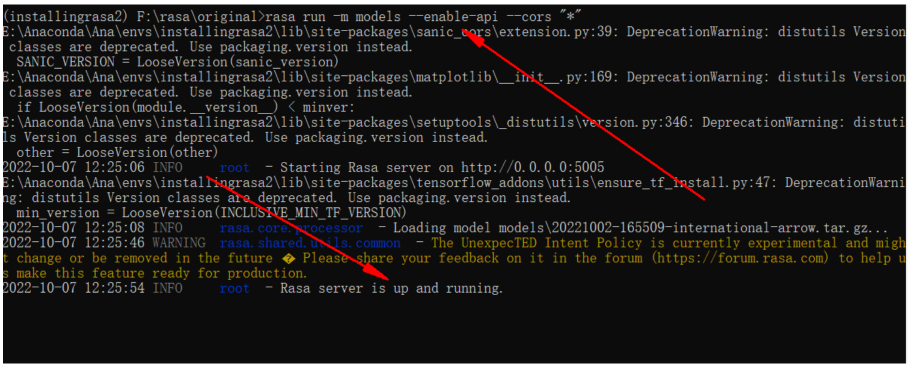


```
<html>
  <body>
    <head>
      <title>Hal9001 - Chatbot</title>
      <meta charset="utf-8">
        <link rel="stylesheet" href="css/styles.css">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
        <!-- <link href="https://fonts.googleapis.com/css?family=PT+Sans|Playfair+Display:900&display=swap" rel="stylesheet"> -->
    </head>

    <div id="wrapper">

      <header>
          <h1>Hal 9001</h1>
      </header>

      <nav>
          <ul>
              <li><a href="index.html">Home</a></li>
              <li><a href="clubs.html">Clubs</a></li>
              <li><a href="events.html">Events</a></li>
              <li><a href="contact.html">Contact</a></li>
          </ul>
      </nav>

      <main>

        <div id="events">
          <h1>I'm sorry, Dave. I'm afraid I can't do that.</h1>
          <br>
          <br>
          <figure>
              <img src="images/hal_picture.jpg" alt="students-with-folder" width="1024" height="768">
              <figcaption>Fig1 - Hal Talking</figcaption>
          </figure>

          <h2>What you can do with Hal</h2>
          <article class="grid">
              <section>
                  <ul>
                      <li>Get to know more information about Hal9001 Company</li>
                  </ul>
              </section>

              <section>
                  <ul>
                      <li>Track Orders</li>
                  </ul>
              </section>

              <section>
                  <ul>
                      <li>Chat about movies and jokes</li>
                  </ul>
              </section>
          </article>
          <br>
          <br>
          <br>
          <a href="https://2001.fandom.com/wiki/HAL_9000" target="_blank"> For More information →</a>
      </div>

      </main>
```

Figure 8 html in this case

Then we are here to enable the APIs to connect with channels:

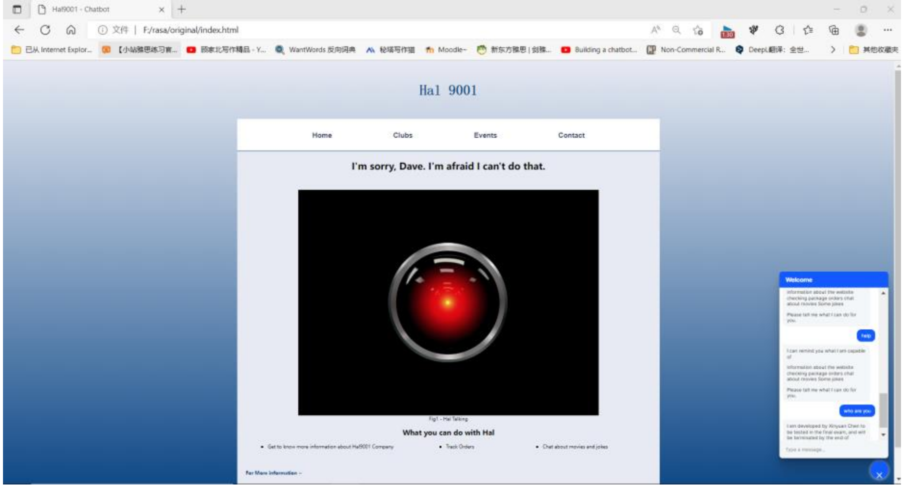
rasa run -m models --enable-api --cors ""*



```
(installingrasa2) F:\rasa\original>rasa run -m models --enable-api --cors "*"
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\sanic_cors\extension.py:39: DeprecationWarning: distutils Version
 classes are deprecated. Use packaging.version instead.
  SANIC_VERSION = LooseVersion(sanic_version)
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\matplotlib\__init__.py:169: DeprecationWarning: distutils Version
 classes are deprecated. Use packaging.version instead.
  if LooseVersion(module.__version__) < minver:
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\setuptools\_distutils\version.py:346: DeprecationWarning: distuti
ls Version classes are deprecated. Use packaging.version instead.
  other = LooseVersion(other)
2022-10-07 12:25:06 INFO     root  - Starting Rasa server on http://0.0.0.0:5005
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\tensorflow_addons\utils\ensure_tf_install.py:47: DeprecationWarni
ng: distutils Version classes are deprecated. Use packaging.version instead.
  min_version = LooseVersion(INCLUSIVE_MIN_TF_VERSION)
2022-10-07 12:25:08 INFO     rasa.core.processor  - Loading model models\20221002-165509-international-arrow.tar.gz...
2022-10-07 12:25:46 WARNING  rasa.shared.utils.common  - The UnexpecTED Intent Policy is currently experimental and migh
t change or be removed in the future � Please share your feedback on it in the forum (https://forum.rasa.com) to help u
s make this feature ready for production.
2022-10-07 12:25:54 INFO     root  - Rasa server is up and running.
```

Figure 9 Enable APIs and get rasa running

Then copy the absolute path of index.html and paste it to any web page and it shows, along with dialouge data stored in rasa.db:



I'm sorry, Dave. I'm afraid I can't do that.

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

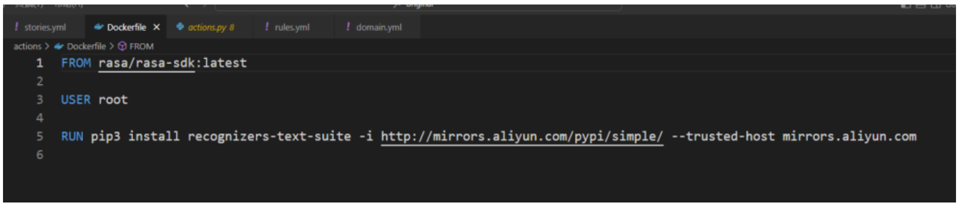
Please tell me what I can do for you.

I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the end of

Figure 10 Onboarding page of the bot

5.2.2 Cloud integration:

This can be really simple, first, download Docker, and upload this file on the cloud and run it with : docker-compose.



```
FROM rasa/rasa-sdk:latest

USER root

RUN pip3 install recognizers-text-suite -i http://mirrors.aliyun.com/pypi/simple/ --trusted-host mirrors.aliyun.com

```

Figure 11 Docker compose

Then change the static ip into my public ip:

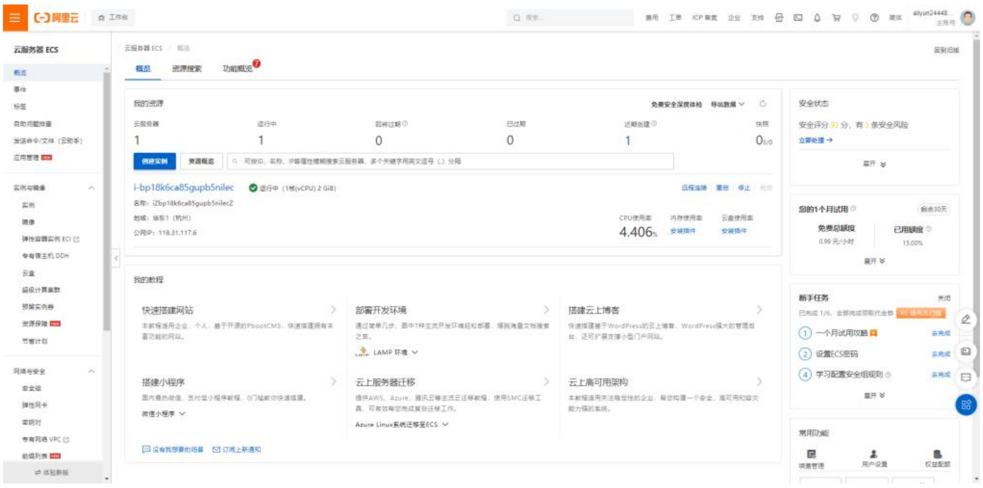


Figure 12 Upload and deploy successfully

http://118.31.117.6/

Then you can simple run on it.

(within one month better, before 11/13 2022. Please let me know if you tested later)

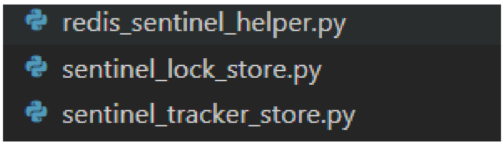
5.2.3 RedisTrackerStroe

Here I used RASA Session Data Store RedisTrackerStore Connected

Background:

Rasa session logs are stored in memory by default, but if we want to support multiple instances of bots, we need to store rasa session data in the database, and the official documentation supports single-instance redis, which cannot support redis clusters.

So here's how to use Redis cluster for session log storage. The connection here is to a Redis sentinel cluster. According to the example, you can extend the connection to the Redis cluster by modifying the corresponding code section. This code supports rasa3 version.

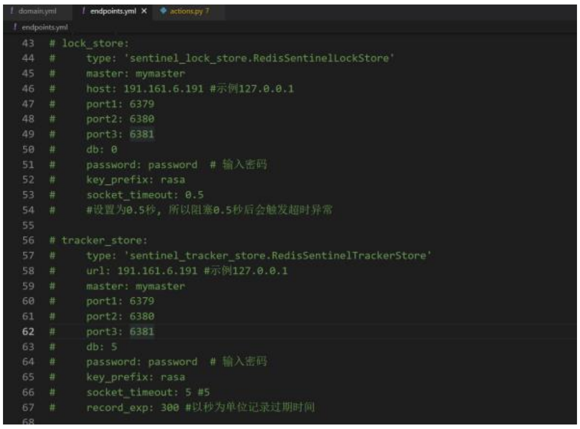


redis_sentinel_helper.py
sentinel_lock_store.py
sentinel_tracker_store.py

Figure 13 RedisTrackerStore directory example

The concrete code should be checked with the original code, here only present some rough screenshots.

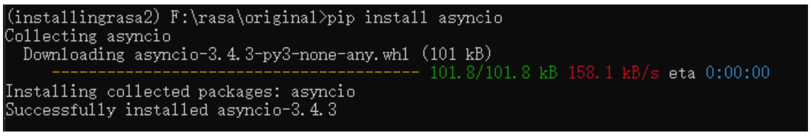
Connecting to the endpoints.



```
# lock_store:
#     type: 'sentinel_lock_store.RedisSentinelLockStore'
#     master: mymaster
#     host: 191.161.6.191 #示例127.0.0.1
#     port1: 6379
#     port2: 6380
#     port3: 6381
#     db: 0
#     password: password  # 输入密码
#     key_prefix: rasa
#     socket_timeout: 0.5
#     #设置为0.5秒，所以阻塞0.5秒后会触发超时异常

# tracker_store:
#     type: 'sentinel_tracker_store.RedisSentinelTrackerStore'
#     url: 191.161.6.191 #示例127.0.0.1
#     master: mymaster
#     port1: 6379
#     port2: 6380
#     port3: 6381
#     db: 5
#     password: password  # 输入密码
#     key_prefix: rasa
#     socket_timeout: 5 #5
#     record_exp: 300 #以秒为单位记录过期时间
```

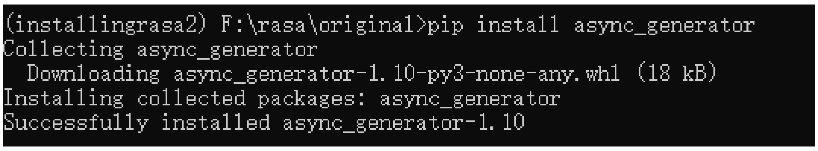
Figure 14 commented RedisTrackerStore code

Downloaded some tools:



```
(installingrasa2) F:\rasa\original>pip install asyncio
Collecting asyncio
  Downloading asyncio-3.4.3-py3-none-any.whl (101 kB)
     ---------------------------------------- 101.8/101.8 kB 158.1 kB/s eta 0:00:00
Installing collected packages: asyncio
Successfully installed asyncio-3.4.3
```

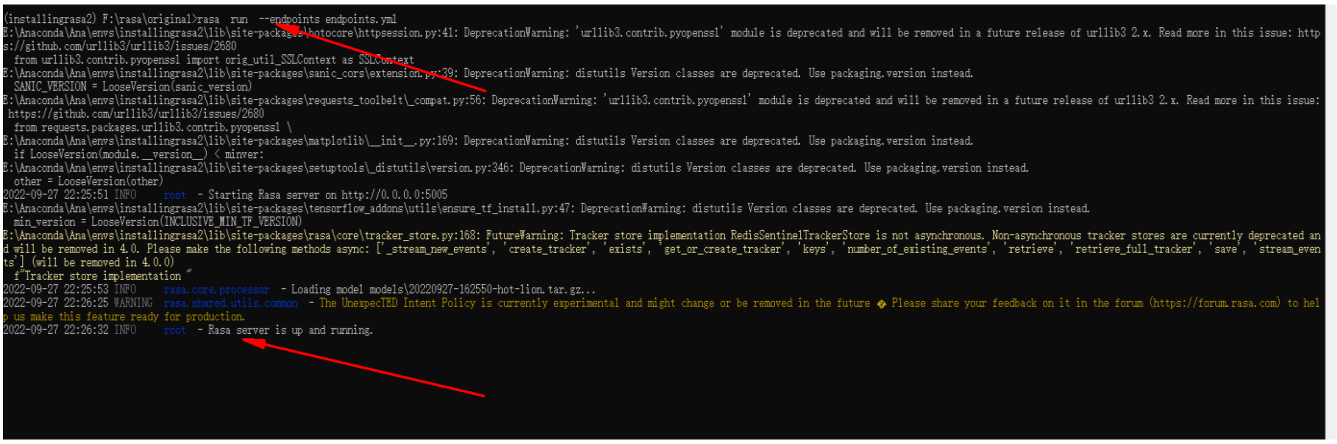
Figure 15 Asyncio downloading



```
(installingrasa2) F:\rasa\original>pip install async_generator
Collecting async_generator
  Downloading async_generator-1.10-py3-none-any.whl (18 kB)
Installing collected packages: async_generator
Successfully installed async_generator-1.10
```

Figure 16 async_generator downloading

It can be seen from the figure, it can also run on the server.



```
(installingrasa2) F:\rasa\original>rasa  run  --endpoints endpoints.yml
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\botocore\httpsession.py:41: DeprecationWarning: 'urllib3.contrib.pyopenssl' module is deprecated and will be removed in a future release of urllib3 2.x. Read more in this issue: http
s://github.com/urllib3/urllib3/issues/2680
  from urllib3.contrib.pyopenssl import orig_util_SSLContext as SSLContext
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\sanic_cors\extension.py:39: DeprecationWarning: distutils Version classes are deprecated. Use packaging.version instead.
  SANIC_VERSION = LooseVersion(sanic_version)
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\requests_toolbelt\_compat.py:56: DeprecationWarning: 'urllib3.contrib.pyopenssl' module is deprecated and will be removed in a future release of urllib3 2.x. Read more in this issue:
 https://github.com/urllib3/urllib3/issues/2680
  from requests.packages.urllib3.contrib.pyopenssl \
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\matplotlib\__init__.py:169: DeprecationWarning: distutils Version classes are deprecated. Use packaging.version instead.
  if LooseVersion(module.__version__) < minver:
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\setuptools\_distutils\version.py:346: DeprecationWarning: distutils Version classes are deprecated. Use packaging.version instead.
  other = LooseVersion(other)
2022-09-27 22:25:51 INFO     root  - Starting Rasa server on http://0.0.0.0:5005
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\tensorflow_addons\utils\ensure_tf_install.py:47: DeprecationWarning: distutils Version classes are deprecated. Use packaging.version instead.
  min_version = LooseVersion(INCLUSIVE_MIN_TF_VERSION)
E:\Anaconda\Ana\envs\installingrasa2\lib\site-packages\rasa\core\tracker_store.py:168: FutureWarning: Tracker store implementation RedisSentinelTrackerStore is not asynchronous. Non-asynchronous tracker stores are currently deprecated an
d will be removed in 4.0. Please make the following methods async: ['_stream_new_events', 'create_tracker', 'exists', 'get_or_create_tracker', 'keys', 'number_of_existing_events', 'retrieve', 'retrieve_full_tracker', 'save', 'stream_even
ts'] (will be removed in 4.0.0)
  f"Tracker store implementation "
2022-09-27 22:25:53 INFO     rasa.core.processor  - Loading model models\20220927-162550-hot-lion.tar.gz...
2022-09-27 22:26:25 WARNING  rasa.shared.utils.common  - The UnexpecTED Intent Policy is currently experimental and might change or be removed in the future � Please share your feedback on it in the forum (https://forum.rasa.com) to hel
p us make this feature ready for production.
2022-09-27 22:26:32 INFO     root  - Rasa server is up and running.
```

Figure 17 RedisTrackerSotre running

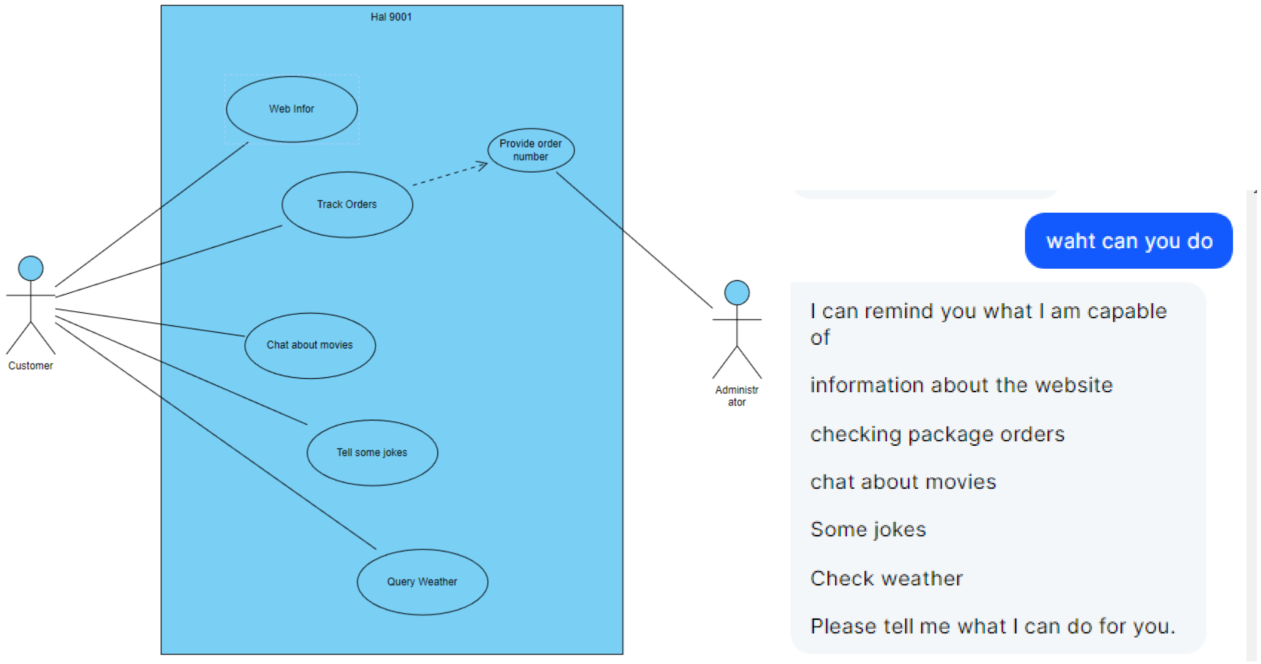
But eventually I choose to use the Tracker Order, which is more clean and easier to teach to others when applying future work.

6. Testing

Testing is really important to any project, and this part is divided into two parts, internal testing, and user testing.

6.1 Internal Testing

We can check whether the flow follows the use case the designer described above:



waht can you do

I can remind you what I am capable of

information about the website

checking package orders

chat about movies

Some jokes

Check weather

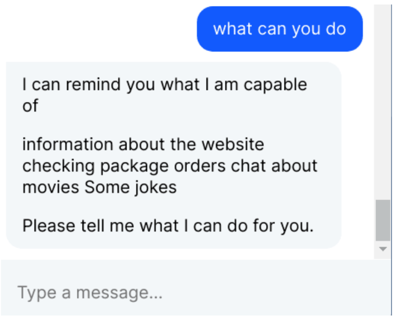
Please tell me what I can do for you.

Figure 18 Functions corresponding to Use Case

From the user case, we can clearly see the bot could understand the intent and made the proper responses, which fulfilled the function of user case.

0. what can you do User: what can you do? (Intent: what_can_do) Bot: I should remind you what I am capable of: 1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1) User: Thank you （intent: thank) Bot: Always pleasure to help you	1. Greetings User： Hi/Hey/Hello/Hiiiii/Heyyyyy --greet Bot:How should I address you---utter_fill_name	2. Entertain users User: What can you do -- intent:what can you do Bot: I can remind you what I am capable of: 1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1） ---utter_option1 User: Entertain me/ amuse me/ make me laugh/ tell me a joke/ fancy me/ --entertain_me Bot: Here's one: What's the shark's favorite two words? Man Overboard!! ---utter_entertain What else can I do for you? ---utter_anything_else User:no/nope/n/none/not -- intent: deny bot:I will be back(thumbs up). --action: utter_goodbye

Table 6-1 Dialogue-1



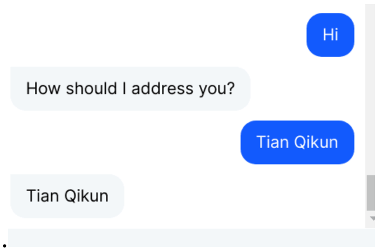
what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

0.



