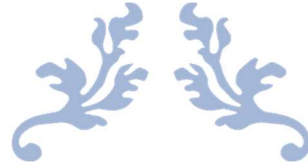




uOttawa



ELG 5125:
Data Science Applications
Assignment 6

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GROUP: DSA_202101_13

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Introduction

Question answering models are one of the most used applications in NLP. In this project a question answering model is being used based on an institution which offers courses and is named “Ischool”, allowing students whether to attend online on the platform or offline. Chatbot handling the study institute’s courses using Google Dialogflow tool for conversational AI virtual agents used in chatbots.

Methodology

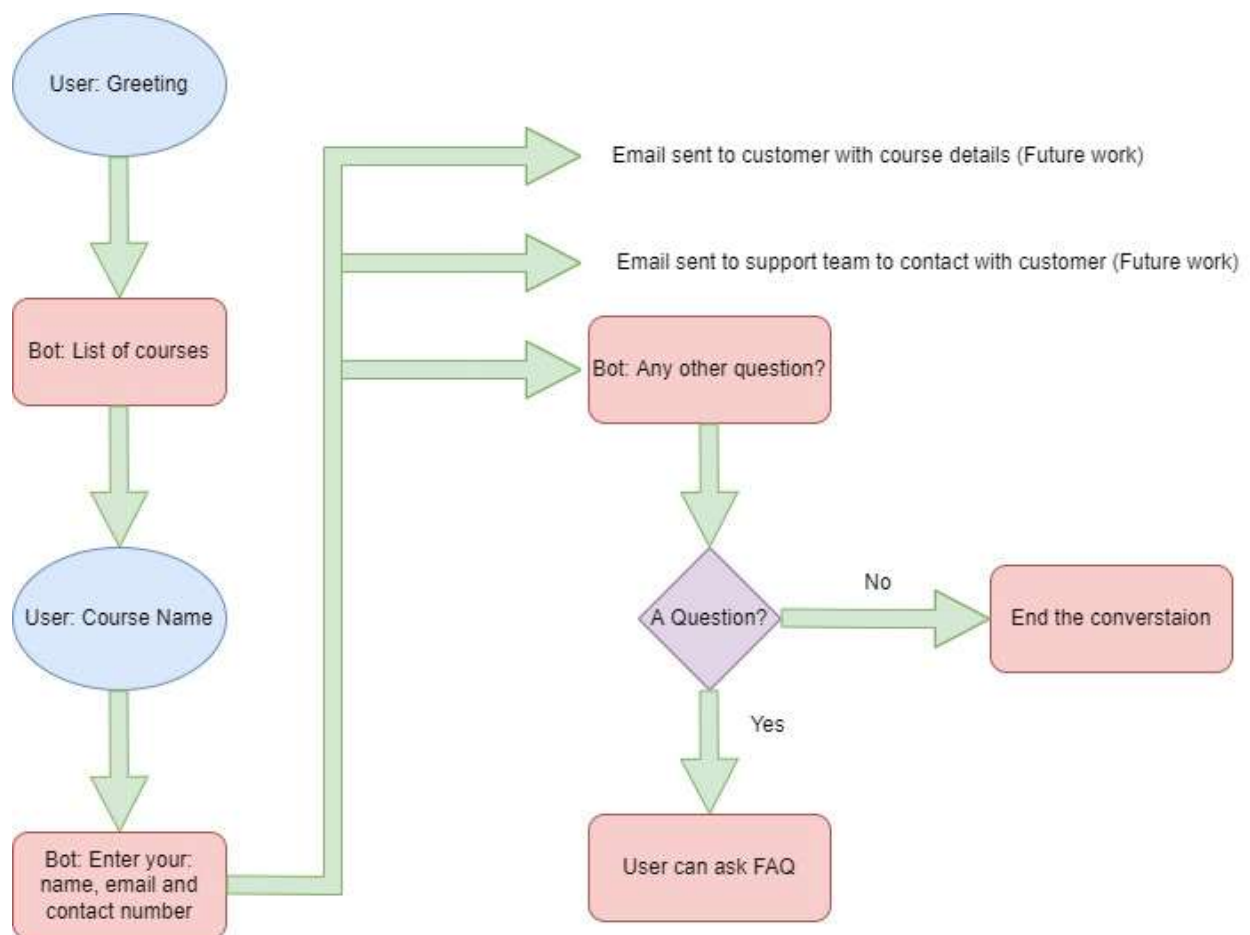


Figure 1 Methodology

Ontology

The “Ischool” institute provides many courses, each course has exactly one director and minimum of 2 instructors.

Ischool has many programs each one has a specific duration as shown:

- 1- Data Science Master’s program - 9 months
- 2- Machine Learning Master’s program- 4 months
- 3- Deep Learning Master’s program - 4 months
- 4- NLP Master’s program - 4 months

Students that join a course can attend online or offline (physically) (student cannot join in both online and offline systems).

Students can only subscribe at exactly one and only one course.

Each instructor can teach minimum 1 course and maximum 3 courses.

Each director can supervise minimum 1 course and maximum 2 courses.

courses have 2 categories and each one has maximum number of students can subscribe of:

- 1- Affordable AI courses - maximum of 800 students.
- 2- Data science master’s program - maximum of 50 students.

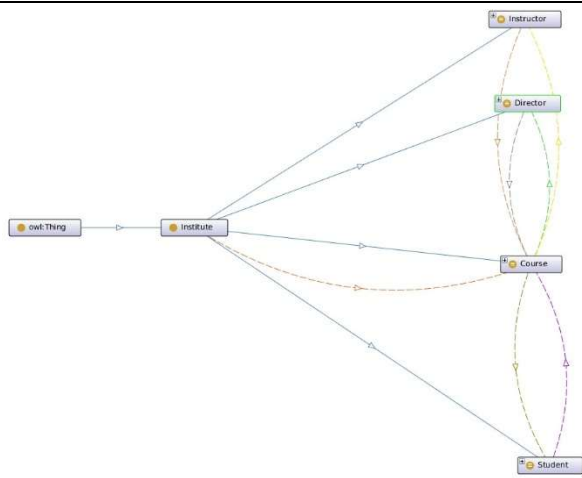


Figure 3 Ontology

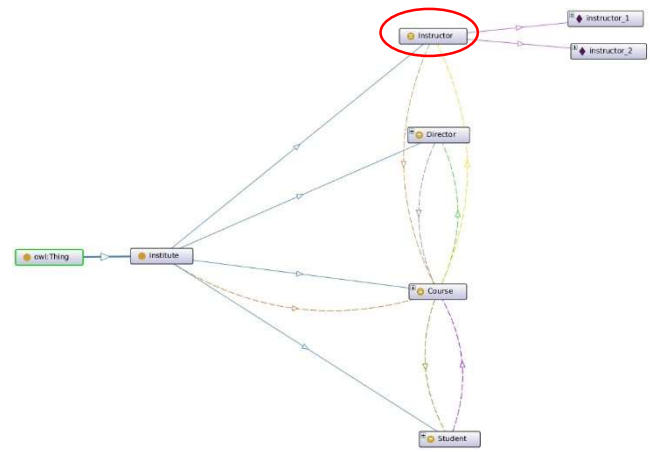


Figure 2 Ontology - Instructor

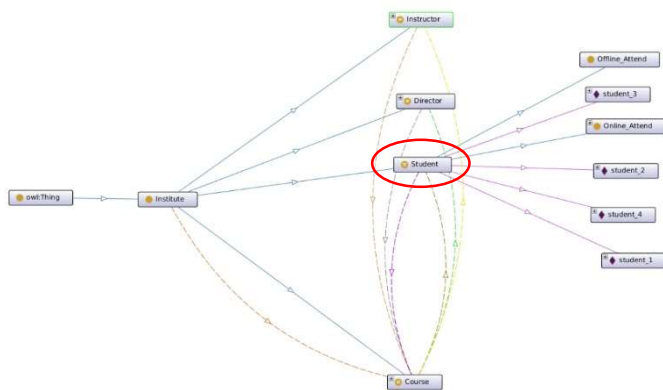