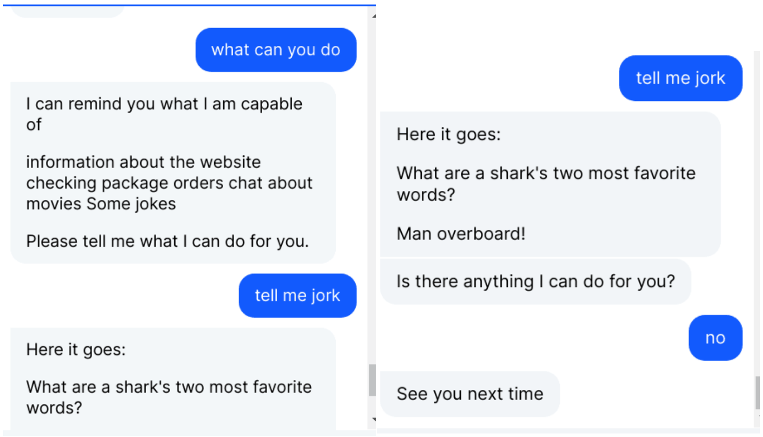
Hi

How should I address you?

Tian Qikun

Tian Qikun

1.



what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

tell me jork

Here it goes:

What are a shark's two most favorite words?

tell me jork

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

no

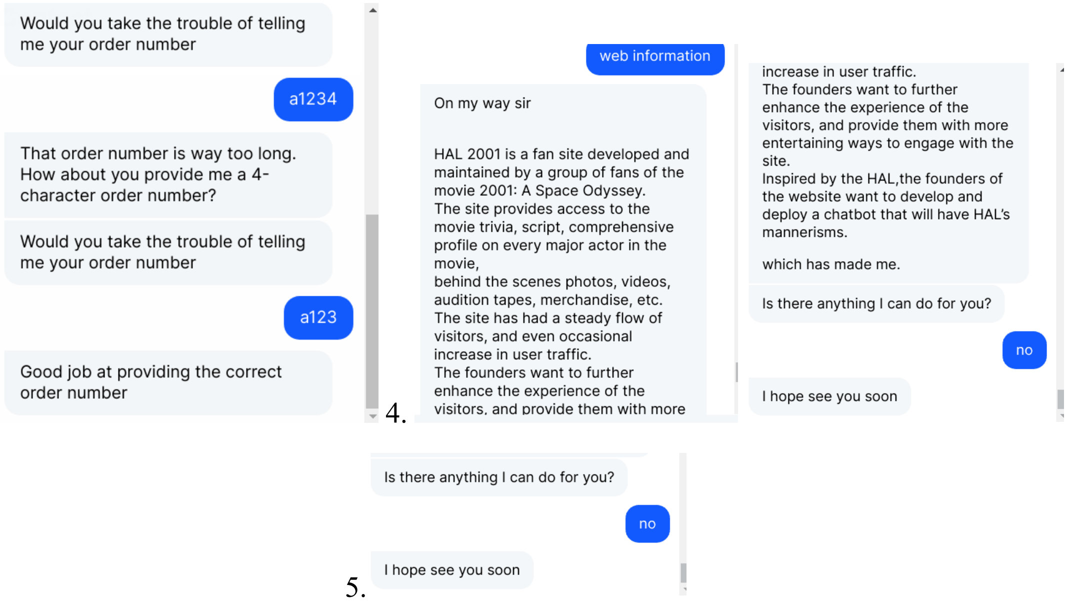
See you next time

2.

Figure 19 Dialogue-1-test

3. Track order user: I wanna check my order/where is my order/how do I check my order/please check my order (intent: my_order) bot: utter_order_query: please provide your number with 6 numbers: user: xxxxxx (intent: order_infor) bot: sure. Displayed as follows: (utter_order_infor) If there anything I can do for you sir? (utter_what_else user: (intent: deny no/ nope bot: (utter_goodbye	4. website infor user: (intent: web_infor I wanna know company information/Some website infor/tell me about your website/something about your website/some company information/show me some website information/give me website information bot: (utter_web_infor Sure. HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey. The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie, behind the scenes photos, videos, audition tapes, merchandise, etc. The site has had a steady flow of visitors, and even occasional increase in user traffic. The founders want to further enhance the experience of the visitors, and provide them with more entertaining ways to engage with the site. Inspired by the HAL,the founders of the website want to develop and deploy a chatbot that will have HAL's mannerisms. which made me. bot: (utter_anything_else user: (intent: deny bot: (utter_bye	5. Is there anything I can help you? bot: (utter_anything_else user: (intent: confirm yes bot: (utter_option1 I should remind you what I am capable of: 1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather (utter_option1)

Table 6-2 Dialogue-2



3.

Would you take the trouble of telling me your order number

a1234

That order number is way too long. How about you provide me a 4-character order number?

Would you take the trouble of telling me your order number

a123

Good job at providing the correct order number

4.

web information

On my way sir

HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey.
The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further enhance the experience of the visitors, and provide them with more

increase in user traffic.
The founders want to further enhance the experience of the visitors, and provide them with more entertaining ways to engage with the site.
Inspired by the HAL,the founders of the website want to develop and deploy a chatbot that will have HAL's mannerisms.

which has made me.

Is there anything I can do for you?

no

I hope see you soon

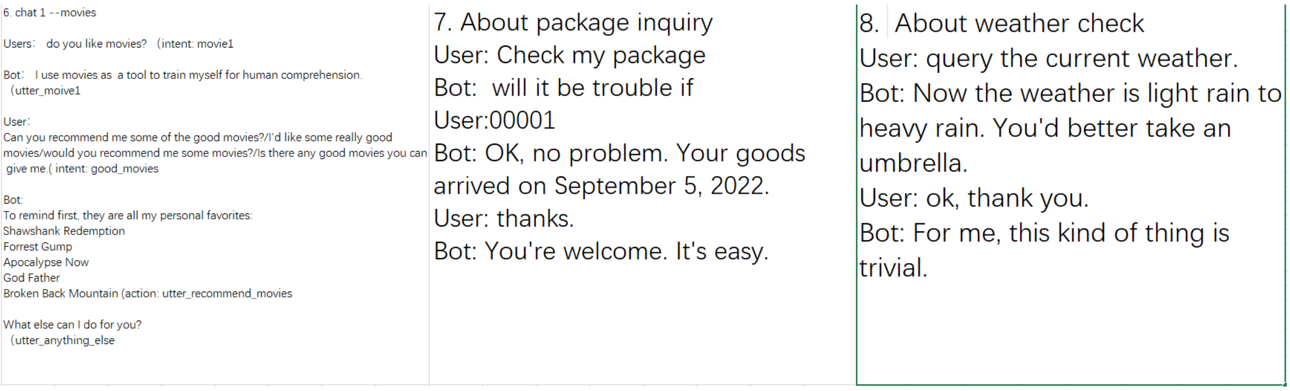
5.

Is there anything I can do for you?

no

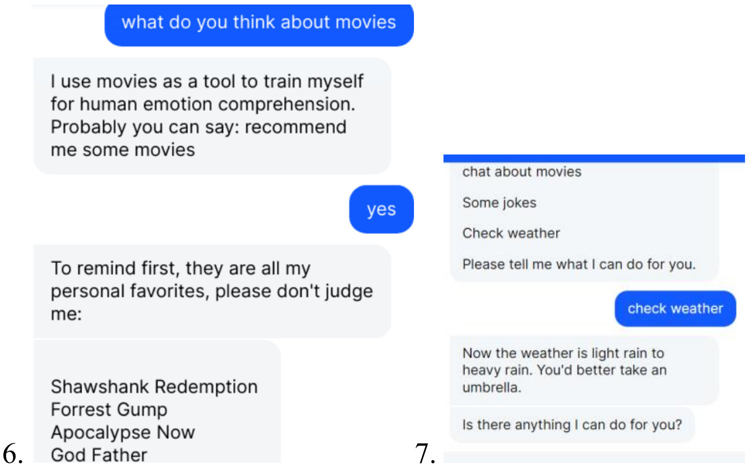
I hope see you soon

Figure 20 Dialogue-2-test



6. chat 1 --movies Users: do you like movies? (intent: movie1 Bot: I use movies as a tool to train myself for human comprehension. (utter_moive1 User: Can you recommend me some of the good movies?/I'd like some really good movies/would you recommend me some movies?/Is there any good movies you can give me.(intent: good_movies Bot: To remind first, they are all my personal favorites: Shawshank Redemption Forrest Gump Apocalypse Now God Father Broken Back Mountain (action: utter_recommend_movies What else can I do for you? (utter_anything_else	7. About package inquiry User: Check my package Bot: will it be trouble if User:00001 Bot: OK, no problem. Your goods arrived on September 5, 2022. User: thanks. Bot: You're welcome. It's easy.	8. About weather check User: query the current weather. Bot: Now the weather is light rain to heavy rain. You'd better take an umbrella. User: ok, thank you. Bot: For me, this kind of thing is trivial.

Table 6-3 Dialogue-3



what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father

6.

chat about movies
Some jokes
Check weather
Please tell me what I can do for you.

check weather

Now the weather is light rain to heavy rain. You'd better take an umbrella.

Is there anything I can do for you?

7.

Figure 21 Dialogue-3-test

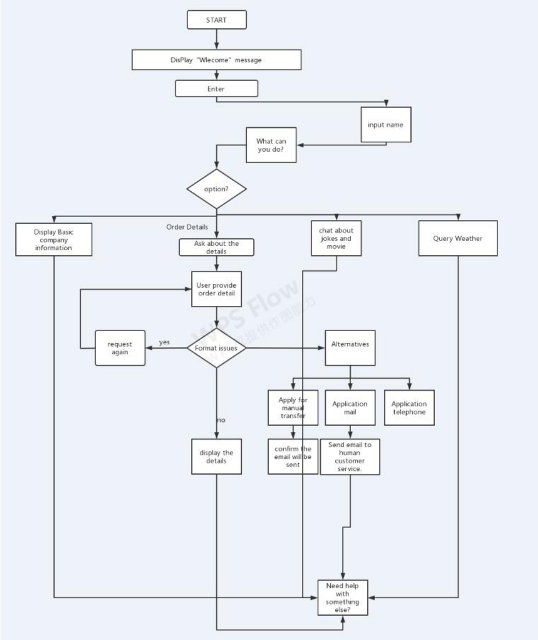

START
DisPlay "Wlecome" message
Enter
input name
What can you do?
option?
Display Basic company information
Order Details
Ask about the details
chat about jokes and movie
Query Weather
User provide order detail
request again
yes
Format issues
Alternatives
Apply for manual transfer
Application mail
Application telephone
no
display the details
confirm the email will be sent
Send email to human customer service.
Need help with something else?
WPS Flow

Figure 22 System Operation flow

The test results are just following the operation system design!

From the above internal testing, we can say that in some way, the bot is meeting the standards of the customer's requirments.

However, I still want to give some feedback to the developer:

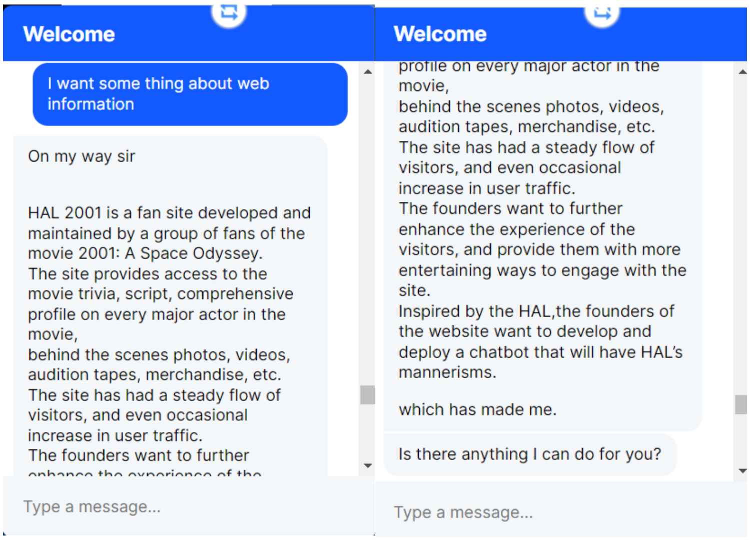
1. We tested internally, and find most occasions, we use “ok” instead of “please recommend me some movies”, so you should changed the story: chat1 movie, change the intent into “affirm” instead of “good_movies”. Which you can see in the nlu.yml and domain.yml.
2. Should consider more about the track order part, sometimes responding a number would not react.
3. Fallback can be done better.The bot seems a little stupid.
4. When I ask same questions four times in a row, it response the same, should be better? Maybe it's also ok, but less human being.
5. Maybe more flexiable? it reacts too slow.(Maybe it's not what you can control)

6.2 User Testing

Requirements:

1. ○ information about the website

Screenshots :



I want some thing about web information

On my way sir

HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey.
The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further

profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further enhance the experience of the visitors, and provide them with more entertaining ways to engage with the site.
Inspired by the HAL,the founders of the website want to develop and deploy a chatbot that will have HAL’s mannerisms.

which has made me.

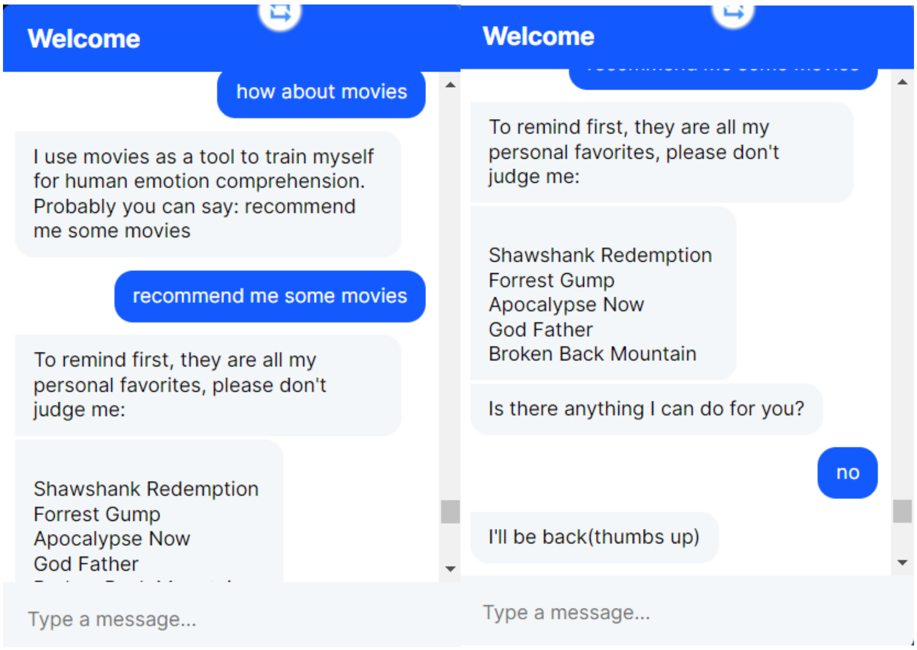
Is there anything I can do for you?

Figure 23 User Testing-1

The system is able to meet our requirement: information about the website. We are able to ask the robot to get the information we want about the website.

2. ○ pleasantries

Screenshots:



how about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

recommend me some movies

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father
Broken Back Mountain

Is there anything I can do for you?

no

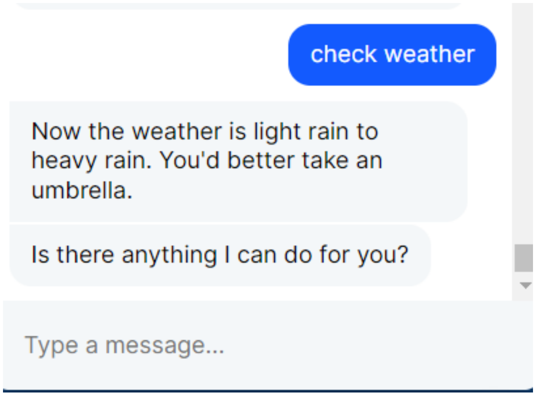
I'll be back(thumbs up)

Figure 24 User Testing-2

The system is capable of meeting our requirement: pleasantries. For example, when we ask the robot about a movie, the robot is able to give us a response, and when we follow up, the robot is able to respond. When we want the robot to recommend a few movies, the robot is also able to recommend a few great movies for us. For this aspect, there is a wide range of aspects involved, and the robot is able to respond appropriately to whatever we say.

3. ○ weather

Screenshots:



check weather

Now the weather is light rain to heavy rain. You'd better take an umbrella.

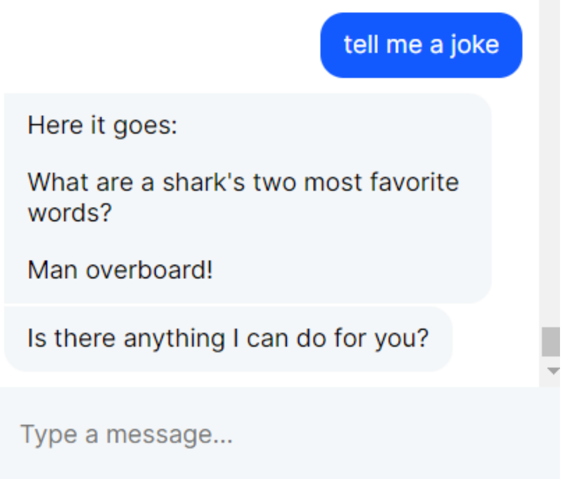
Is there anything I can do for you?

Figure 25 User Testing-3

The system is able to meet our requirement: weather. Weather is an essential topic in life, whether we travel or not, our lives are tied to the weather, so this is essential. When we ask the robot about the weather, the robot responds to weather-related questions and provides friendly reminders. This also reflects the role of the previous requirement.

4. ○ jokes

Screenshots :



tell me a joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

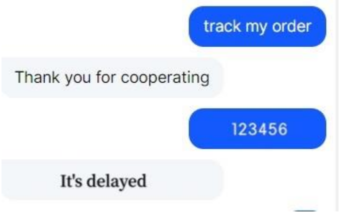
Is there anything I can do for you?

Figure 26 User Testing-4

The system was able to meet our requirement: jokes. Our character requirement for the robot is humorous and dark, so being able to please the user is its ability, so telling jokes is one of its skills. When we asked it to tell a joke, it was able to tell a joke that amused people.

5.

- Address customer grievances in a typical "**HAL**" fashion
  - Merchandise grievances are mostly related to order delays, damaged packages, incorrect packages, etc.



track my order

Thank you for cooperating

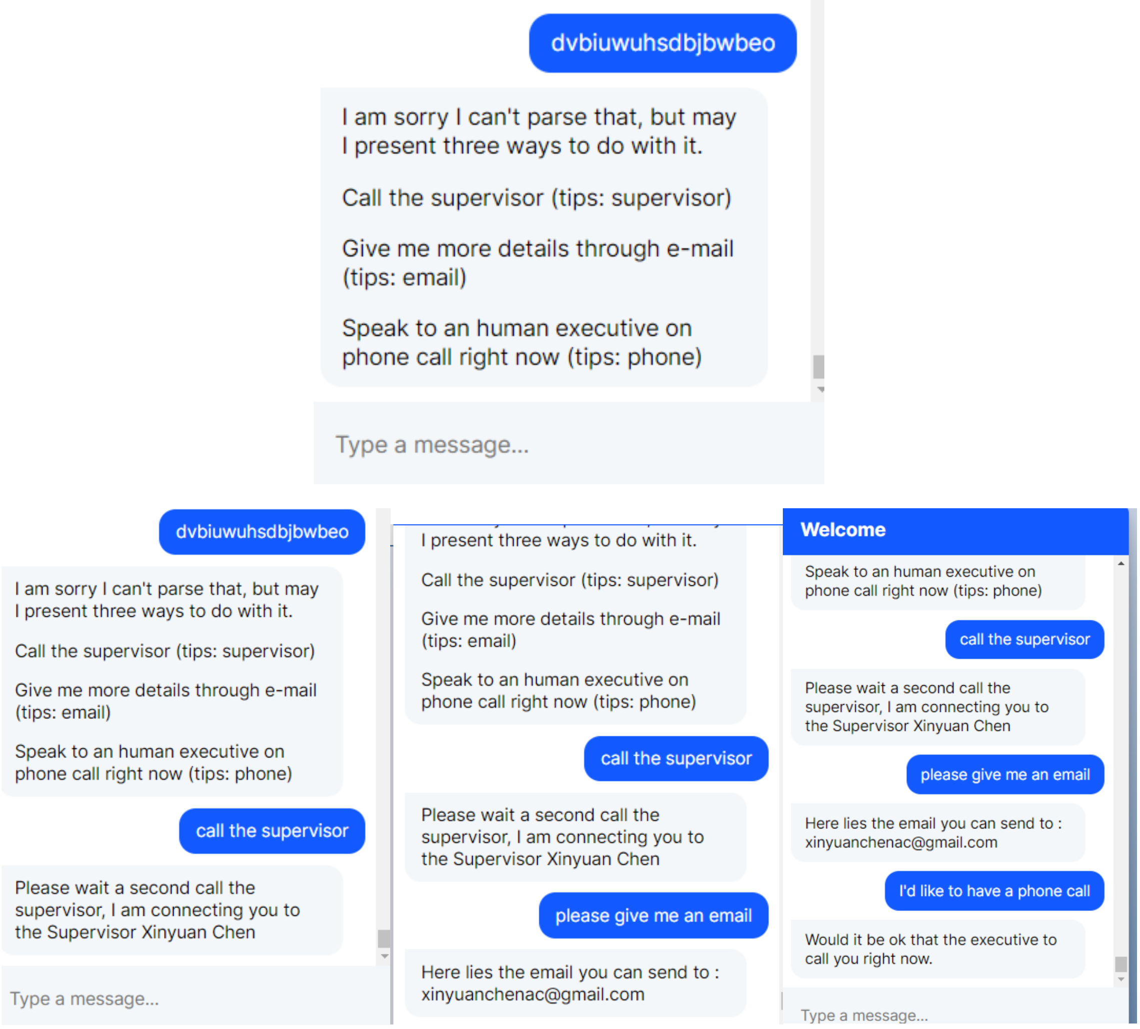
123456

It's delayed

Figure 27 track order

5 . Three approaches to deal with unexpected query:

- If faced with any issues while dealing with any of the above user requests, the chatbot should be able to provide an alternative to address the customer's queries. The alternatives are…
    - connecting to a human supervisor and chat with them
        - Once the user selects this alternative, the bot should indicate that it's connecting to a human supervisor. Display the supervisor's name as well.
    - or ask the user to provide their detailed query in an email
        - Upon selecting this alternative, the bot should provide the user the email-id where they can send their query
    - or ask the user if they would like to speak to an executive right away over a phone call.
        - In this alternative, the bot should first ask the user for their phone number, and then take permission to have one of the human executives call that number



dvbiuwuhsdbjbwbeo

I am sorry I can't parse that, but may I present three ways to do with it.