Figure 5 Ontology - Student

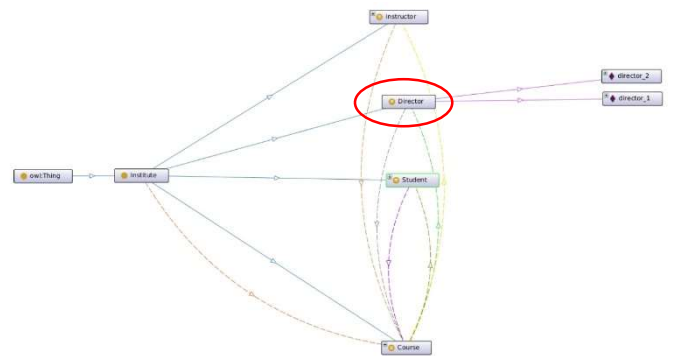


Figure 4 Ontology - Director

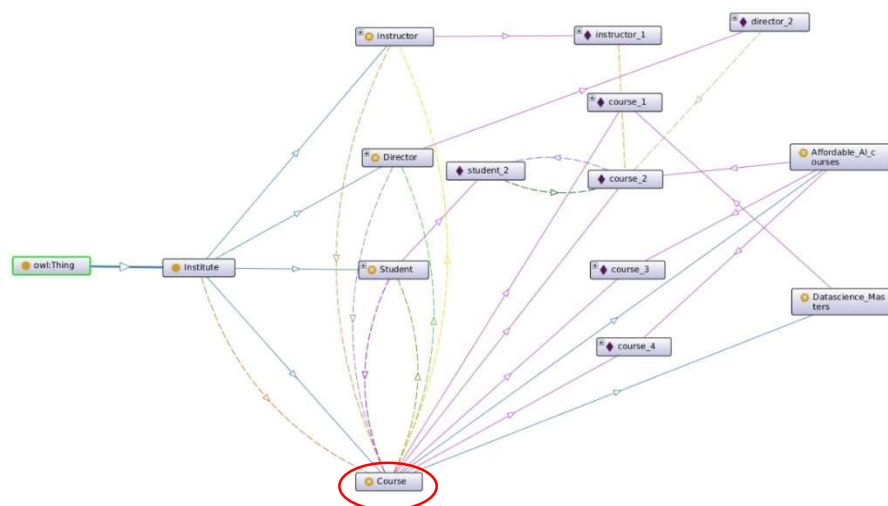


Figure 6 Ontology - Course

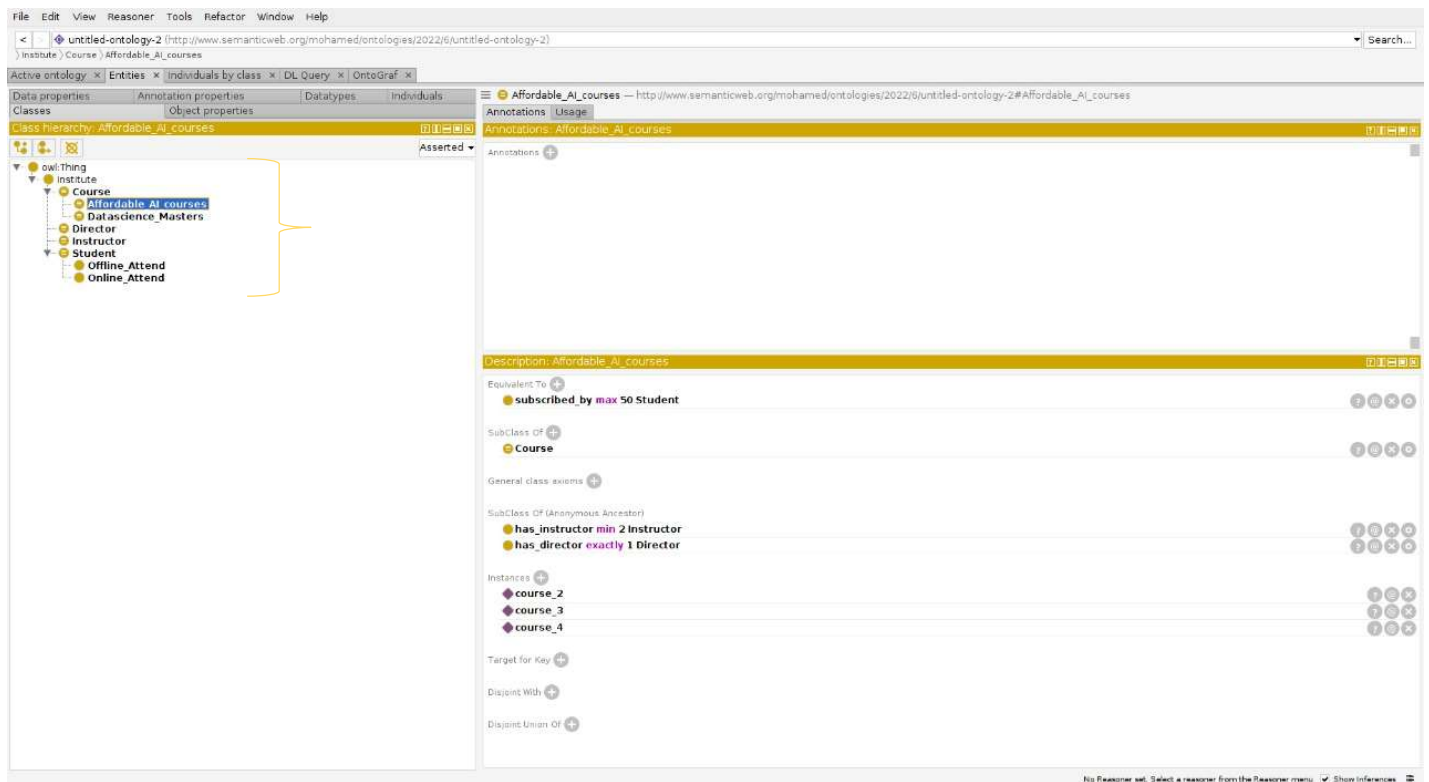


Figure 7 Ontology - Example of class hierarchy

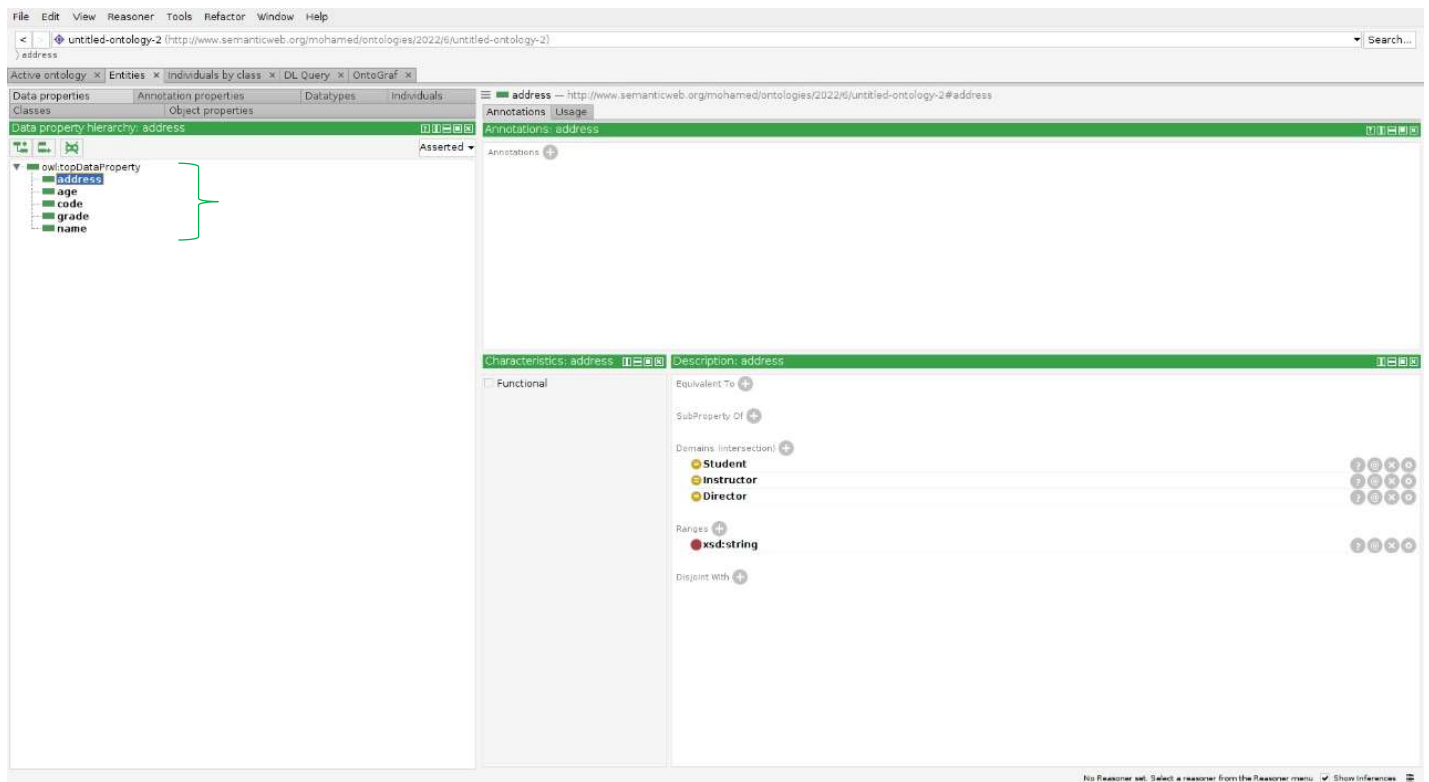


Figure 8 Ontology - Example of data property hierarchy

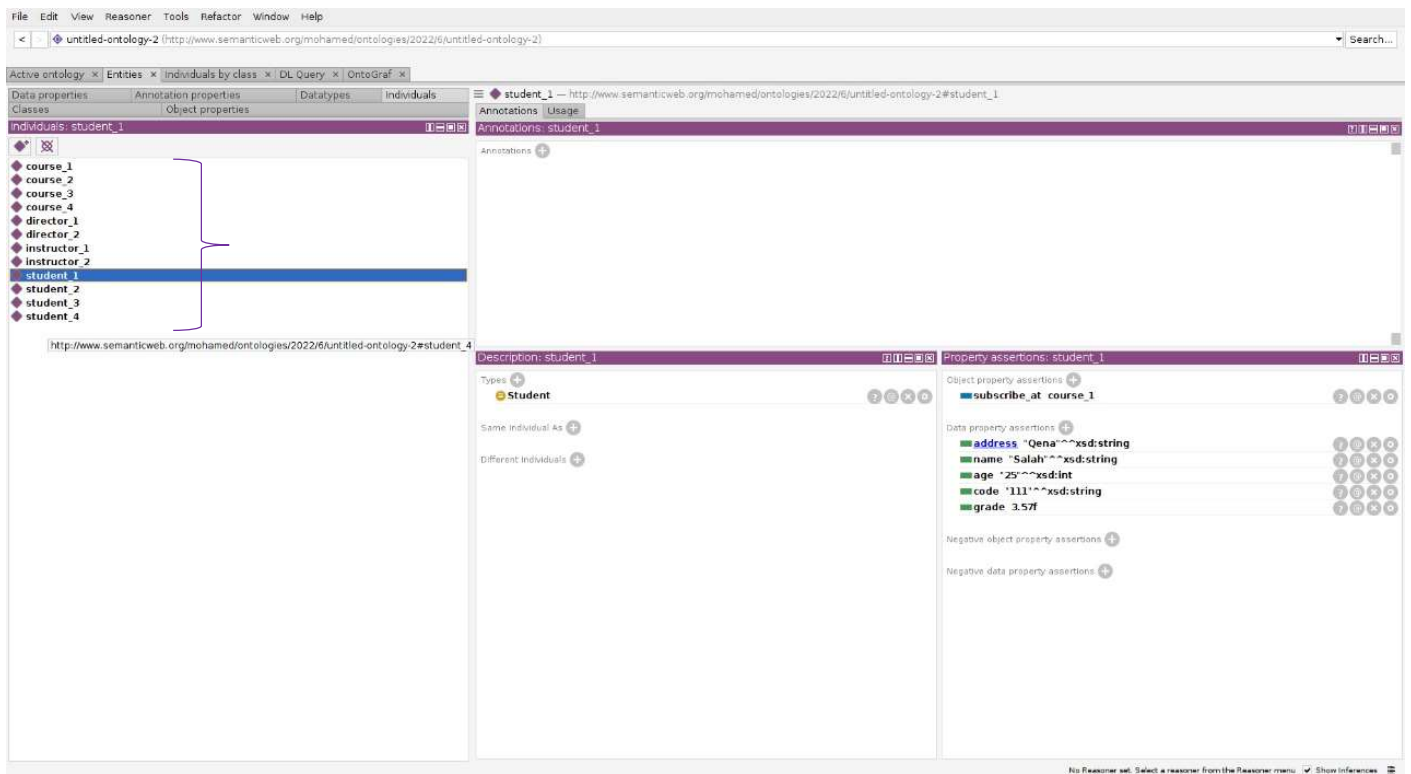