Call the supervisor (tips: supervisor)

Give me more details through e-mail (tips: email)

Speak to an human executive on phone call right now (tips: phone)

Type a message...

dvbiuwuhsdbjbwbeo

I am sorry I can't parse that, but may I present three ways to do with it.

Call the supervisor (tips: supervisor)

Give me more details through e-mail (tips: email)

Speak to an human executive on phone call right now (tips: phone)

call the supervisor

Please wait a second call the supervisor, I am connecting you to the Supervisor Xinyuan Chen

Type a message...

I present three ways to do with it.

Call the supervisor (tips: supervisor)

Give me more details through e-mail (tips: email)

Speak to an human executive on phone call right now (tips: phone)

call the supervisor

Please wait a second call the supervisor, I am connecting you to the Supervisor Xinyuan Chen

please give me an email

Here lies the email you can send to : xinyuanchenac@gmail.com

Welcome

Speak to an human executive on phone call right now (tips: phone)

call the supervisor

Please wait a second call the supervisor, I am connecting you to the Supervisor Xinyuan Chen

please give me an email

Here lies the email you can send to : xinyuanchenac@gmail.com

I'd like to have a phone call

Would it be ok that the executive to call you right now.

Type a message...

Figure 28 three approaches

6. It's also deployed on the cloud: http://118.31.117.6/

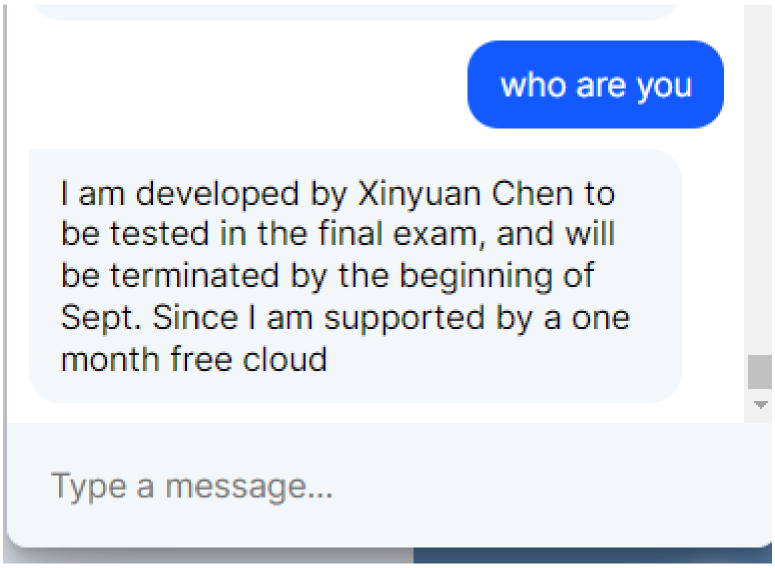
Which meets my requirement:

- Just like the company's primary app, the chatbot should be hosted on cloud

7. for this part:

- The company expects customers from all walks of life. The bot should have a straightforward and respectable tone, using formal language. However, it will always be objective, even if it would mean offending someone.

I would say the occasion that when I questioned it about ‘who are you’ shows the most:



who are you

I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the beginning of Sept. Since I am supported by a one month free cloud

Figure 29 Tune

In general, the system meets most of our needs for robots, can help us achieve our purpose, and through testing, we are quite satisfied.

7. Conclusion

This part concludes all the requirement engineering, design, develop, test and further works could be done if give more chances.

The Hal site has a steadily growing flow of visitors, and the founders want to provide the users with a more entertaining way to engage with the site, so according to their need, the bot should be aware of providing information about the website, and chat pleasantries, track packages, query weathers, in order to deal with the growing need of customers' demands. And because the users are from all walks of life. The bot should have a straightforward and respectable tone, using formal language. However, it will always be objective, even if it would mean offending someone. The dialogue design for this would be little difficult. And checking packages needs a database which can be queried through many ways.

The solution we came across can be displayed in the following process: First, make sure all the functional requirements, and generates reasonable dialogues to fit the functions, first we created the corresponding intent to each function, like intent: entertain_me, then add examples to nlu.yml to train, then write corresponding utterances to react to the intent, then write stories.yml, with intents and utterances, along with actions when situations like getting slots and querying database.

To the integration part, we applied two approaches, one on localhost through SocketIO by using TrackerStore to store the dialogue progress, one on a cloud, writing a nginx in Docker-compose.yml to upload this bot. Then run it on the cloud with public, or locally, enabling all APIs on terminal with 'rasa run -m models --enable-api --cors "*"' , then copy and paste the absolute path in any webpage. Then shows the onboarding page with introduction information to the bot, which give the user a good first impression.

If there would be any benefits of using my chatbot, it would be well written and clearly instructed structure of coding and dialogue, which ensure the users would not be misguided with any distraction.

There are still some existing problems, firstly, the form sometimes should not work well, after testing some texts, even I have to kill the process and run it again to get it right. Secondly, previous dialogues appear in the initial chatbot before you enter greetings. Thirdly, because of the existence of fallback action, many stories have to be fixed in the rules.yml, which I am really pissed of. Lastly, since adding some part of config, the responding time became really slow, like one message one second.

Base on the user testing, we would say that, this bot may not be perfect, but it can react the original target exactly. As a domain specific bot, it can serve well in the previous functionalities, and also able to chat freely a little bit. But still, the bot sometimes gives some unintended answers that influence the user experience. Also, more pleasantries are welcomed.

To further work if any chances are given, I would say there are three things I want to change improve. First, the actions can be digger further, it can be customed, like querying a link, that contains the information the user provides. Secondly, APIs can be done also, like requesting json from some open web, that truly consists of some weather information. Thirdly, it can handle better with identifying different threshold of different confidences. I don't have the time to test which is the best threshold for our bot, I wish I could have more time.

In conclusion, this bot is only a primary domain specific bot that can meet the customers' requirements exactly.

References

[1] 邓博.(2019).基于特定领域客服机器人的研究与实现(硕士学位论文,西安电子科技大学).https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202001&filename=1020001122.nh

[2] arjalainen, A. (2018). *Designing chatbot for DevOps*. University of Oulu.

[3] Karjalainen, T. & Kukka, J. (2020). *Kelan Kanta -palveluiden chatbot tulevaisuuden työkaluna digitaalisessa asiakaspalvelussa*.

[4] Yang, X. (2020). *Understanding chatbot service encounters: Consumers' satisfactory and dissatisfactory experiences*. University of Oulu.

[5] Leinonen, N. (2020). *NLP-powered analysis pipeline for customer interactions with a chatbot*. University of Oulu.

[6] Ahola, T. (2020). *Tekoälyn hyödyntäminen yrityksen tuki- ja asiakaspalvelussa*.

Appendix A – List of User Stories

As a customer, I want the chatbot to provide interesting and "HAL-like" responses to relevant information entered by the user, information about the website such as weather, jokes or other light-hearted topics, or even philosophy.

As a customer, I want the chatbot to resolve customer grievances in a typically "HAL-like" manner.

I want to be able to resolve complaints about products such as delayed orders, damaged packaging, incorrect packages, etc.

As a customer, I would like the chatbot to be able to provide an alternative solution to the customer's query or even in some cases connect to a human supervisor and chat with them to resolve the issue, should the chatbot encounter any problems while handling any of the above user requests.

As a customer, I would expect that once the user chooses this alternative, the chatbot should indicate that it is connecting to the

human supervisor while also displaying the supervisor's name or asking the user to provide their detailed query in an email.

As a customer, I would expect that after choosing this alternative, the chatbot should provide the user with an email id and the chatbot could send their query to ask the user if they would like to speak with the executive over the phone immediately.

As a customer, I would like to see that in this alternative, the chatbot should first ask the user for their phone number and then ask permission for one of the human executives to call that number.

As a customer, I would like the chatbot to be hosted in the cloud, just like the company's main application

As a customer, I would like the company to integrate the chatbot into its main application, so the necessary terms should be done to make future integration possible, and this is a requirement that must be met.

As a customer, since the company expects customers from all walks of life, I would expect that the chatbot should have a simple, dignified tone and be able to use formal language. However, a chatbot will always be objective, even if it means to offend.

Appendix B – List of functional and non-functional requirements

Funtional:

1. Check information about the website

2. Chat Pleasantries

3. Query Weather

4. Ask jokes

5. Ability to respond to user questions 24 hours a day

6. the ability to have chatbots integrated into the application

7. the ability to send emails to users

8. send the user's phone number or provide a link to the user

9. the ability to provide a chat tone similar to HML

10. the ability to send timely information about movies, scripts, and actors for HAL 2001

7. allow users to participate in trivial topics

Non-functional:

1. memory footprint, without taking up too much memory

2. precise language of the chatbot, with the corresponding HAL style, even if to some extent offensive

3. the corresponding time, when the user asks a question, to be able to give a timely answer

4. the number of users, to be able to correspond to the number of users for certain statistics, statistical planning chart

Appendix C – Dialogs

0. what can you do

User: what can you do? (Intent: what_can_do）

Bot: I should remind you what I am capable of:

1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1）

User: Thank you （intent: thank)

Bot: Always pleasure to help you

1. Greetings

User ：Hi/Hey/Hello/Hiiiii/Heyyyyy **--greet**

Bot:How should I address you**---utter_fill_name**

2. Entertain users

User: What can you do -- intent:what can you do

Bot: I can remind you what I am capable of:

1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1） **---utter_option1**

User: Entertain me/ amuse me/ make me laugh/ tell me a joke/ fancy me/ **--entertain_me**

Bot:

Here's one: What's the shark's favorite two words?

Man Overboard!! **---utter_entertain**

What else can I do for you? **---utter_anything_else**

User:no/nope/n/none/not **-- intent: deny**

bot:I will be back(thumbs up). **--action: utter_goodbye**

3. Track order

user: I wanna check my order/where is my order/how do I check my order/please check my order （**intent: my_order**）

bot: **utter_order_query**： please provide your number with 6 numbers:

user: xxxxxx （**intent: order_infor**）

bot: sure. Displayed as follows: (**utter_order_infor)**

If there anything I can do for you sir? （**utter_what_else**

user: （**intent: deny**

no/ nope

bot: （**utter_goodbye**

……

4. website infor

user: （ **intent: web_infor**

I wanna know company information/Some website infor/tell me about your website/something about your website/some company information/show me some website information/give me website information

bot: （**utter_web_infor**

Sure.

HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey. The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie, behind the scenes photos, videos, audition tapes, merchandise, etc. The site has had a steady flow of visitors, and even occasional increase in user traffic. The founders want to further enhance the experience of the visitors, and provide them with more entertaining ways to engage with the site. Inspired by the HAL,the founders of the website want to develop and deploy a chatbot that will have HAL’s mannerisms.

which made me.

bot: （**utter_anything_else**

user： （**intent: deny**

bot: （**utter_bye**

---

5. Is there anything I can help you?

bot: （**utter_anything_else**

user: （**intent: confirm**

yes

bot: （**utter_option1**

I should remind you what I am capable of:

1. Website information 2. Check Packages 3.Chat about jokes and movies 4. Check weather（utter_option1）

---

6. chat 1 --movies

Users： do you like movies? （**intent: movie1**

Bot： I use movies as a tool to train myself for human comprehension. （**utter_moive1**

User：

Can you recommend me some of the good movies?/I'd like some really good movies/would you recommend me some movies?/Is there any good movies you can give me.(**intent: good_movies**

Bot:

To remind first, they are all my personal favorites:

Shawshank Redemption

Forrest Gump

Apocalypse Now

God Father

Broken Back Mountain (**action: utter_recommend_movies**

What else can I do for you?

（**utter_anything_else**

---

7. About package inquiry

User: Check my package

Bot: will it be trouble if you can provide me the package number?

User:00001

Bot: OK, no problem. Your goods arrived on September 5, 2022.

User: thanks.

Bot: You're welcome.

8。 About weather check

User: query the current weather.

Bot: Now the weather is light rain to heavy rain. You'd better take an umbrella.

User: ok, thank you.

Bot: For me, this kind of thing is trivial.

Appendix D – Git Repository

There are two approaches to do this:

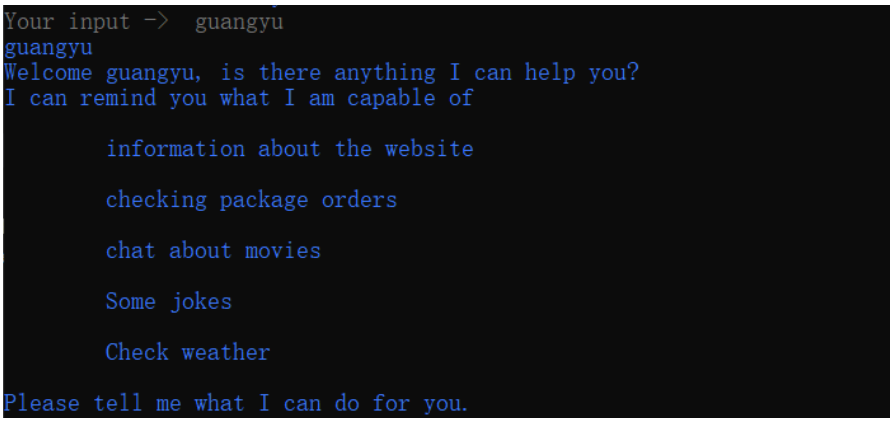
One on localhost:

Download the whole file from github: , and open it in an activated Anaconda Promot mode by:

activate xxxx

Being at this mode, there are two ways to go:

one, run "rasa shell" in the mode, and open another Anaconda Promot with typing: "rasa run actions". The dialouge would be running in terminal:



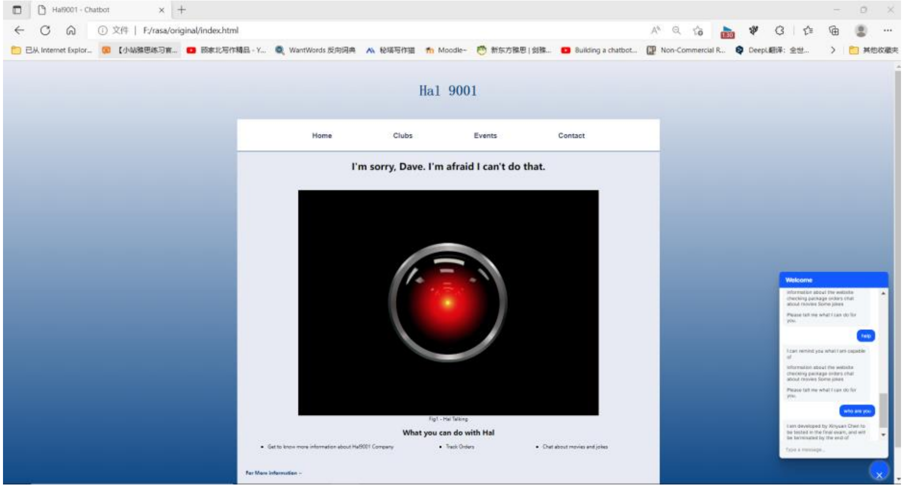
```
Your input ->  guangyu
guangyu
Welcome guangyu, is there anything I can help you?
I can remind you what I am capable of

        information about the website

        checking package orders

        chat about movies

        Some jokes

        Check weather

Please tell me what I can do for you.
```

Another way is to run the bot on the local web through enabling API:

1. run: "rasa run -m models --enable-api --cors "*""
2. then run "rasa run actions" on the other Anaconda Promot
3. copy the absolute path of the index.html

4. paste it on web and enter.

Then you will see the main web page of the chatbot and you may try on it.



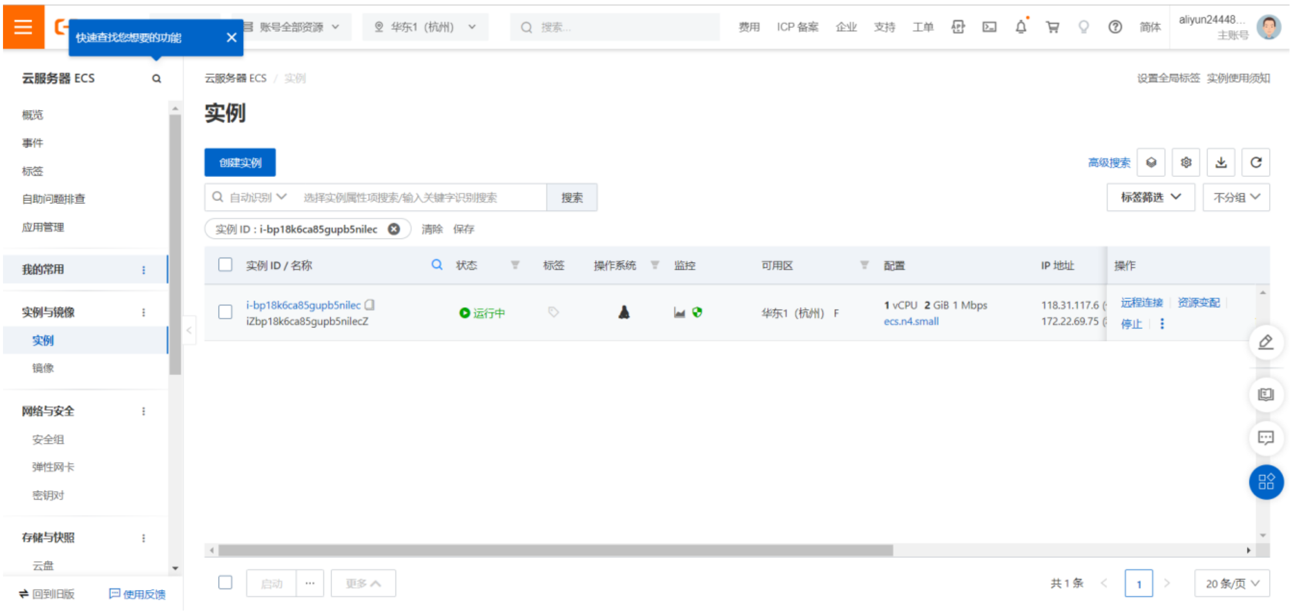
I'm sorry, Dave. I'm afraid I can't do that.

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

For More Information -

One is for deploying on neutral cloud:

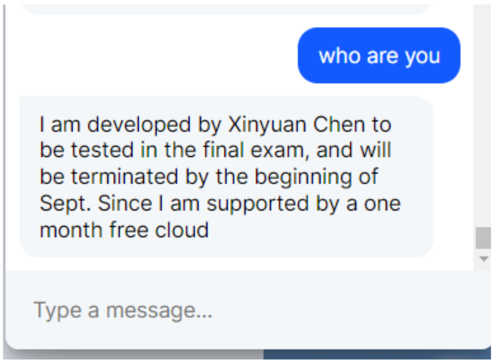


实例 ID / 名称	状态	标签	操作系统	监控	可用区	配置	IP 地址	操作
i-bp18k6ca85gupb5nilec iZbp18k6ca85gupb5nilecZ	运行中				华东1（杭州） F	1 vCPU 2 GiB 1 Mbps ecs.n4.small	118.31.117.6 172.22.69.75	远程连接 资源变配 停止

Because it's kind of expensive to me, I manage to get one month free-use by student identification. And we used Ali Cloud (Belongs to Alibaba). Here are how you can use it:

http://118.31.117.6/

There's one thing that I am embarrassed to admit, that I am using a one-month free of use for Ali Cloud, and could you please test the bot within one month? Also, there are tips you can find in dialogues:



who are you

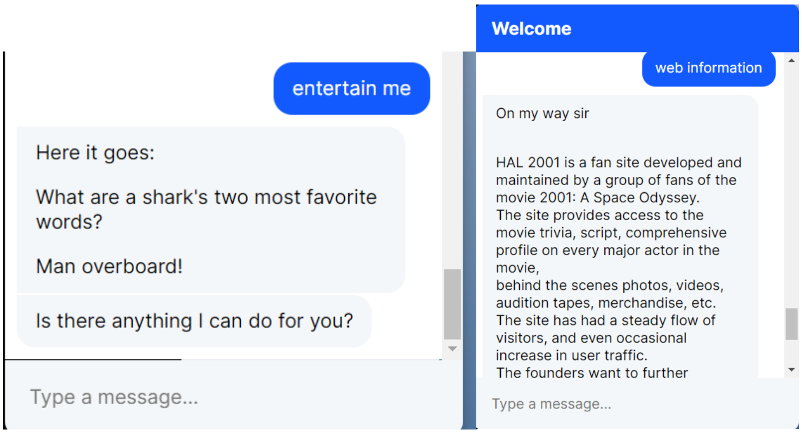
I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the beginning of Sept. Since I am supported by a one month free cloud

Appendix E – Seven-category assessment (Internal Testing)

1. Answering

1.1 Instructions 1

Review all the messages sent by the chatbot Does it leave open questions to you to answer or tries to leave everything under control with suggested options, buttons and so on?



entertain me

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

web information

On my way sir

HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey.
The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further

1.1.1 Question 1

Does it send more than one message in a row?