Figure 9 Ontology - Example of individuals

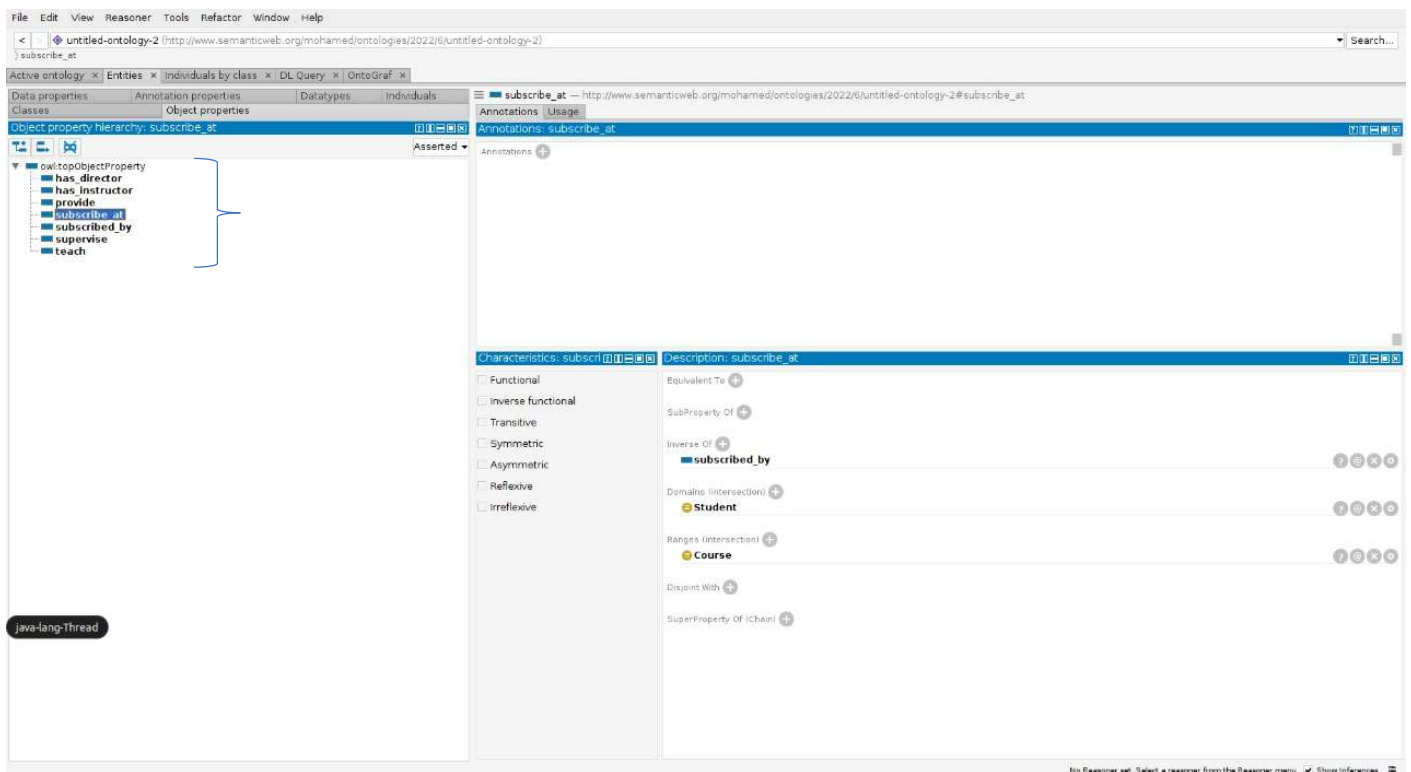


Figure 10 Ontology - Example of object property

System Snaps

System configurations

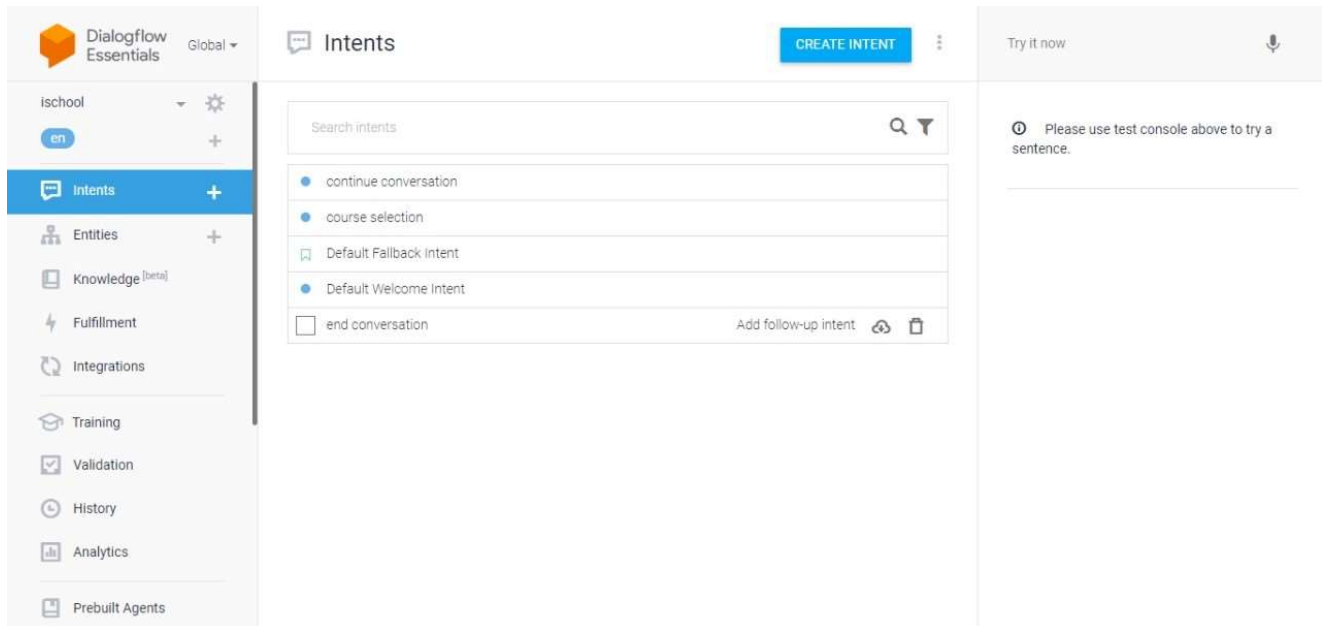


Figure 11 Configuration - intents

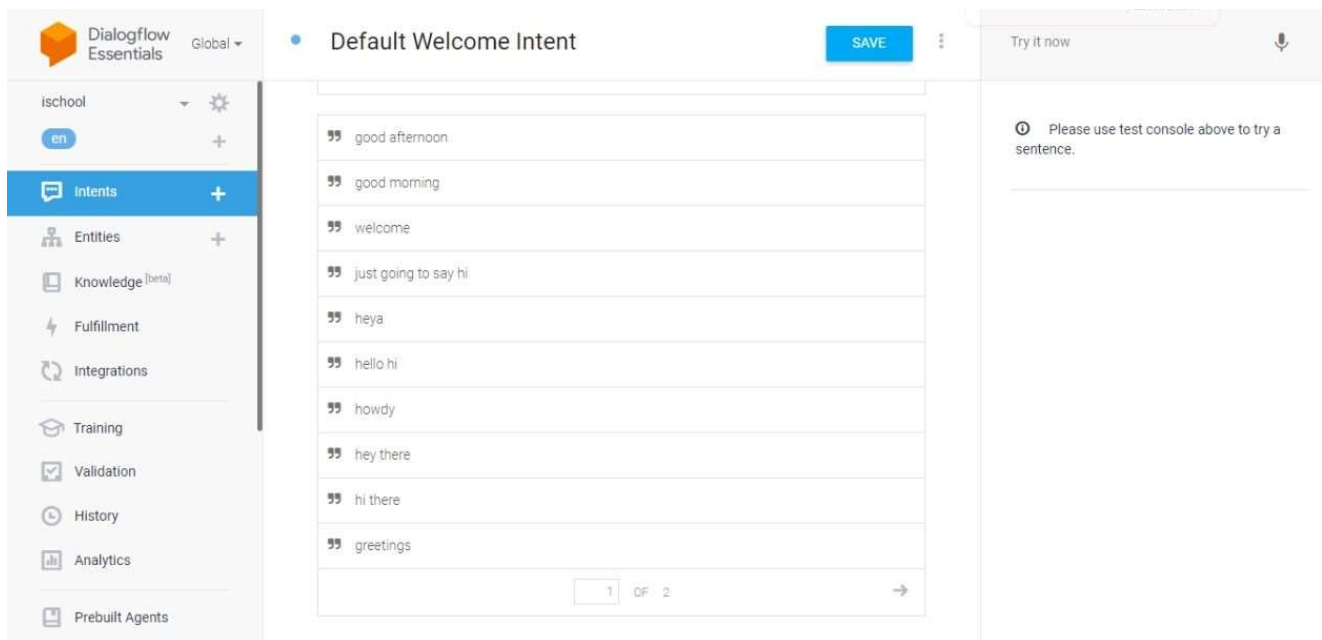


Figure 12 Configuration - Welcome intent

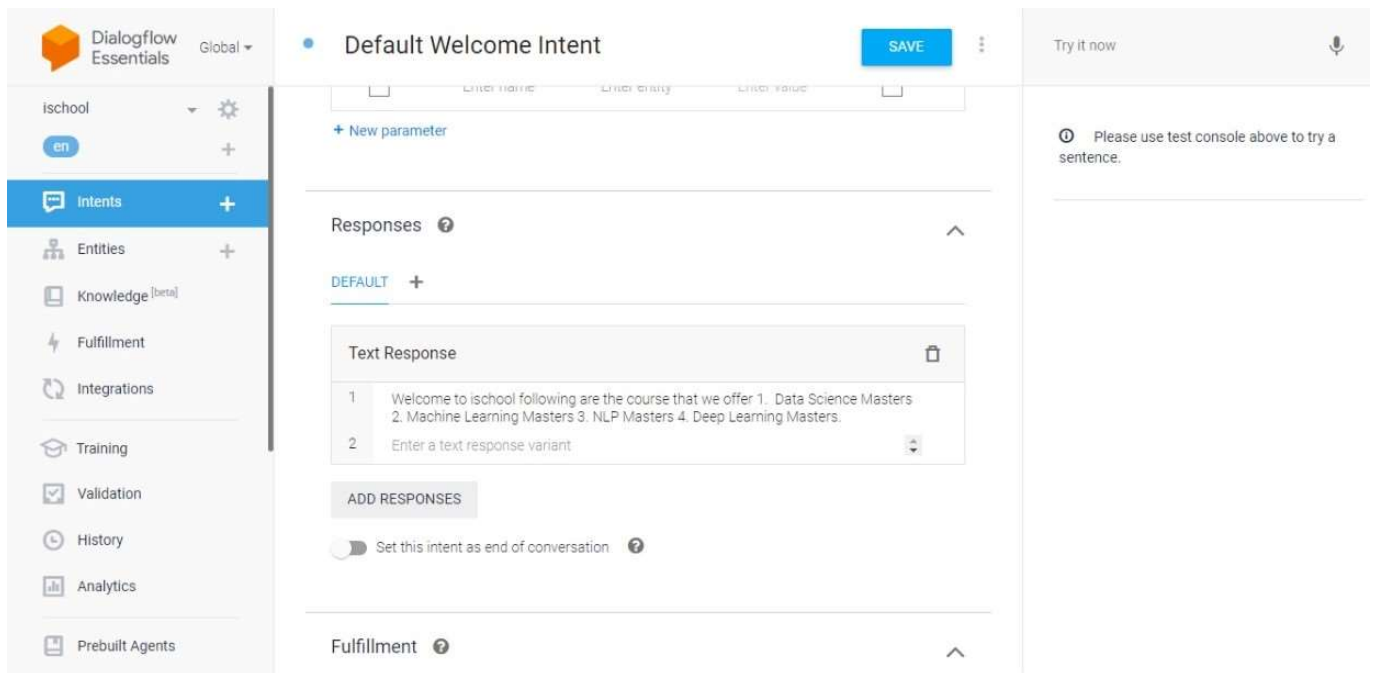


Figure 13 Configuration - Welcome intent (adding responses)