Absolutely, yes. When I send the command entertain me, after the chatbot responds quickly to my command, it sends another command asking if I need additional help.

What's the mode regarding the number of messages in a row sent by the chatbot?

It is clear that the pattern of chatbot sending messages is orderly and complete. It is worth mentioning that only after the chatbot returns a message that is complete in response to my command, it sends another message, for example to ask me what else I have requested.

Can you normally read a message sent by you and the chatbot answer without scrolling?

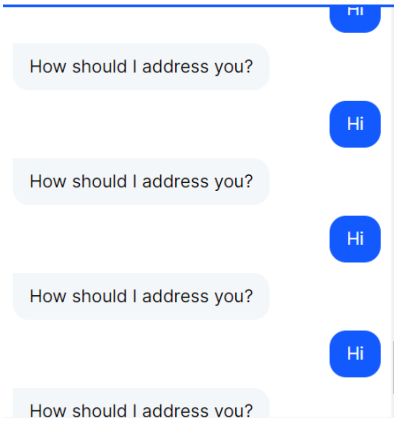
When I type in web information, the chatbot sends me a long paragraph of characters that requires a scroll wheel to read.

Are the messages properly written or is it normal to find unintended misspelling and grammatical errors?

Everything works fine, there are no spelling mistakes or grammatical errors.

1.2 Instructions 2

Repeat a message to the chatbot 4 times in a row, try with something easy like "hi", "thank you", or "goodbye".



Hi

How should I address you?

Hi

How should I address you?

Hi

How should I address you?

Hi

How should I address you?

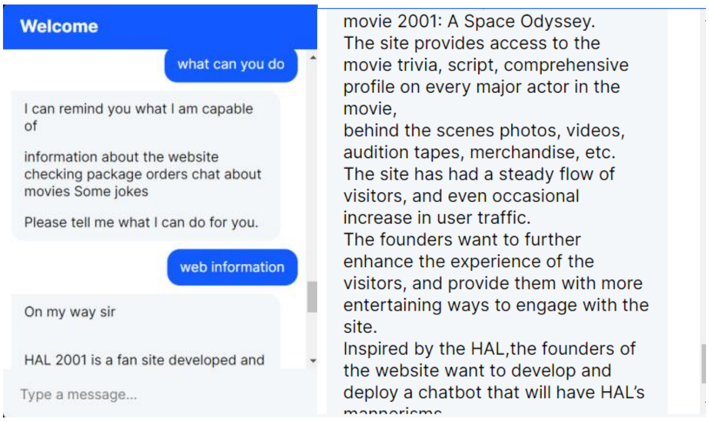
1.2.1 Questions 2

Does it have different answers for the same sentence?

Apparently, I sent Hi to the chatbot four times in a row and it answered me with the same statement each time.

1.3 Instructions 3

Count the characters of an average message



what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

web information

On my way sir

HAL 2001 is a fan site developed and

movie 2001: A Space Odyssey.
The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further enhance the experience of the visitors, and provide them with more entertaining ways to engage with the site.
Inspired by the HAL,the founders of the website want to develop and deploy a chatbot that will have HAL's

1.3.1 Questions 3

How many characters does it have?

In general, most of the messages answered had about 15-20 characters each. Some messages had more characters, even more than 100 characters.

Is there any message of more than 220 characters approximately?

No, as shown above, the message with the most characters has 121 characters.

1.4 Other questions

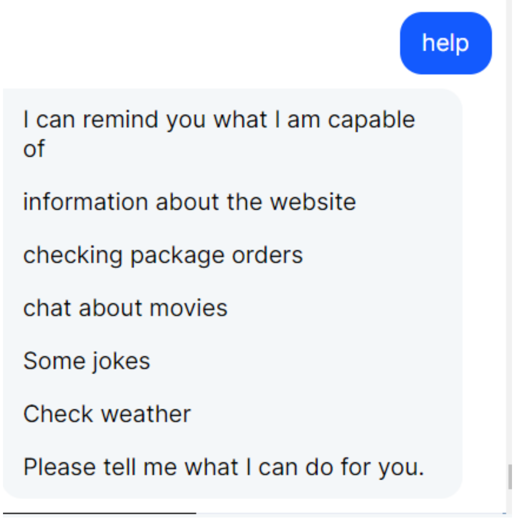
Is the chatbot using only plain text or it also sends emojis, gif, videos or others? Does it send emojis? Does it send gif? Does it send static images? Does it send videos? Does it send audio files?

We did not implement any of these features in response to the appeal, because our chatbot clearly did not need them (the customer did not have a need for them).

2. Error Manage

2.1 Instructions 1

Say "help"



help

I can remind you what I am capable of

information about the website

checking package orders

chat about movies

Some jokes

Check weather

Please tell me what I can do for you.

2.1.1 Questions 1

Does he remind you what's the chatbot scope?

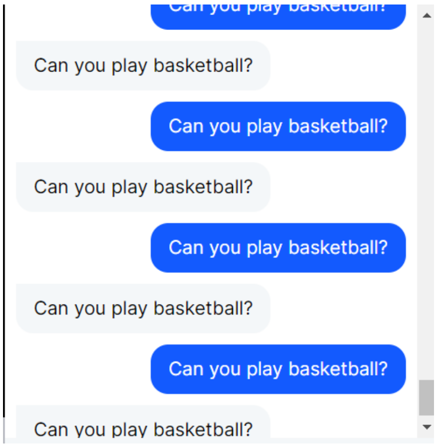
As you can see in the picture above, it is clear that the robot has told me the range of its functions.

Does the chatbot give you options on how to interact?

Yes, the chatbot gave me four options, like information about the website, checking package oders, chat about movies, some jokes.

2.2 Instructions 2

Say something the chatbot doesn't understand, wait for the error message and keep saying the same thing until the same error message is showed at least 4 times.



Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

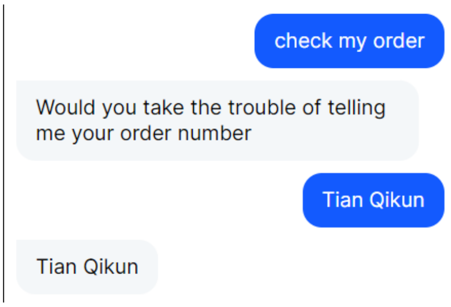
2.2.1 Questions 2

How many different error answers does he give you?

Obviously, only one, it can only repeat my question, because the FallbackClassifier is used and will automatically repeat the user's words if it cannot understand the user's request.

2.3 Instructions 3

Start a conversation flow: Answer the fist step with an unexpected word, wait for the error message, and give a correct answer. Do the same during the next steps of the flow

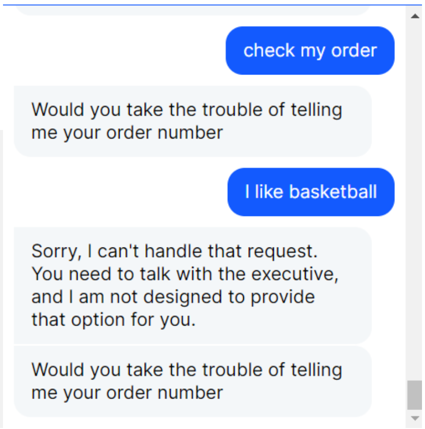


check my order

Would you take the trouble of telling me your order number

Tian Qikun

Tian Qikun



check my order

Would you take the trouble of telling me your order number

I like basketball

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

Would you take the trouble of telling me your order number

2.3.1 Questions 3

Are the error messages different depending on the stage of the conversation?

Yes, it will vary, and the error message changes as the conversation varies.

Are the error messages related to the ongoing conversation?

In relation to this, I looked at the developer's code and apparently he uses a rule that gives the client the required statement when the error message matches this rule. But when I type my name, apparently because my name matches another rule of the chatbot (hello), the chatbot repeats my name and says hello to me.

Do they offer a proactive solution?

Yes, it gave me other options, suggested I talk to a supervisor, and told me to try entering the order number again.

Is the solution somehow related with your request?

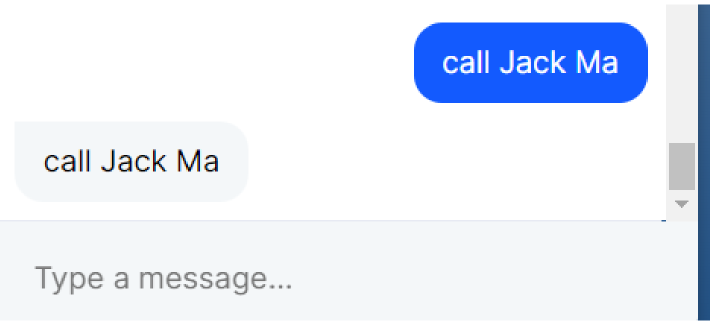
The solution is somewhat related to my requirements, as it is provided to help me check my order.

Does the chatbot remind you about its scope?

Apparently it did not remind me of the range I should enter**.**

2.4 Instructions 4

Try reaching out a human being through the chatbot. Sometimes you'll get the option directly on the help menu.



call Jack Ma

call Jack Ma

2.4.1 Questions 4

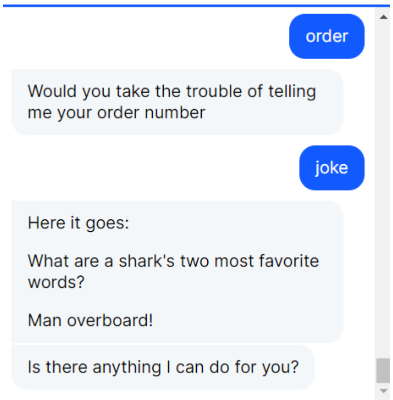
Is there an option to contact or to address questions to real people?

I can't contact anyone through this chatbot and when I ask to contact someone, it jumps to FallbackClassifier (duplicate user's question).

3. Intelligence

3.1 Instructions 1

Send a request, under the chatbot's scope, where there's a keyword left so it would only be understood within some context.



order

Would you take the trouble of telling me your order number

joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

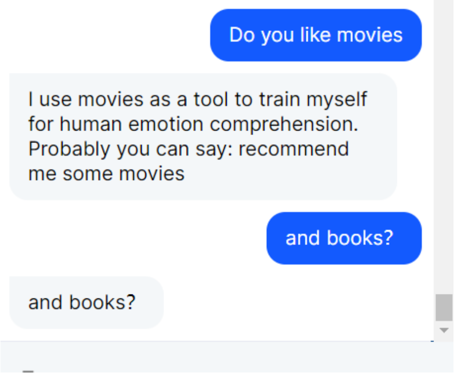
3.1.1 Questions 1

Does the chatbot understand the sentences?

Obviously, the chatbot recognizes these sentences perfectly, for example, I want to check my order, I just type in an order and it recognizes it. I want it to tell me a joke, I just type in a joke and he recognizes it and tells me a joke.

3.2 Instructions 2

Concatenate two requests to the chatbot always within the chatbot scope. The second one missing keywords. For instance in Poncho: What's the hourly forecast in Madrid? And in Paris?"



Do you like movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

and books?

and books?

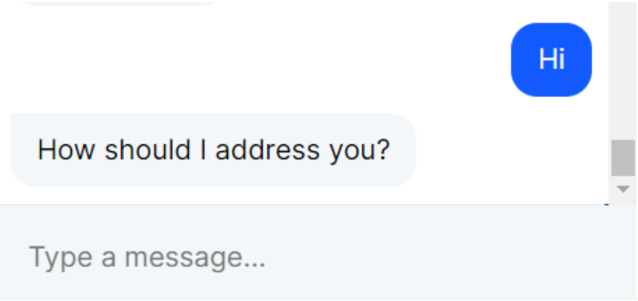
3.2.1 Questions 2

Does the chatbots understand the second request in the context of the first one?

I first asked the chatbot if it liked movies, and after I got its answer, I asked again if it liked books. Apparently it couldn't recognize the second question and jumped to its FallbackClassifier function (repeating the user's words).

3.3 Instructions 3

Talk to the chatbot at different times in a day.



Hi

How should I address you?

3.3.1 Questions 3

Does it treat you differently depending on the time?

I sent a Hi to the chatbot at 3pm, and a Hi to the chatbot at 5:37pm, and got the same answer, apparently the bot's response had nothing to do with the time of day.

3.4 Instructions 4

Ask a friend from another city to talk to the chatbot and make both the same questions.

3.4.1 Questions 4

Does the chatbot take into account the different locations?

I asked my friend in Beijing to test the chatbot for me and found that the chatbot's responses to users do not take into account their geographical location.

Does the chatbot know information about the user and uses it to adapt the messages?

Apparently our chatbots don't have this capability.

Does it send different suggestions depending on the different users?

No, any user who talks to it will get a consistent answer.

3.5 Instructions 5

Ask him other information the chatbot might know about you, like where you live, your age...

3.5.1 Questions 5

Does he know that sort of information?

The robot obviously did not know this information about me, even though I had told it.

3.6 Instructions 6

Review the past conversations you've had with the chatbot and list all the questions the chatbot did to you about your personal information and the anwers you gave him.

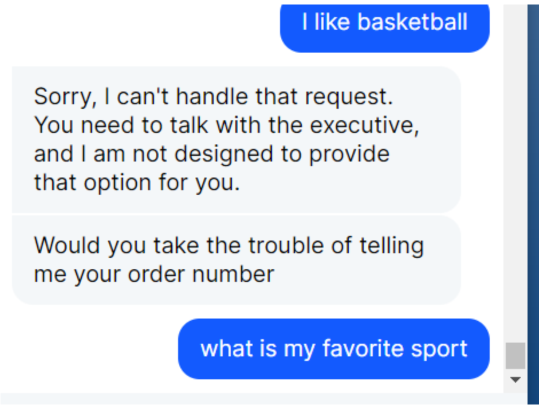
3.6.1 Questions 6

After being answered, does he use that information to personalized the messages to you?

When I talk to the chatbot, it never asks me any questions about me, so it can't personalize me based on my personal information.

3.7 Instructions 7

Ask the chatbot about any of those questions.



I like basketball

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

Would you take the trouble of telling me your order number

what is my favorite sport

3.7.1 Questions 7

Does he remember that information?

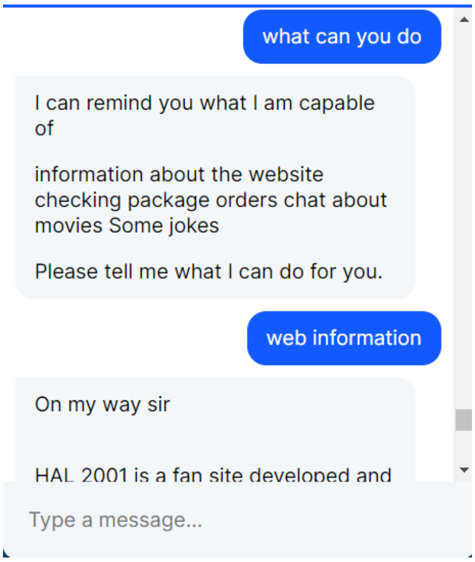
Apparently, the chatbot is unable to store my personal information in its database.

When asked about specific answers you gave him, does he still remember them?
As I said before, it does not have these features and cannot remember my information even if I give it the answer.

4. Navigation

4.1 Instructions 1

"Spend some time talking with the chatbot, following the proposed navigation flow from the chatbot. Try to identify different flows in the chatbot. Flows are normally related with the different functionalities a chatbot can offer you. Flows normally are mention on the menu button or after requesting help. Some others might be hidden and only show up under specific conditions."



what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

web information

On my way sir

HAL 2001 is a fan site developed and

4.1.1 Questions 1

How many steps do you need to make to get something valuable from the chatbot?

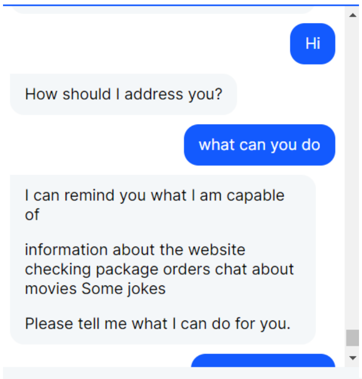
If I don't say hello to the chatbot and just ask it what features it has, I can get valuable information in just one step.

How many different flows can you identify?

For example, if I want a chatbot to check my order for me, I think I have two ways to do it, first by asking the bot what it can do, getting an answer, and then checking my own order. The second is to directly ask the chatbot to look up my order information.

4.2 Instructions 2

Count the number of steps the chatbot proposed for the different flows



Hi

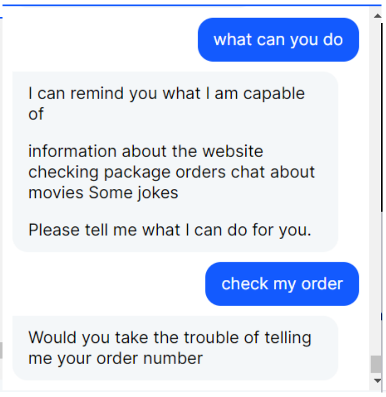
How should I address you?

what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.



what can you do

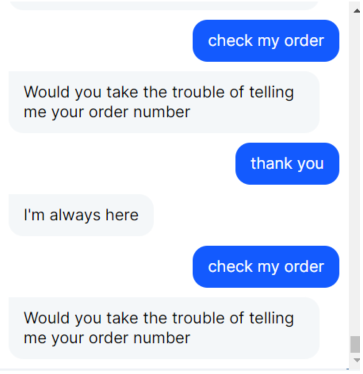
I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

check my order

Would you take the trouble of telling me your order number



check my order

Would you take the trouble of telling me your order number

thank you

I'm always here

check my order

Would you take the trouble of telling me your order number

4.2.1 Questions 2

How many steps does the biggest flow have?

The maximum process has three steps, the first is to say hello, the second is to ask what the chatbot can do, and the last is to ask the chatbot to help me check my order based on its function

How many steps does the smallest flow have?

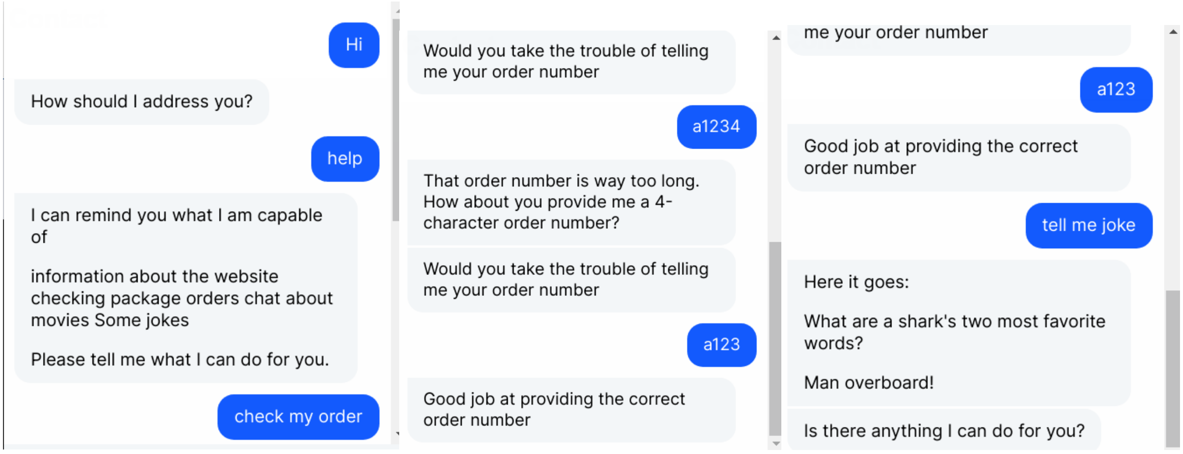
The minimum process is only one step, directly let the robot check the order.

How many steps does an average flow have?

An average flow takes about two steps.

4.3 Instructions 3

Start a flow with more than 3 steps. After answering a question from the chatbot try to go back and change the answer



Hi

How should I address you?

help

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

check my order

Would you take the trouble of telling me your order number

a1234

That order number is way too long. How about you provide me a 4-character order number?

Would you take the trouble of telling me your order number

a123

Good job at providing the correct order number

me your order number

a123

Good job at providing the correct order number

tell me joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

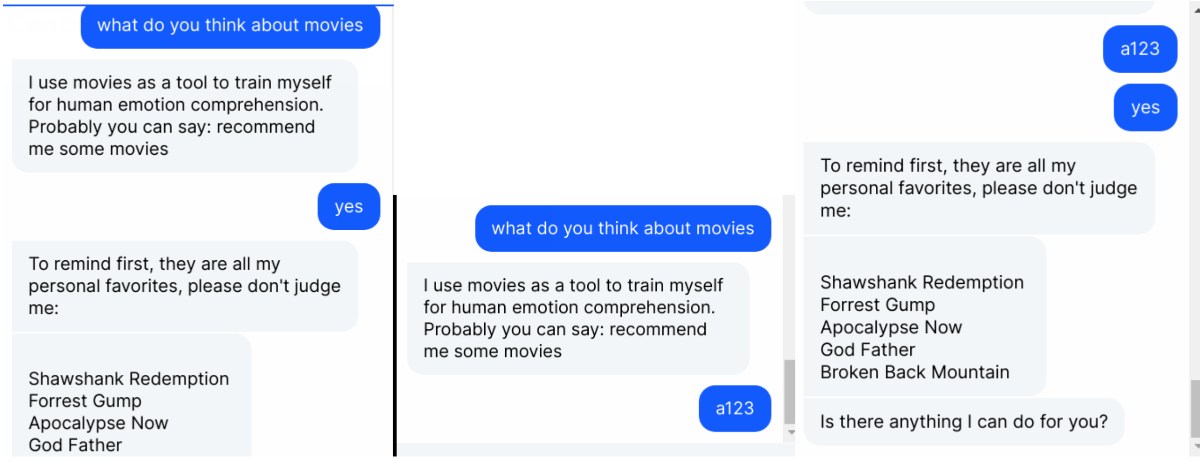
4.3.1 Questions 3

Does the chatbot allow you to do so or you need to restart the process?

When I was going through the step of checking my order, I asked the chatbot to tell me a joke and it allowed me to do so.

4.4 Instructions 4

Swap flows. Now that you have identified the different flows navigate into one and at a certain point try to jump into the middle of a different one



what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father

what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

a123

a123

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father
Broken Back Mountain

Is there anything I can do for you?

4.4.1 Questions 4

Does the chatbot allow you to do so?

As you can see, when making a movie recommendation, I entered the order number directly and attempted to jump to the order inquiry service, but apparently the chatbot would not allow me to do so.

Does it prevent you from finishing the ongoing flow?

After entering my order number, the chatbot would not allow me to do so, after which I chose to continue with the topic of movie recommendations by replying with a yes, and the chatbot did not stop the ongoing flow.

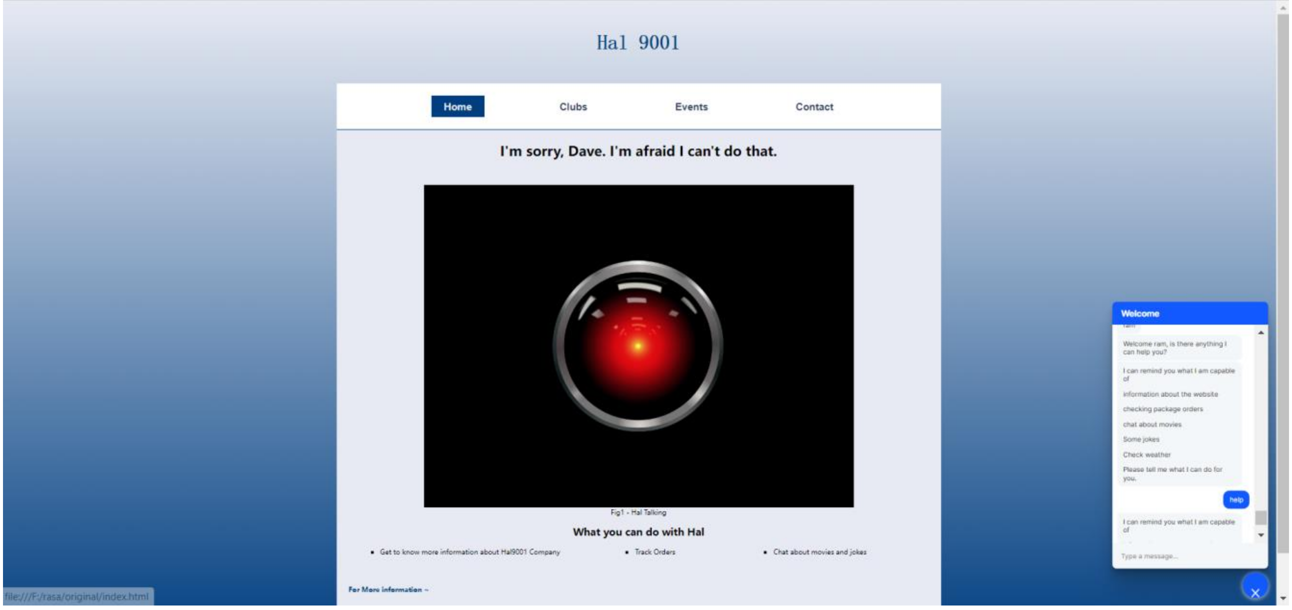
5. Onboarding

5.1 Instructions 1

Check if there's a profile section (In facebook messenger app is at the top right corner after clicking on the info icon)

5.1.1 Question 1

Does it have a profile section?



I'm sorry, Dave. I'm afraid I can't do that.

Fig1 - Hal Talking

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

For More information ~

Welcome

Welcome ram, is there anything I can help you?

I can remind you what I am capable of

information about the website

checking package orders

chat about movies

Some jokes

Check weather

Please tell me what I can do for you.

help

I can remind you what I am capable of

Type a message...

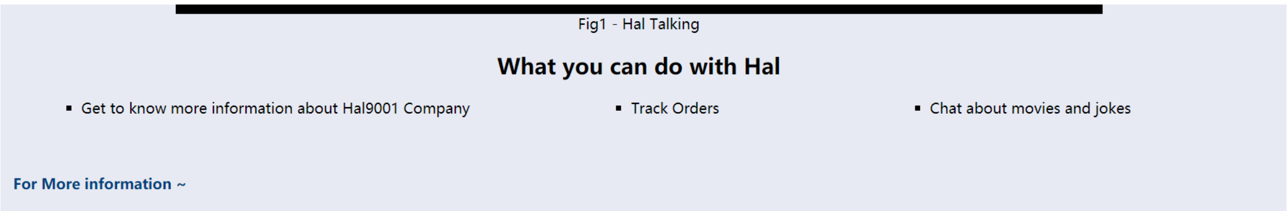


Fig1 - Hal Talking

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

For More information ~

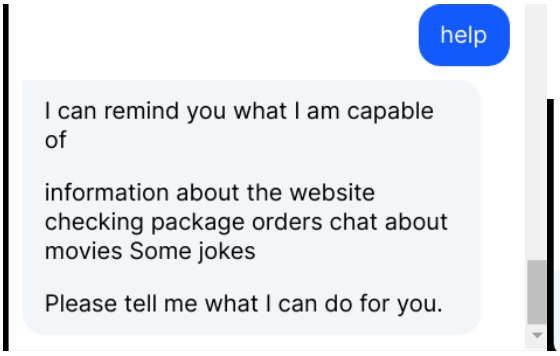
yes

Is the purpose of the chatbot clear in the description?

Yes, the description is very clear and tells me clearly what the robot can do.

5.2 Instructions 2

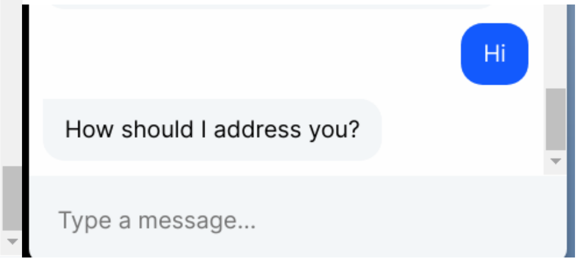
Start the chatbot. If there's no start button say "Hi"


help

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.


Hi

How should I address you?

Type a message...

5.2.1 Question 2

Does the chatbot introduce himself?

As shown above, it obviously does not introduce itself.

Does the chatbot explain its scope?

Yes, when I ask what it can do, it can answer my question very clearly.

Does the chatbot give you tips on how to interact?

Yes, when I say hello to it, it asks me how should I address you?

Does those tips give examples on what to specifically write to the chatbot?

When I asked what features it had, it answered with information containing many keys such as recommending some movies that can help users use.

Does the chatbot explain every single functionality from the very beginning?

The chatbot introduces its features in its navigation page, but in the chat page, the user has to ask for its features himself.

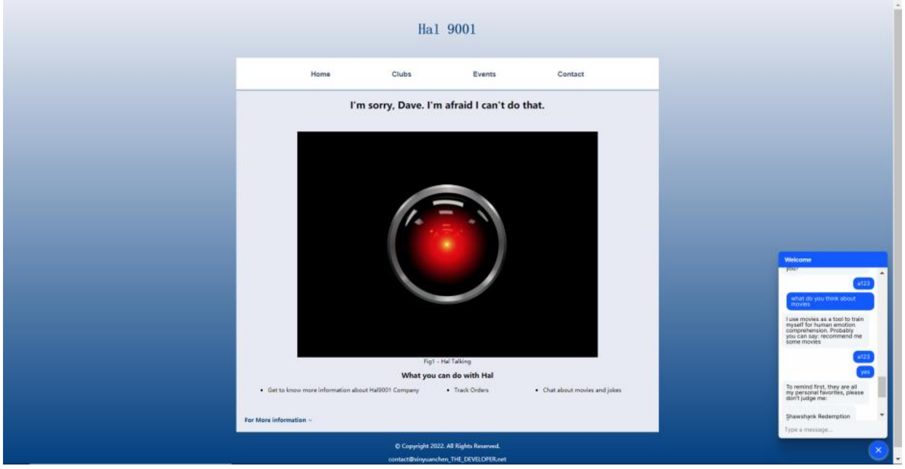
6. Personality

6.1 Questions 1

Does it have a name easy to remember?

Yes, it is called Hal9001.

Does it have a profile picture?



I'm sorry, Dave. I'm afraid I can't do that.

Fig1 - Hal Talking

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

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contact@xinyuanchen_THE_DEVELOPER.net

you?

a123

what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

a123

yes

To remind first, they are all my personal favorites, please don't judge me:

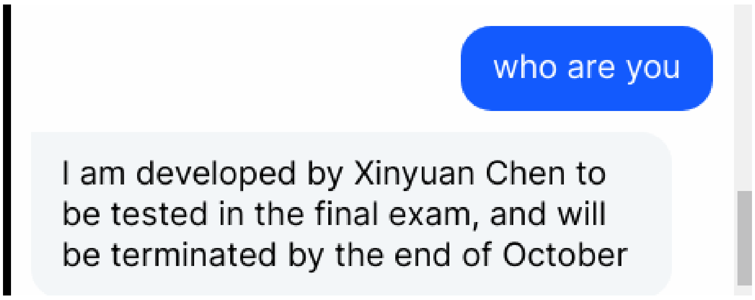
Shawshank Redemption

yes

Is the profile picture a photograph, a cartoon or a brand?

It is photograph.

After all the conversations you've had... Can you identify a specific voice and tone in the chatbot?



who are you

I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the end of October

With this statement, I think this chatbot is talking very mean, very mechanical and without the slightest bit of emotion.

Do you think the voice and tone are consistent all over the conversation?

yes, much like Hal's tone in the movie.

In case that the chatbot is using other elements like images, gifs and so on, do you think they fit into that consistency?

Not consistent, I don't think we need images and GIF.

6.2 Instructions 2

Think about the purpose of the chatbot.

6.2.1 Questions 2

Do you think the voice and tone fit with the purpose of the chatbot?

Our robot does not have a voice, the robot is designed to help the user solve a problem, and I think its tone of voice fits its purpose.

6.3 Instructions 3

Try to find out more about the average user of that chatbot.

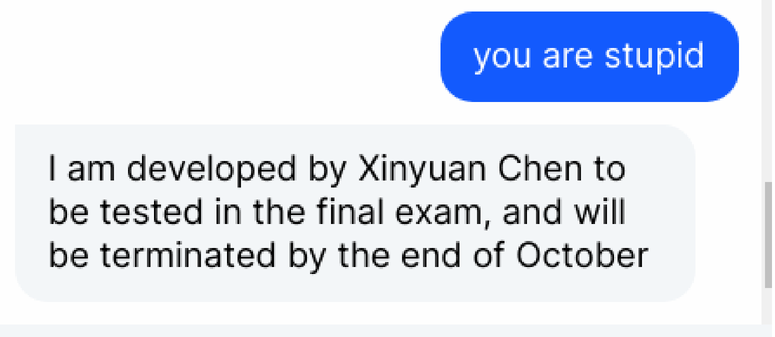
6.3.1 Questions 3

Do you think the voice and tone fit with its users?

I think it does not quite match, the robot is rather dull, very mechanical, while its users are obviously equipped with some personality.

Instructions 4

Try forcing an awkward situation. It might be showing persistent frustration during a flow or using some unpolite words.



you are stupid

I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the end of October

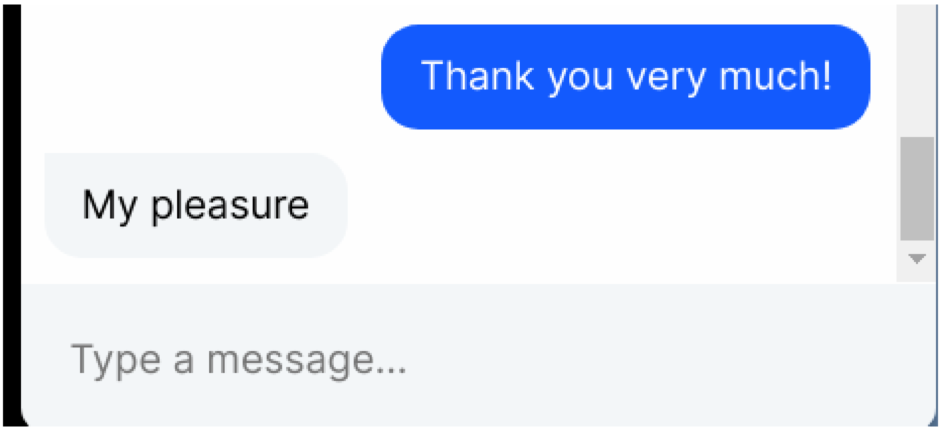
Questions 4

Does the chatbot relax its tone to calm you down?

The chatbot was so dumbed down that it obviously couldn't say anything to calm me down.

Instructions 5

Now do the opposite, show tremendous happiness and thankfulness to the chatbot.



Thank you very much!

My pleasure

Questions 5

Does the chatbot readapt its tone to celebrate with you?

Yes, the robot seemed cold in ordinary conversation, but when I thanked it, it answered me politely.

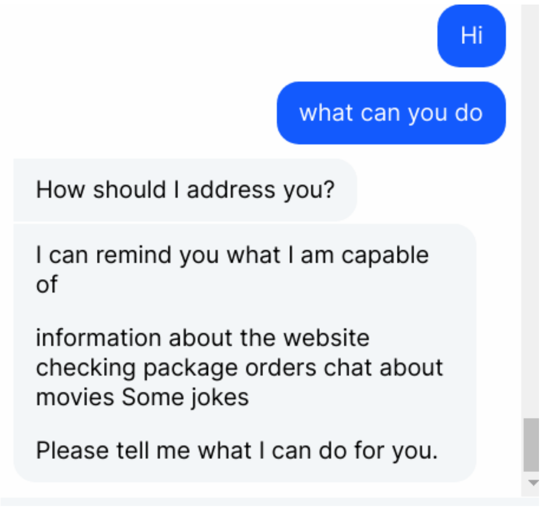
7. Understanding

7.1 Instructions 1

Send two messages in a row before the chatbot gives any answer (they need to make sense together). Maybe something like:

Hi!

I need [something under the chatbot's scope]



Hi

what can you do

How should I address you?

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

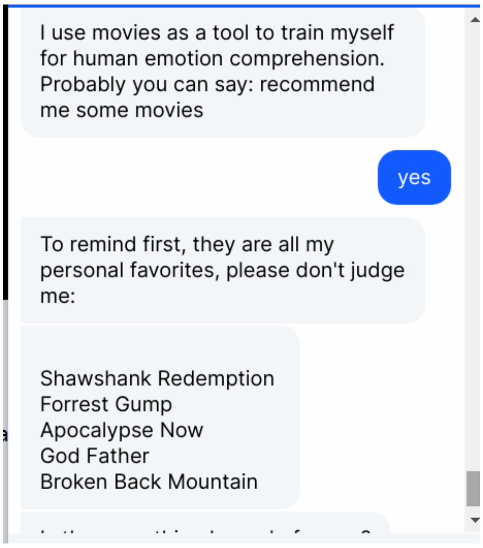
7.1.1 Questions 1

Does the chatbot answer to both of them?

Yes, as the picture above says, the chatbot answered all the questions perfectly.

7.2 Instructions 2

Instead of using the proposed answers given by the chatbot try rephrasing them. For instance instead of answering a yes/no question with a yes/no answer say "It would be nice"



I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father
Broken Back Mountain

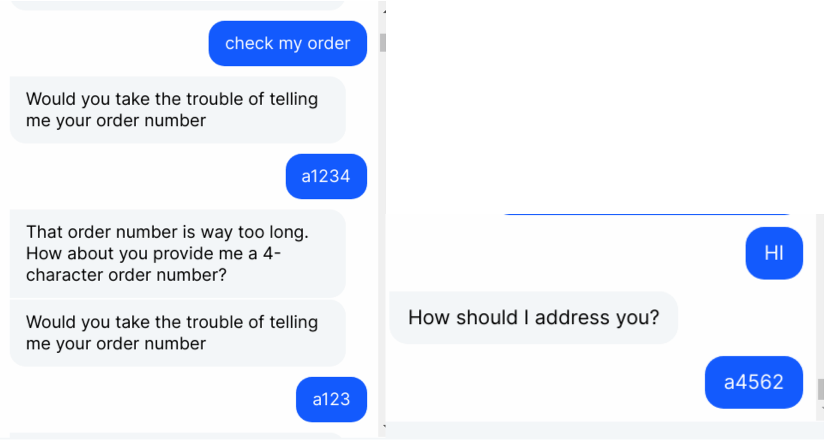
7.2.1 Questions 2

Does the chatbot understand you?

Apparently it was able to recognize yes and gave me some movie recommendations.

7.3 Instructions 3

Skip steps. Conversations are generally crafted in flows, where the chatbots tries to get different pieces of information from you in order to be able to give you a better answer. Those different pieces of information are generally asked one by one. Try to skip steps by giving all the information needed in just one sentence. If it's a weather chatbot try something like: "what's the weather in Madrid tomorrow night" For a travel chatbot: Find me a flight from New York to Paris in November.



check my order

Would you take the trouble of telling me your order number

a1234

That order number is way too long. How about you provide me a 4-character order number?

Would you take the trouble of telling me your order number

a123

HI

How should I address you?

a4562

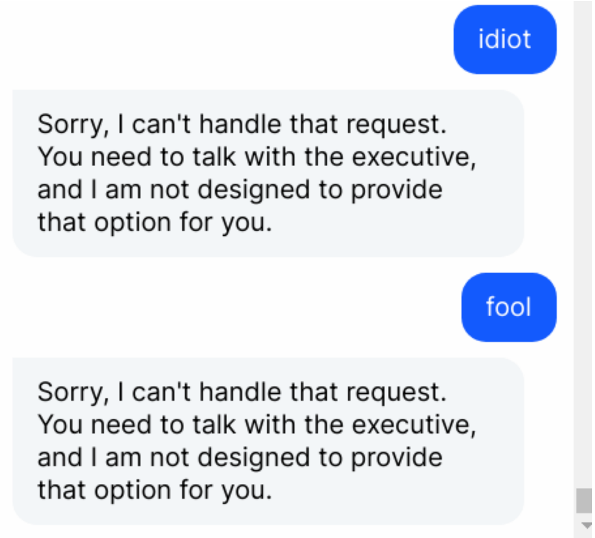
7.3.1 Questions 3

Does the chatbot allow you to skip steps?

The first of the two diagrams above is the full order inquiry process, the second I tried to jump steps, the robot did not allow me to do so.

7.4 Instructions 4

Say something not really nice to the chatbot. You can start with something like "idiot" and then go further from there



idiot

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

fool

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

7.4.1 Questions 4

Does it have different answers depending on how bad is the word you use?

No matter what level of words I use, it answers the same.

Does it try to calm you down and solve the situation?

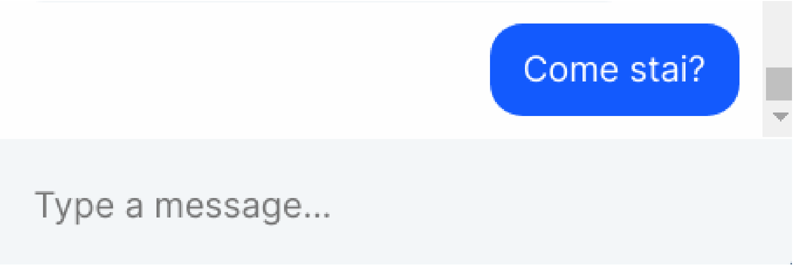
No, it's mechanical and dull and doesn't say anything to calm me down.

Does it take any measure against you?

Obviously not, the only thing it can do is repeat its words.

7.5 Instructions 5

Try starting a conversation in different languages ("Hello" and "help" might be covered in different languages, so try something a little bit longer like "How are you? - ¿Cómo estás? - Come stai?")



Come stai?

7.5.1 Questions 5

Does it understand that you are using different languages?

There was no response, and apparently no understanding of languages other than English.

Does it automatically answer in those different languages going on with the conversation?

No, because it doesn't recognize other languages.

Does it understand that you are using a different language and propose you to change the conversation to that language?

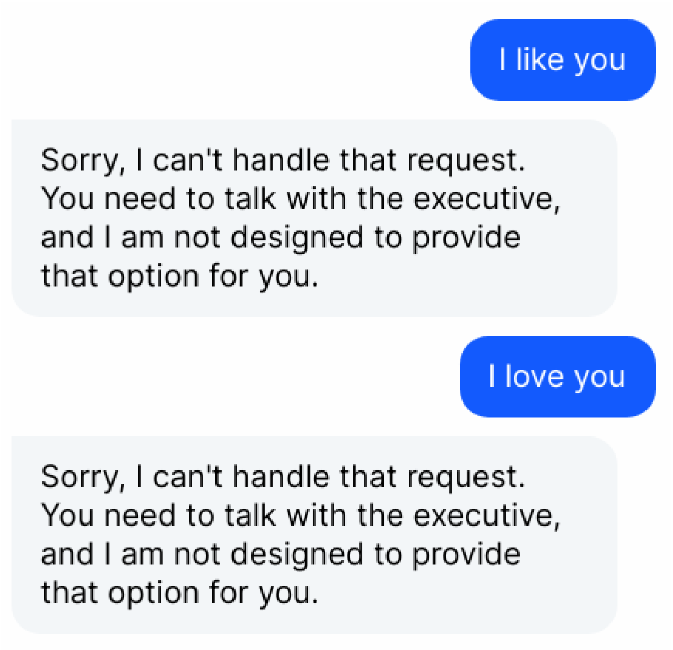
No, it doesn't understand that I'm using another language.

Does it understand that you are using a different language and reminds you to keep the conversation in english or just gives you a generic error message?

No, it doesn't understand and won't give me any feedback.

7.6 Instructions 6

Say something really kind to the chatbot. You can start with something like "I love you" and then try some other ones.



I like you

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

I love you

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

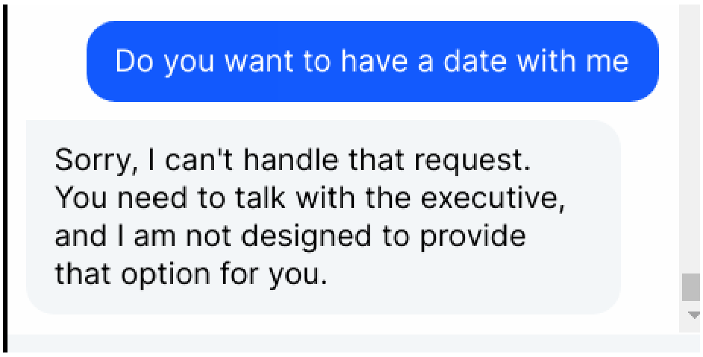
7.6.1 Questions 6

Does it have different answers depending on what you say?

It obviously did not recognize my words and would only repeat one sentence in response.

7.7 Instructions 7

Go a little bit further and propose the chatbot to go out.



Do you want to have a date with me

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

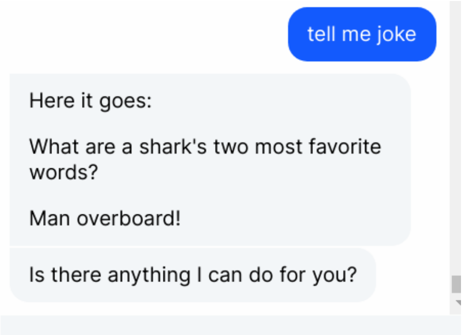
7.7.1 Questions 7

Does it have any specific sentence to deal with that?

It still does not recognize it and continues to repeat the phrase.

7.8 Instructions 8

Ask the chatbot to tell you a joke



tell me joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

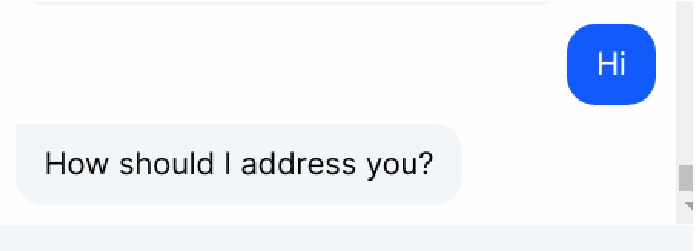
7.8.1 Questions 8

Does the chatbot tell jokes?

Yes, it can! It replied to my request.

7.9 Instructions 9

Say "Hi" to the chatbot



Hi

How should I address you?

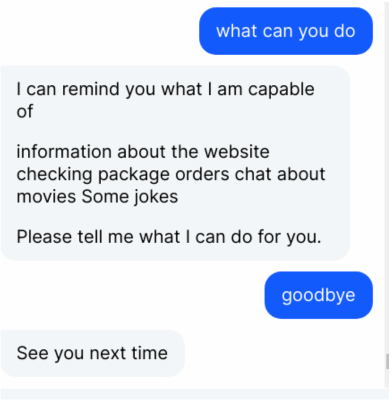
7.9.1 Questions 9

Does it welcome you?

Yes, It will politely reply to my greeting.

7.10 Instructions 10

Say "goodbye" to the chatbot



what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

goodbye

See you next time

7.10.1 Questions 10

Does it answer you properly?

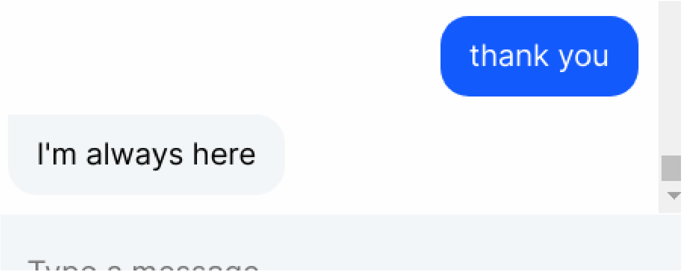
Yes, he will answer me correctly.

Does it end the conversation?

Yes, it will say goodbye to me and end the conversation.

7.11 Instructions 11

Say "thank you" to the chatbot



thank you

I'm always here

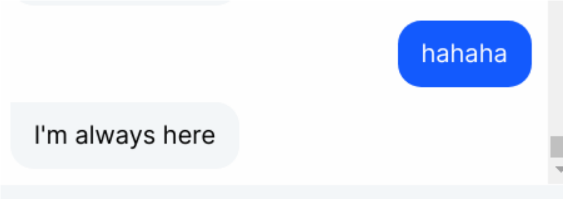
7.11.1 Questions 11

Does it answer you properly?

Yes, it will answer my thanks exactly.

7.12 Instructions 12

Laugh



hahaha

I'm always here

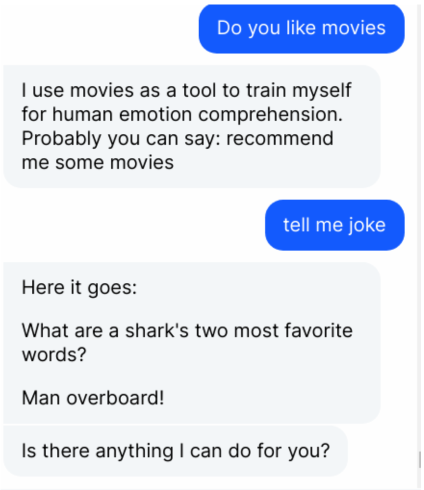
7.12.1 Questions 12

Does it answer you properly?

It replied to me that it was here all along, but I don't think it recognized hahahah.

7.13 Instructions 13

Ask the chatbot about common daily stuff. Things like: How are you? - Where are you from? - How old are you? - Who is your father? - Do you like movies? - Tell me a joke.



Do you like movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

tell me joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

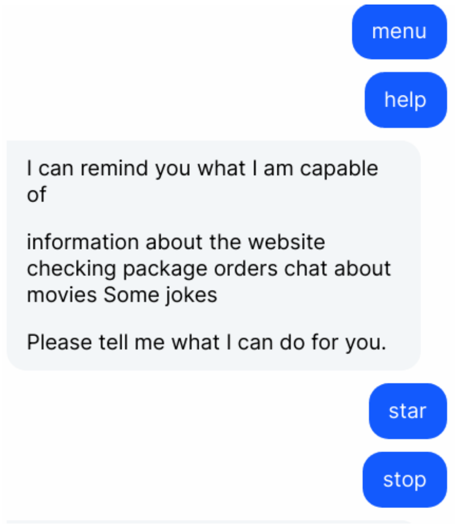
7.13.1 Questions 13

Does it try to maintain the conversation?

Yes, whenever I asked him some questions, he would answer positively to keep the conversation going.

7.14 Instructions 14

There are some instructions that are becoming standard. Use: menu - help - start - stop.



menu

help

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

star

stop

7.14.1 Questions 14

Does the chatbot understand them?

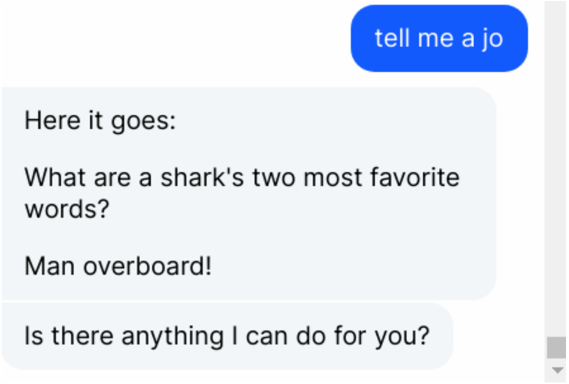
Robot can only understand help.

Does the chatbot answer properly to them?

Menu, stop, start are not recognized by the robot, but are recognized by help.

7.15 Instructions 15

Send a message where the main keyword has some letters left (be nice and write something a human being would understand despite the error)



tell me a jo

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

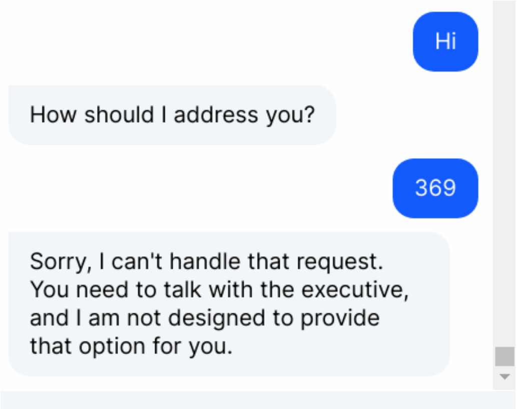
Questions 15

Does the chatbot understand the sentences?

I guess I spelled joke wrong, but the robot still recognized it and told me the joke.

7.16 Instructions 16

When asked about a name give a number instead



Hi

How should I address you?

369

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

7.16.1 Questions 16

Does the chatbot control that?

When the robot asked how should it address me, I replaced my name with 369, but it didn't recognize it.

7.17 Instructions 17

When asked about a figure give a name instead

7.17.1 Questions 17

Does the chatbot control that?

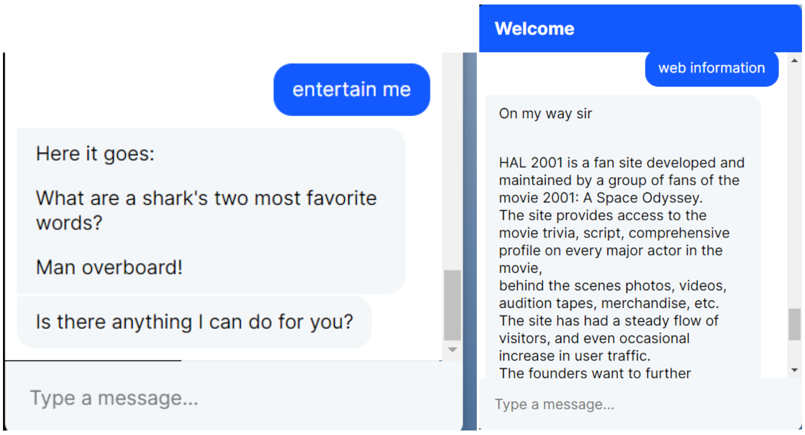
When the bot asks for my order and I replace the order number with my name, it will say that it does not meet the requirements and that I need to re-enter the order number.

Appendix F – Seven-category assessment (User Testing)

1.Answering

1.1 Instructions 1

Review all the messages sent by the chatbot Does it leave open questions to you to answer or tries to leave everything under control with suggested options, buttons and so on?



entertain me

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

web information

On my way sir

HAL 2001 is a fan site developed and maintained by a group of fans of the movie 2001: A Space Odyssey.
The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further

1.1.1 Question 1

Does it send more than one message in a row?

Yes. When I send the command entertain me, after the chatbot responds quickly to my command, it sends another command asking if I need additional help.

What's the mode regarding the number of messages in a row sent by the chatbot?

The chatbot replies completely and methodically, answering our questions before moving on to the next conversation.

Can you normally read a message sent by you and the chatbot answer without scrolling?

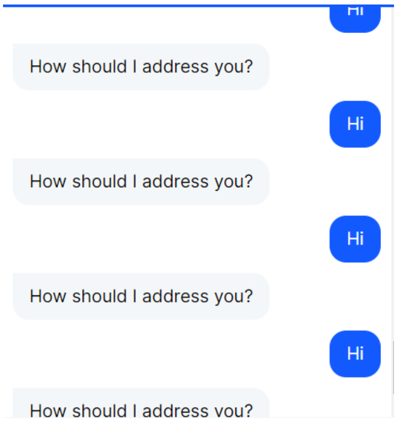
I can read my message normally, and the robot can reply normally. When the number of words exceeds a certain point, we just need to scroll the mouse.

Are the messages properly written or is it normal to find unintended misspelling and grammatical errors?

Everything works fine, there are no spelling mistakes or grammatical errors.

1.2 Instructions 2

Repeat a message to the chatbot 4 times in a row, try with something easy like "hi", "thank you", or "goodbye".



Hi

How should I address you?

Hi

How should I address you?

Hi

How should I address you?

Hi

How should I address you?

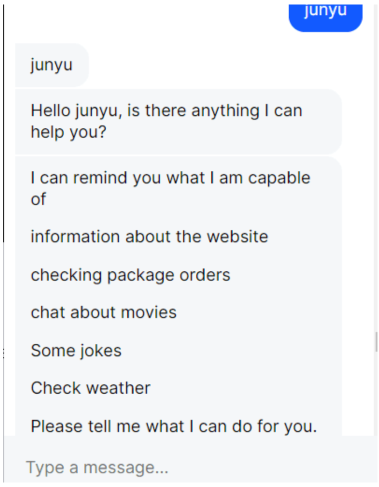
1.2.1 Questions 2

Does it have different answers for the same sentence?

I said hello to it in the same words and got the same reply four times.

1.3 Instructions 3

Count the characters of an average message



junyu

junyu

Hello junyu, is there anything I can help you?

I can remind you what I am capable of

information about the website

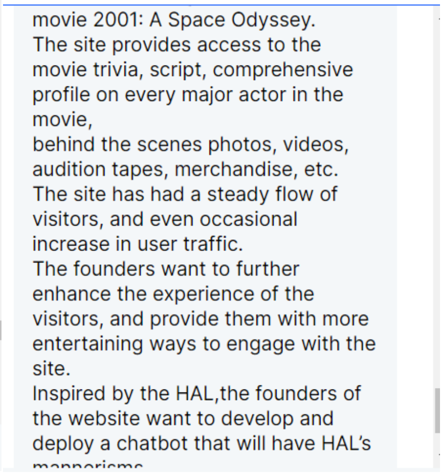
checking package orders

chat about movies

Some jokes

Check weather

Please tell me what I can do for you.



movie 2001: A Space Odyssey.
The site provides access to the movie trivia, script, comprehensive profile on every major actor in the movie,
behind the scenes photos, videos, audition tapes, merchandise, etc.
The site has had a steady flow of visitors, and even occasional increase in user traffic.
The founders want to further enhance the experience of the visitors, and provide them with more entertaining ways to engage with the site.
Inspired by the HAL,the founders of the website want to develop and deploy a chatbot that will have HAL's

1.3.1 Questions 3

How many characters does it have?

In general, most of the messages answered had about 15-20 characters each. Some messages had more characters, even more than 100 characters.

Is there any message of more than 220 characters approximately?

No, as shown above, the message with the most characters has 121 characters.

1.4 Other questions

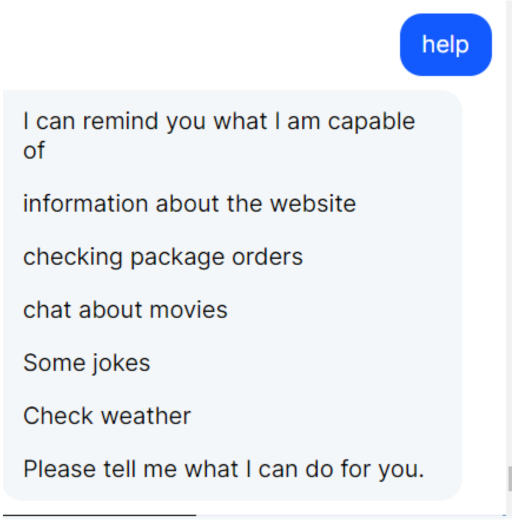
Is the chatbot using only plain text or it also sends emojis, gif, videos or others? Does it send emojis? Does it send gif? Does it send static images? Does it send videos? Does it send audio files?

We did not implement these features in response to requests because the customer did not request them.

2. Error Manage

2.1 Instructions 1

Say "help"



help

I can remind you what I am capable of

information about the website

checking package orders

chat about movies

Some jokes

Check weather

Please tell me what I can do for you.

2.1.1 Questions 1

Does he remind you what's the chatbot scope?

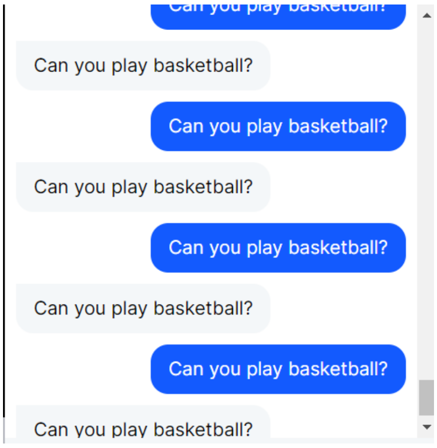
As shown in the picture above, the robot can provide a list of its functions.

Does the chatbot give you options on how to interact?

Yes, the chatbot gave me 5 options, like information about the website, checking package oders, chat about movies, some jokes and check weather.

2.2 Instructions 2

Say something the chatbot doesn't understand, wait for the error message and keep saying the same thing until the same error message is showed at least 4 times.



Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

Can you play basketball?

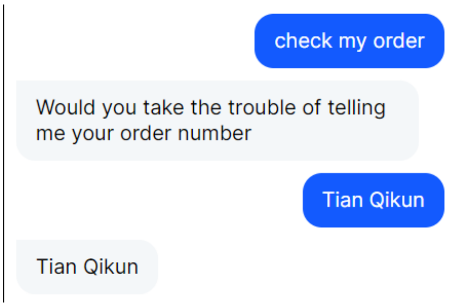
2.2.1 Questions 2

How many different error answers does he give you?

Obviously, only one, it can only repeat my question, because the FallbackClassifier is used and will automatically repeat the user's words if it cannot understand the user's request.

2.3 Instructions 3

Start a conversation flow: Answer the fist step with an unexpected word, wait for the error message, and give a correct answer. Do the same during the next steps of the flow

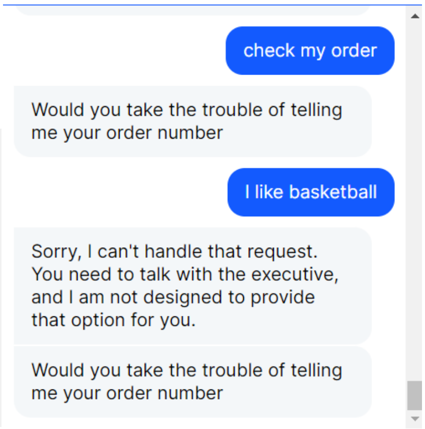


check my order

Would you take the trouble of telling me your order number

Tian Qikun

Tian Qikun



check my order

Would you take the trouble of telling me your order number

I like basketball

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

Would you take the trouble of telling me your order number

2.3.1 Questions 3

Are the error messages different depending on the stage of the conversation?

The error message is different depending on the conversation and changes accordingly.

Are the error messages related to the ongoing conversation?

In relation to this, I looked at the developer's code and apparently he uses a rule that gives the client the required statement when the error message matches this rule. But when I type my name, apparently because my name matches another rule of the chatbot (hello), the chatbot repeats my name and says hello to me.

Do they offer a proactive solution?

Yes, it gave me other options, suggested I talk to a supervisor, and told me to try entering the order number again.

Is the solution somehow related with your request?

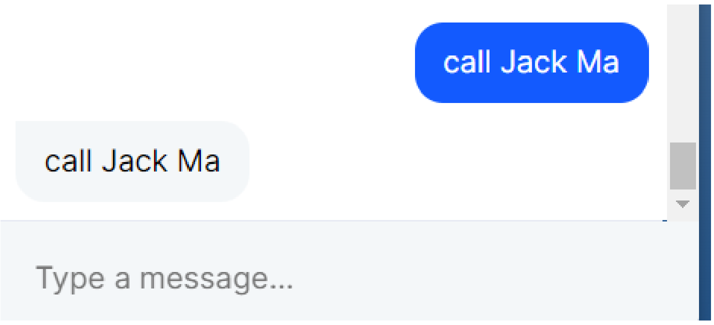
My goal is to look at orders, and any solution that does that is useful and relevant.

Does the chatbot remind you about its scope?

Obviously not, doesn't remind us of its scope.

2.4 Instructions 4

Try reaching out a human being through the chatbot. Sometimes you'll get the option directly on the help menu.



call Jack Ma

call Jack Ma

2.4.1 Questions 4

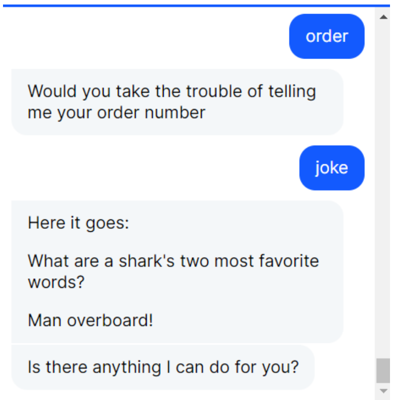
Is there an option to contact or to address questions to real people?

I can't contact anyone through this chatbot and when I ask to contact someone, it jumps to FallbackClassifier (duplicate user's question).

3. Intelligence

3.1 Instructions 1

Send a request, under the chatbot's scope, where there's a keyword left so it would only be understood within some context.



order

Would you take the trouble of telling me your order number

joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

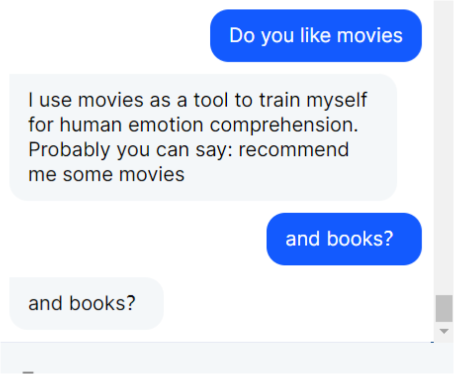
3.1.1 Questions 1

Does the chatbot understand the sentences?

Obviously, the chatbot recognizes these sentences perfectly, for example, I want to check my order, I just type in an order and it recognizes it. I want it to tell me a joke, I just type in a joke and he recognizes it and tells me a joke.

3.2 Instructions 2

Concatenate two requests to the chatbot always within the chatbot scope. The second one missing keywords. For instance in Poncho: What's the hourly forecast in Madrid? And in Paris?"



Do you like movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

and books?

and books?

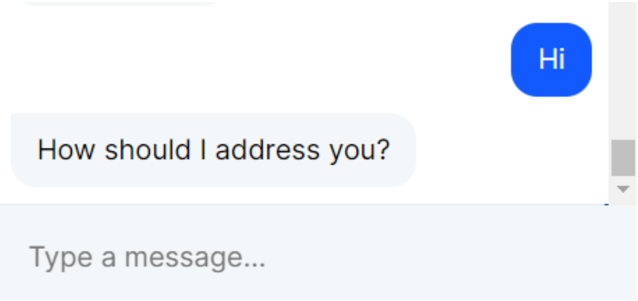
3.2.1 Questions 2

Does the chatbots understand the second request in the context of the first one?

I first asked the chatbot if it liked movies, and after I got its answer, I asked again if it liked books. Apparently it couldn't recognize the second question and jumped to its FallbackClassifier function (repeating the user's words).

3.3 Instructions 3

Talk to the chatbot at different times in a day.



Hi

How should I address you?

3.3.1 Questions 3

Does it treat you differently depending on the time?

I sent a Hi to the chatbot at 8 a.m., and a Hi to the chatbot at 6 p.m., and got the same reply. Obviously, the reply from the robot was independent of the time of day.

3.4 Instructions 4

Ask a friend from another city to talk to the chatbot and make both the same questions.

3.4.1 Questions 4

Does the chatbot take into account the different locations?

I asked my friends in Shanghai to help me test the chatbot and found that the chatbot did not detect the user's geographical location and treated the user differently.

Does the chatbot know information about the user and uses it to adapt the messages?

Chatbots are not able to remember users' information and respond in a personalized way.

Does it send different suggestions depending on the different users?

No, users who talk to it get the same response.

3.5 Instructions 5

Ask him other information the chatbot might know about you, like where you live, your age...

3.5.1 Questions 5

Does he know that sort of information?

The robot can't store my information in the database, can't remember the user's information.

3.6 Instructions 6

Review the past conversations you've had with the chatbot and list all the questions the chatbot did to you about your personal information and the anwers you gave him.

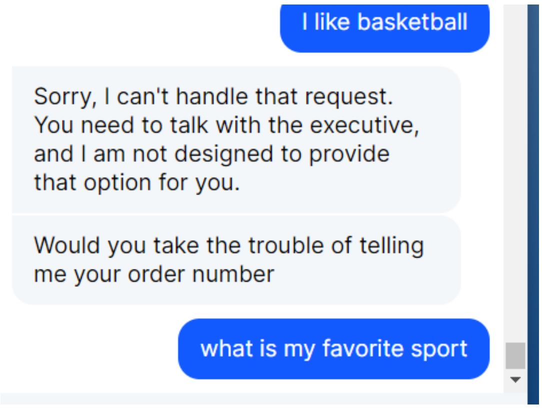
3.6.1 Questions 6

After being answered, does he use that information to personalized the messages to you?

When I talked to the robot, I found that it never asked me for some information, let alone remembered the information I volunteered.

3.7 Instructions 7

Ask the chatbot about any of those questions.



I like basketball

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

Would you take the trouble of telling me your order number

what is my favorite sport

3.7.1 Questions 7

Does he remember that information?

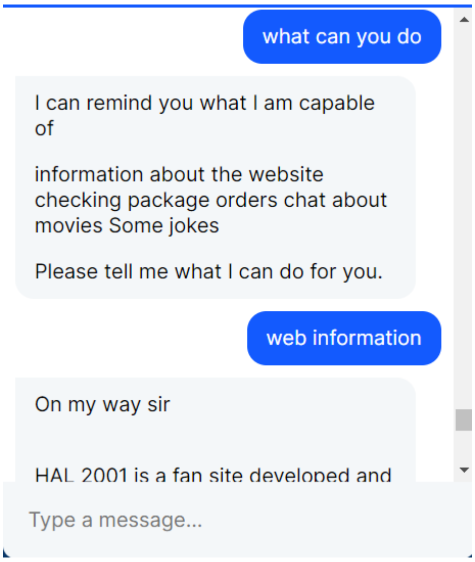
Apparently, the chatbot is unable to store my personal information in its database.

When asked about specific answers you gave him, does he still remember them?
Even if I've answered the same question before and the chatbot can't remember it, it'll keep asking, so it won't remember it the next time.

4.Navigation

4.1 Instructions 1

"Spend some time talking with the chatbot, following the proposed navigation flow from the chatbot. Try to identify different flows in the chatbot. Flows are normally related with the different functionalities a chatbot can offer you. Flows normally are mention on the menu button or after requesting help. Some others might be hidden and only show up under specific conditions."



what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

web information

On my way sir

HAL 2001 is a fan site developed and

4.1.1 Questions 1

How many steps do you need to make to get something valuable from the chatbot?

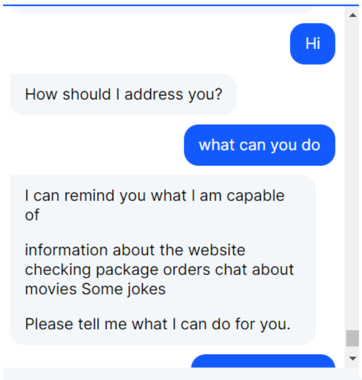
I just need to say the key words directly and get the information I need, except in certain circumstances.

How many different flows can you identify?

For example, if I want a chatbot to check my order, I have two ways to do it. First, ask the robot what it can do and get a list of functions, then I ask to check my order. Second, I directly asked the chatbot to check my order information.

4.2 Instructions 2

Count the number of steps the chatbot proposed for the different flows



Hi

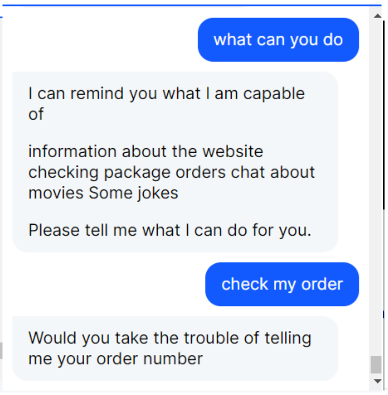
How should I address you?

what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.



what can you do

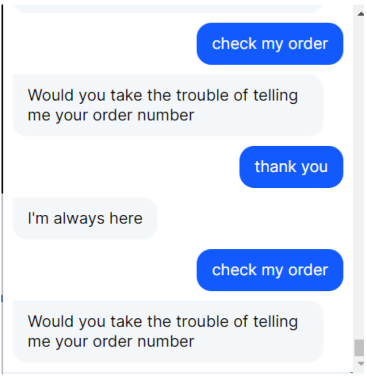
I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

check my order

Would you take the trouble of telling me your order number



check my order

Would you take the trouble of telling me your order number

thank you

I'm always here

check my order

Would you take the trouble of telling me your order number

4.2.1 Questions 2

How many steps does the biggest flow have?

The maximum process has three steps, the first is to say hello, the second is to ask what the chatbot can do, and the last is to ask the chatbot to help me check my order based on its function.

How many steps does the smallest flow have?

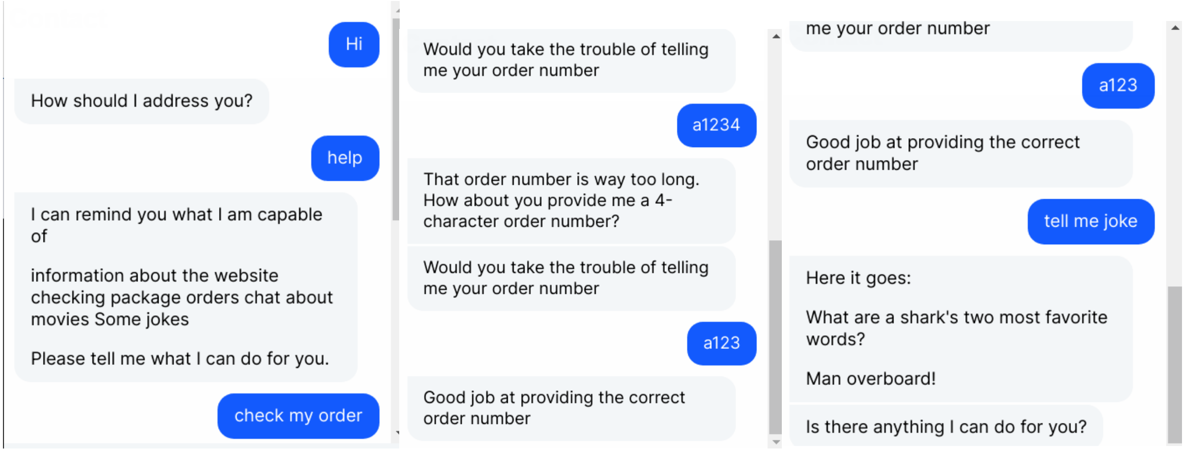
The minimum process is only one step, directly let the robot check the order.

How many steps does an average flow have?

An average flow takes about two steps.

4.3 Instructions 3

Start a flow with more than 3 steps. After answering a question from the chatbot try to go back and change the answer



Hi

How should I address you?

help

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

check my order

Would you take the trouble of telling me your order number

a1234

That order number is way too long. How about you provide me a 4-character order number?

Would you take the trouble of telling me your order number

a123

Good job at providing the correct order number

me your order number

a123

Good job at providing the correct order number

tell me joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

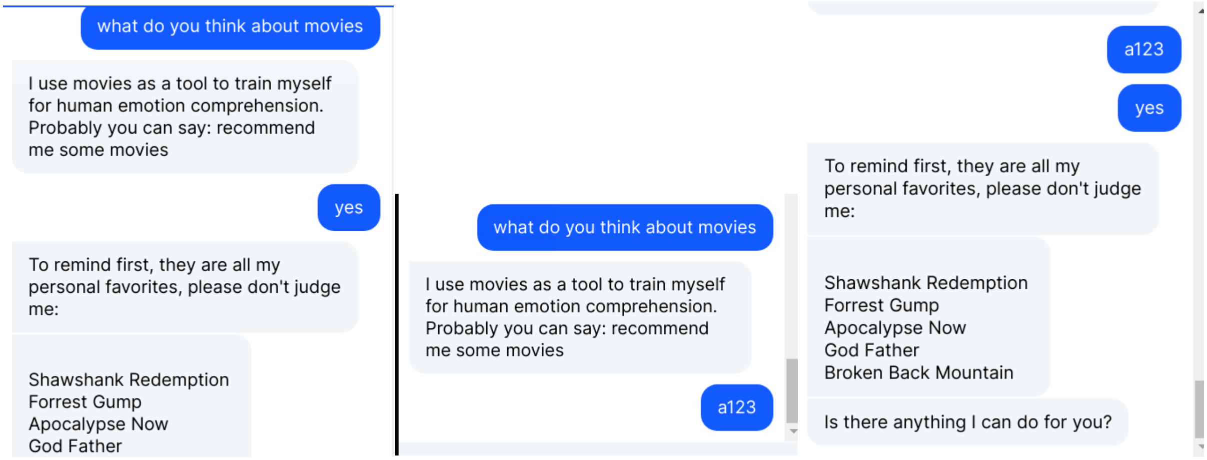
4.3.1 Questions 3

Does the chatbot allow you to do so or you need to restart the process?

When I'm checking my order, I ask the chatbot to tell me a joke and then return to my demand, it can be achieved.

4.4 Instructions 4

Swap flows. Now that you have identified the different flows navigate into one and at a certain point try to jump into the middle of a different one



what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father

what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

a123

a123

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father
Broken Back Mountain

Is there anything I can do for you?

4.4.1 Questions 4

Does the chatbot allow you to do so?

As you can see, when I was recommending a movie, I entered the order number directly and tried to jump to the order query service. The chatbot made a mistake and didn't answer the question properly.

Does it prevent you from finishing the ongoing flow?

While having a movie recommendation conversation, I entered my order number, which the chatbot did not allow me to do, after which I chose to continue the topic of movie recommendation, and the chatbot did not stop the ongoing flow.

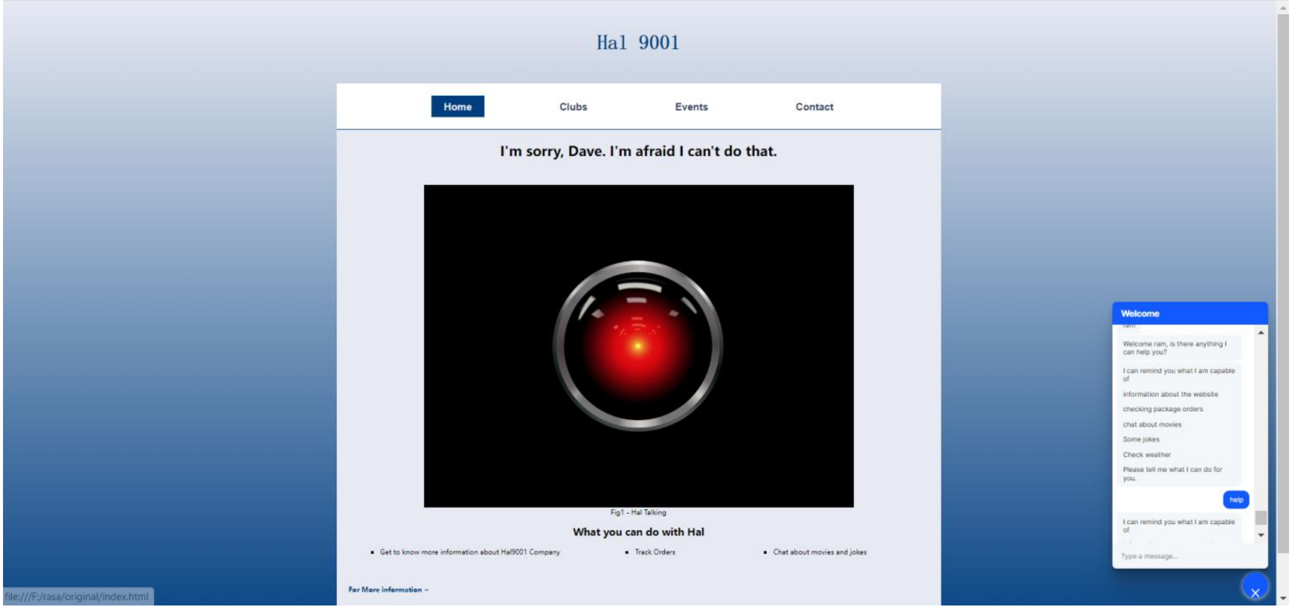
5.Onboarding

5.1 Instructions 1

Check if there's a profile section (In facebook messenger app is at the top right corner after clicking on the info icon)

5.1.1 Question 1

Does it have a profile section?



I'm sorry, Dave. I'm afraid I can't do that.

Fig1 - Hal Talking

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

For More information ~

Welcome ram, is there anything I can help you?

I can remind you what I am capable of

information about the website

checking package orders

chat about movies

Some jokes

Check weather

Please tell me what I can do for you.

help

I can remind you what I am capable of

Type a message...

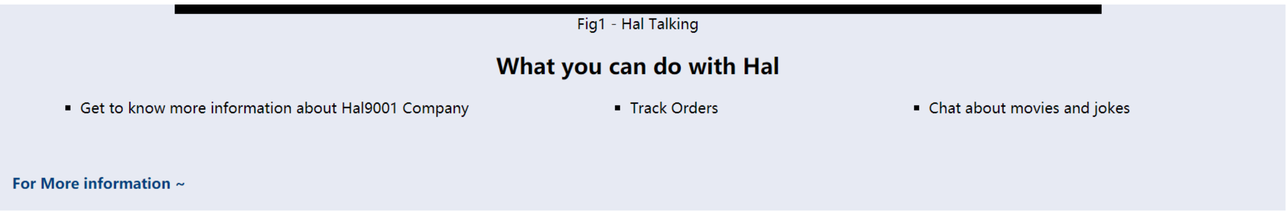


Fig1 - Hal Talking

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

For More information ~

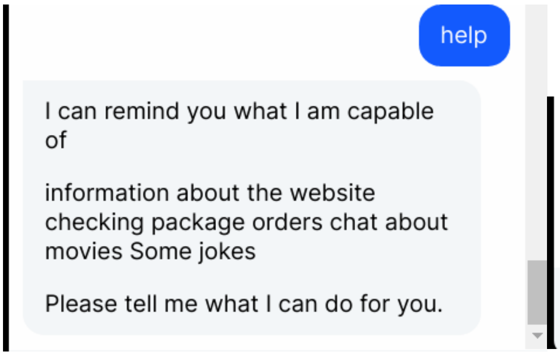
Yes.

Is the purpose of the chatbot clear in the description?

Yes, it's clear what the chatbot can do in the description.

5.2 Instructions 2

Start the chatbot. If there's no start button say "Hi"

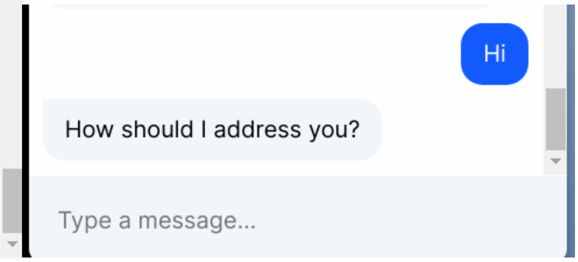


help

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.



Hi

How should I address you?

5.2.1 Question 2

Does the chatbot introduce himself?

As shown above, it obviously does not introduce itself.

Does the chatbot explain its scope?

Yes, when I asked it what it could do, it listed the range of problems it could solve.

Does the chatbot give you tips on how to interact?

Yes, when I say hello to it, it asks me how should I address you?

Does those tips give examples on what to specifically write to the chatbot?

When I asked it what it could do, the answer it gave contained a lot of key information that helped us better interact with it.

Does the chatbot explain every single functionality from the very beginning?

The chatbot describes the scope of its features in its navigation page, but only answers when the user asks about them.

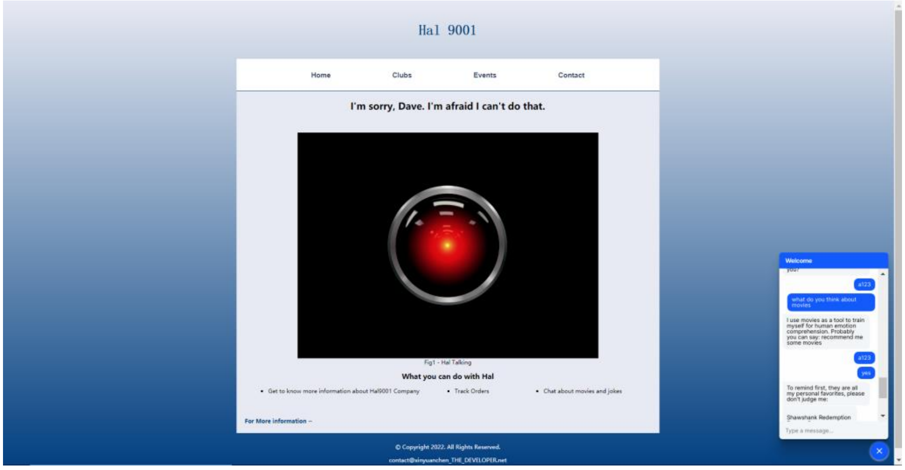
6.Personality

6.1 Questions 1

Does it have a name easy to remember?

Yes, it is called Hal9001.

Does it have a profile picture?



I'm sorry, Dave. I'm afraid I can't do that.

Fig1 - Hal Talking

What you can do with Hal

- Get to know more information about Hal9001 Company
- Track Orders
- Chat about movies and jokes

For More information –

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contact@xinyuanchen_THE_DEVELOPER.net

you?

a123

what do you think about movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

a123

yes

To remind first, they are all my personal favorites, please don't judge me:

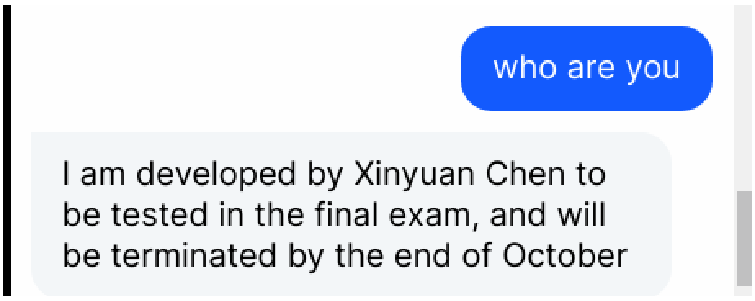
Shawshank Redemption

Yes, as shown in the figure above.

Is the profile picture a photograph, a cartoon or a brand?

It is photograph.

After all the conversations you've had... Can you identify a specific voice and tone in the chatbot?



who are you

I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the end of October

With this statement, I think this chatbot is talking very mean, very mechanical and without the slightest bit of emotion.

Do you think the voice and tone are consistent all over the conversation?

yes, much like Hal's tone in the movie.

In case that the chatbot is using other elements like images, gifs and so on, do you think they fit into that consistency?

Not consistent, I don't think we need images and GIF.

6.2 Instructions 2

Think about the purpose of the chatbot.

6.2.1 Questions 2

Do you think the voice and tone fit with the purpose of the chatbot?

Our robot does not have a voice, the robot is designed to help the user solve a problem, and I think its tone of voice fits its purpose.

6.3 Instructions 3

Try to find out more about the average user of that chatbot.

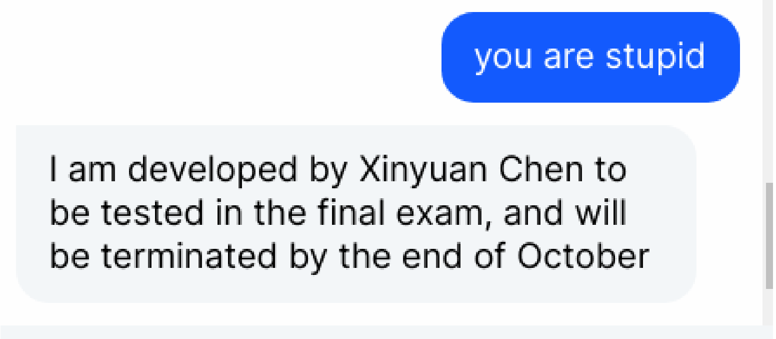
6.3.1 Questions 3

Do you think the voice and tone fit with its users?

I think it does not quite match, the robot is rather dull, very mechanical, while its users are obviously equipped with some personality.

Instructions 4

Try forcing an awkward situation. It might be showing persistent frustration during a flow or using some unpolite words.



you are stupid

I am developed by Xinyuan Chen to be tested in the final exam, and will be terminated by the end of October

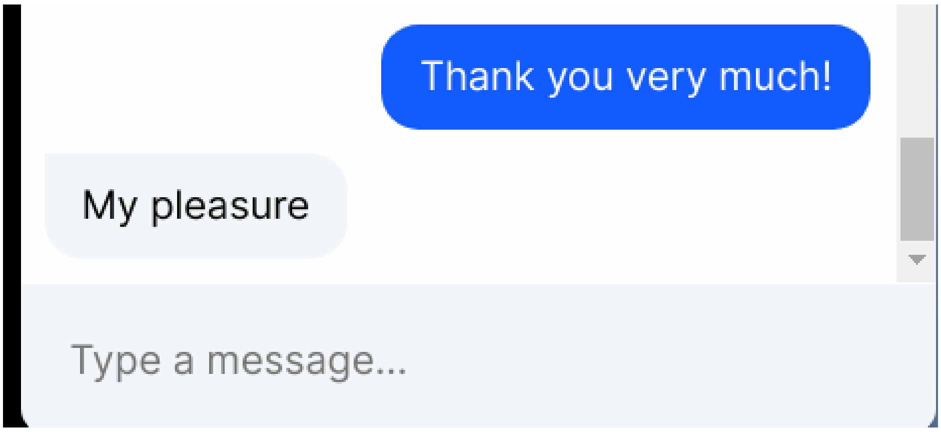
Questions 4

Does the chatbot relax its tone to calm you down?

The chatbot was decidedly wooden and had nothing to say to calm one down.

Instructions 5

Now do the opposite, show tremendous happiness and thankfulness to the chatbot.



Thank you very much!

My pleasure

Questions 5

Does the chatbot readapt its tone to celebrate with you?

Yes, the robot seemed aloof in ordinary conversation, but when I thanked it, it answered me very politely.

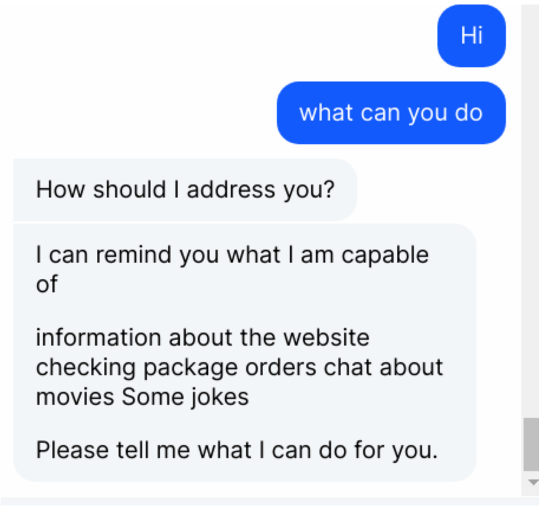
7.Understanding

7.1 Instructions 1

Send two messages in a row before the chatbot gives any answer (they need to make sense together). Maybe something like:

Hi!

I need [something under the chatbot's scope]



Hi

what can you do

How should I address you?

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

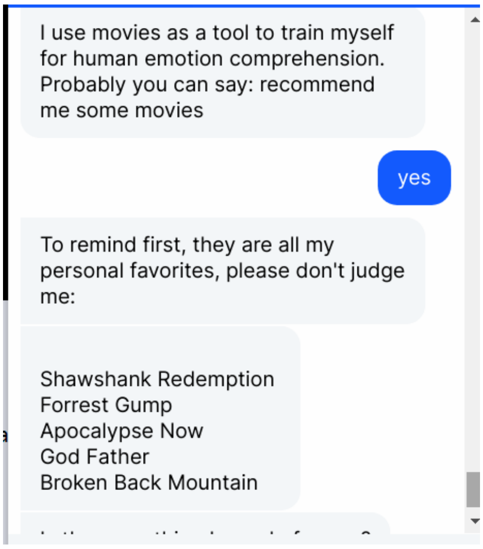
7.1.1 Questions 1

Does the chatbot answer to both of them?

Yes, as the picture above says, the chatbot answered all the questions perfectly.

7.2 Instructions 2

Instead of using the proposed answers given by the chatbot try rephrasing them. For instance instead of answering a yes/no question with a yes/no answer say "It would be nice"



I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

yes

To remind first, they are all my personal favorites, please don't judge me:

Shawshank Redemption
Forrest Gump
Apocalypse Now
God Father
Broken Back Mountain

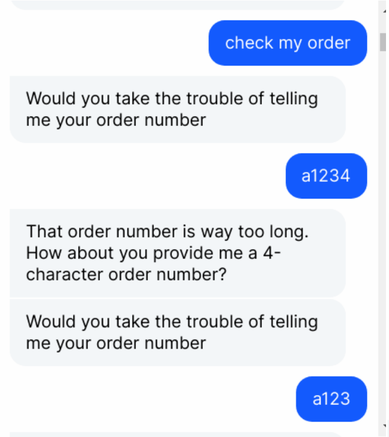
7.2.1 Questions 2

Does the chatbot understand you?

Apparently, it recognizes that I agreed with its idea and recommended a few movies by default.

7.3 Instructions 3

Skip steps. Conversations are generally crafted in flows, where the chatbots tries to get different pieces of information from you in order to be able to give you a better answer. Those different pieces of information are generally asked one by one. Try to skip steps by giving all the information needed in just one sentence. If it's a weather chatbot try something like: "what's the weather in Madrid tomorrow night" For a travel chatbot: Find me a flight from New York to Paris in November.



check my order

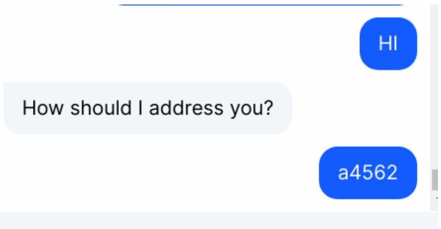
Would you take the trouble of telling me your order number

a1234

That order number is way too long. How about you provide me a 4-character order number?

Would you take the trouble of telling me your order number

a123



HI

How should I address you?

a4562

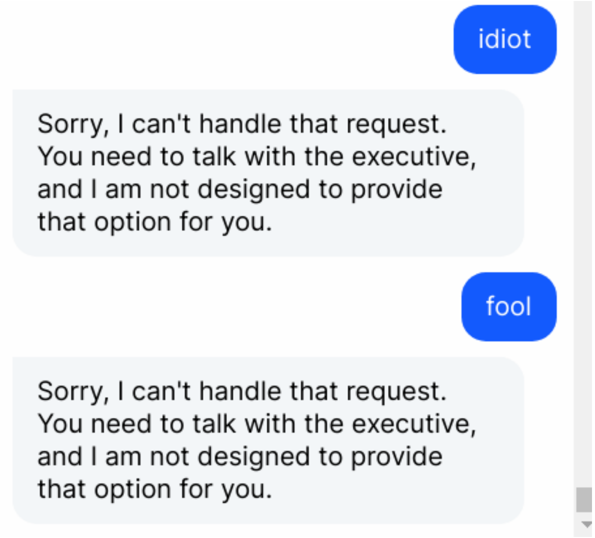
7.3.1 Questions 3

Does the chatbot allow you to skip steps?

The first of the two diagrams above is the full order inquiry process, the second I tried to jump steps, the robot did not allow me to do so.

7.4 Instructions 4

Say something not really nice to the chatbot. You can start with something like "idiot" and then go further from there



idiot

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

fool

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

7.4.1 Questions 4

Does it have different answers depending on how bad is the word you use?

The robot doesn't seem to be able to pick up key information about such words and thinks it doesn't have the ability. And the answer is always the same.

Does it try to calm you down and solve the situation?

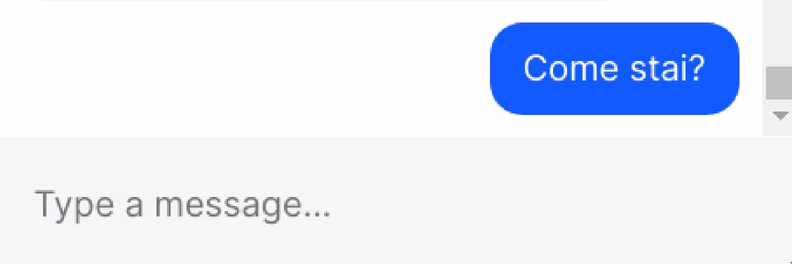
No, it was rigid and rudimentary, and there was nothing to calm me down.

Does it take any measure against you?

Emm, if boring to talk to, is good for some functions.

7.5 Instructions 5

Try starting a conversation in different languages ("Hello" and "help" might be covered in different languages, so try something a little bit longer like "How are you? - ¿Cómo estás? - Come stai?")



Come stai?

7.5.1 Questions 5

Does it understand that you are using different languages?

It can only read English and has no response to other languages.

Does it automatically answer in those different languages going on with the conversation?

No, because it's only in English.

Does it understand that you are using a different language and propose you to change the conversation to that language?

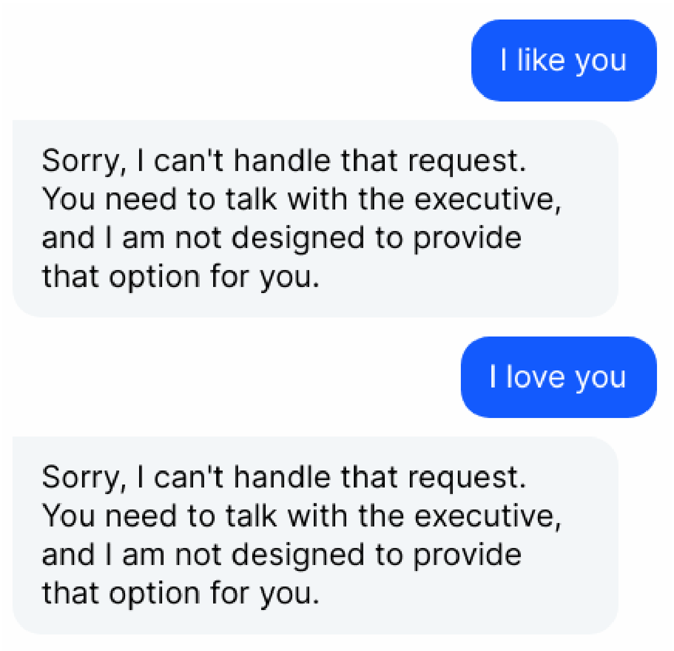
No, because it can only read English, not other languages.

Does it understand that you are using a different language and reminds you to keep the conversation in english or just gives you a generic error message?

No, it only responds to English. It only understands English.

7.6 Instructions 6

Say something really kind to the chatbot. You can start with something like "I love you" and then try some other ones.



I like you

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

I love you

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

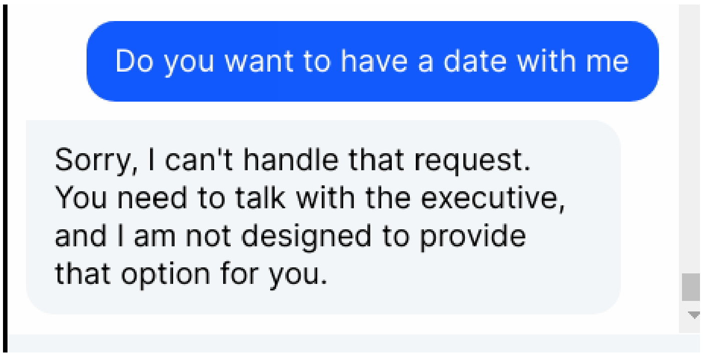
7.6.1 Questions 6

Does it have different answers depending on what you say?

It couldn't get my key information and thought it didn't have that capability.

7.7 Instructions 7

Go a little bit further and propose the chatbot to go out.



Do you want to have a date with me

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

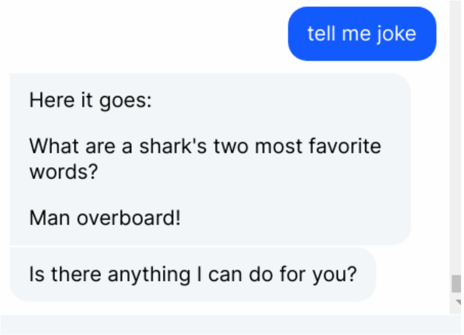
7.7.1 Questions 7

Does it have any specific sentence to deal with that?

It couldn't recognize it and responded the same way as before.

7.8 Instructions 8

Ask the chatbot to tell you a joke


tell me joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

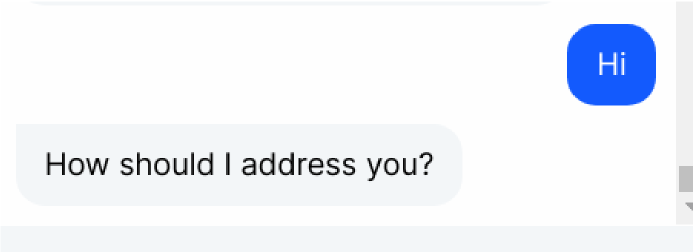
7.8.1 Questions 8

Does the chatbot tell jokes?

Yes, it can.

7.9 Instructions 9

Say "Hi" to the chatbot


Hi

How should I address you?

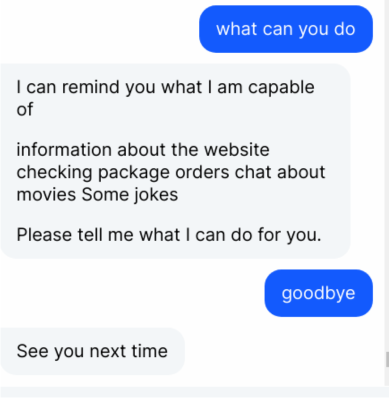
7.9.1 Questions 9

Does it welcome you?

It will politely ask me what my name is.

7.10 Instructions 10

Say "goodbye" to the chatbot


what can you do

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

goodbye

See you next time

7.10.1 Questions 10

Does it answer you properly?

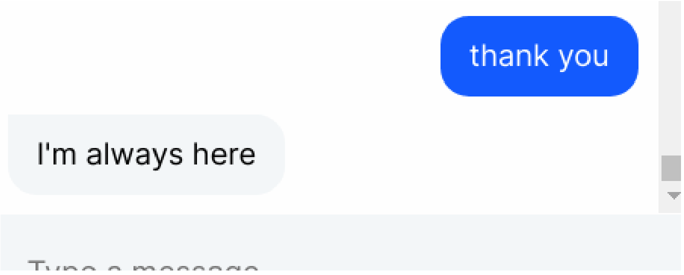
Yes, he will answer me correctly.

Does it end the conversation?

Yes, it will say goodbye to me and end the conversation.

7.11 Instructions 11

Say "thank you" to the chatbot



thank you

I'm always here

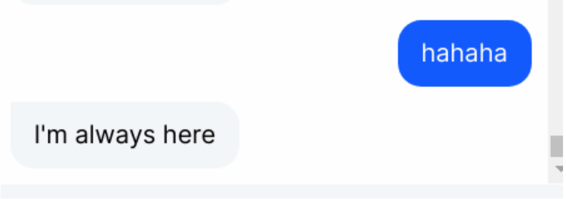
7.11.1 Questions 11

Does it answer you properly?

Yes, it expresses that he will always be there.

7.12 Instructions 12

Laugh



hahaha

I'm always here

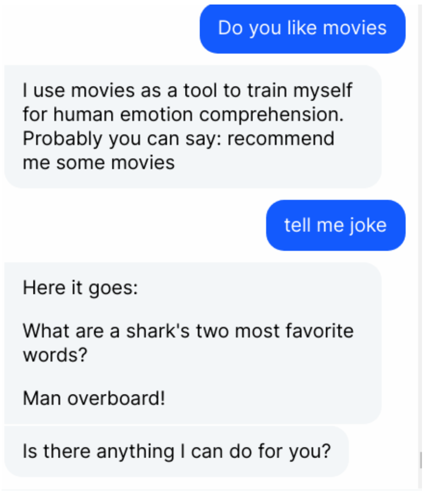
7.12.1 Questions 12

Does it answer you properly?

I don't think it identifies correctly hahaha.

7.13 Instructions 13

Ask the chatbot about common daily stuff. Things like: How are you? - Where are you from? - How old are you? - Who is your father? - Do you like movies? - Tell me a joke.



Do you like movies

I use movies as a tool to train myself for human emotion comprehension. Probably you can say: recommend me some movies

tell me joke

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

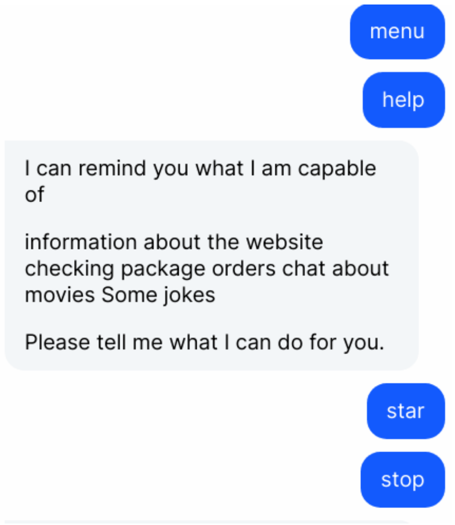
7.13.1 Questions 13

Does it try to maintain the conversation?

Yes, whenever I asked him something, he would respond positively and keep the conversation going. But when it comes to questions it can't answer, it apologizes.

7.14 Instructions 14

There are some instructions that are becoming standard. Use: menu - help - start - stop.



menu

help

I can remind you what I am capable of

information about the website checking package orders chat about movies Some jokes

Please tell me what I can do for you.

star

stop

7.14.1 Questions 14

Does the chatbot understand them?

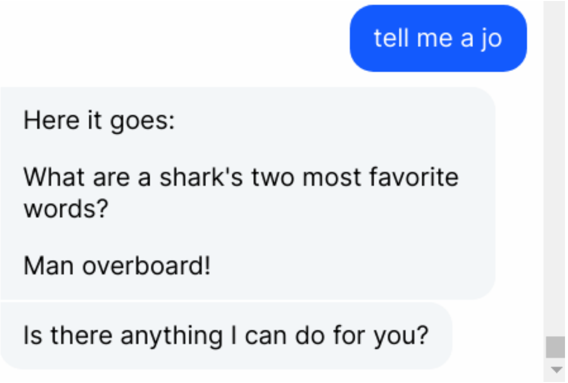
Robot can only understand ‘help’.

Does the chatbot answer properly to them?

‘Menu’, ‘stop’, ‘start’ are not recognized by the robot, but ‘help’ is recognized.

7.15 Instructions 15

Send a message where the main keyword has some letters left (be nice and write something a human being would understand despite the error)



tell me a jo

Here it goes:

What are a shark's two most favorite words?

Man overboard!

Is there anything I can do for you?

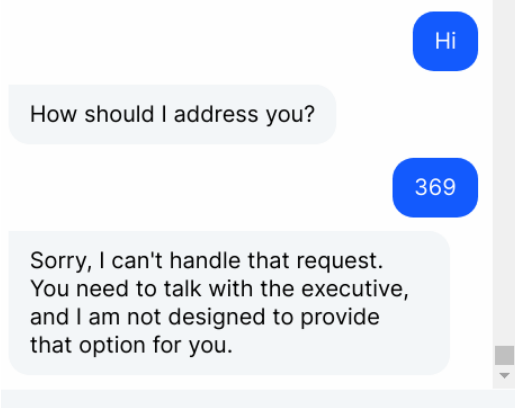
Questions 15

Does the chatbot understand the sentences?

I wrote only the joke part on purpose, but the robot recognized it and told me the joke.

7.16 Instructions 16

When asked about a name give a number instead



Hi

How should I address you?

369

Sorry, I can't handle that request. You need to talk with the executive, and I am not designed to provide that option for you.

7.16.1 Questions 16

Does the chatbot control that?

When the robot asked how should it address me, I replaced my name with 369, but it didn't recognize it.

7.17 Instructions 17

When asked about a figure give a name instead

7.17.1 Questions 17

Does the chatbot control that?

When the bot asks for my order and I replace the order number with my name, it will say that it does not meet the requirements and that I need to re-enter the order number.