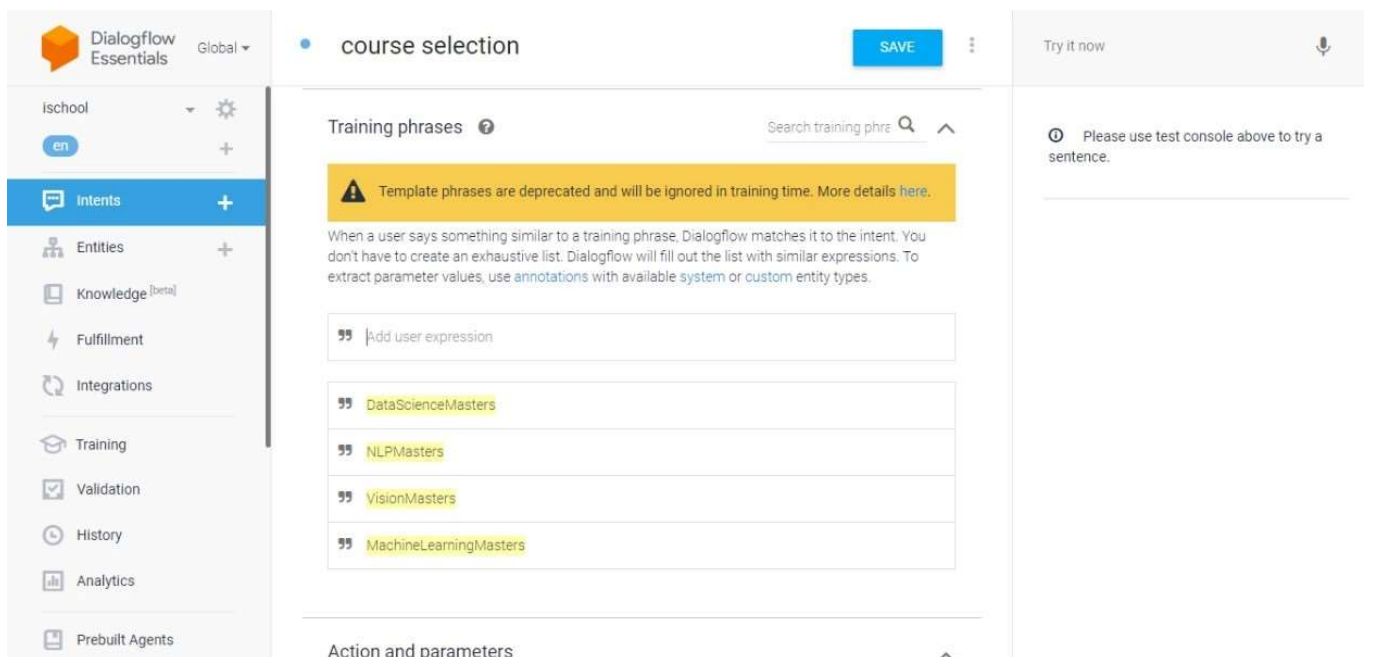


Figure 14 Configuration - Course Selection

Global

ischool

en

+

Intents

+

Entities

+

Knowledge [beta]

Fulfillment

Integrations

Training

Validation

History

Analytics

Prebuilt Agents

course selection

SAVE

Try it now

Action and parameters

Enter action name

REQUIRED	PARAMETER NAME	ENTITY	VALUE	IS LIST	PROMPTS
<input checked="" type="checkbox"/>	course_na	@course_name	\$course_name	<input type="checkbox"/>	please enter yo...
<input checked="" type="checkbox"/>	cust_name	@sys.any	\$cust_name	<input type="checkbox"/>	please enter yo...
<input checked="" type="checkbox"/>	cust_email	@sys.email	\$cust_email	<input type="checkbox"/>	please enter yo...
<input checked="" type="checkbox"/>	cust_contact	@sys.phone	\$cust_contact	<input type="checkbox"/>	please enter yo...
<input type="checkbox"/>	Enter name	Enter entity	Enter value	<input type="checkbox"/>	—

+ New parameter

Please use test console above to try a sentence.

Figure 15 Configuration - Course Selection (action and parameters)

Global

ischool

en

+

Intents

+

Entities

+

Knowledge [beta]

Fulfillment

Integrations

Training

Validation

History

Analytics

Prebuilt Agents

course selection

SAVE

Try it now

Responses

DEFAULT

+

Text Response

1 we have sent the course syllabus and other relevant details to you via email , an email has been sent to support team you will contacted soon , Do you have any further questions?

2 Enter a text response variant

ADD RESPONSES

Set this intent as end of conversation

Fulfillment

Enable webhook call for this intent

Enable webhook call for slot filling

Please use test console above to try a sentence.

Figure 16 Configuration - Course Selection (adding responses)

Dialogflow Essentials

Global

ischool

en

Intents

Entities

Knowledge [beta]

Fulfillment

Integrations

Training

Validation

History

Analytics

Prebuilt Agents

continue conversation

SAVE

Try it now

Please use test console above to try a sentence.

Training phrases

Search training phrase

⚠

Template phrases are deprecated and will be ignored in training time. [More details here.](#)

When a user says something similar to a training phrase, Dialogflow matches it to the intent. You don't have to create an exhaustive list. Dialogflow will fill out the list with similar expressions. To extract parameter values, use annotations with available system or custom entity types.

” Add user expression

” yes i have.

” yes

Action and parameters

Enter action name

Figure 17 Configuration - Continue conversation

Dialogflow Essentials

Global

ischool

en

Intents

Entities

Knowledge [beta]

Fulfillment

Integrations

Training

Validation

History

Analytics

Prebuilt Agents

continue conversation

SAVE

Try it now

Please use test console above to try a sentence.

Enter name

Enter entity

Enter value

+ New parameter

Responses

DEFAULT

+

Text Response

1 please state your question

2 tell me your question

3 please state your query

4 Enter a text response variant

ADD RESPONSES

Set this intent as end of conversation

?

Figure 18 Configuration - Continue conversation (adding responses)

Global

ischool
en

Intents
Entities
Knowledge [beta]
Fulfillment
Integrations
Training
Validation
History
Analytics
Prebuilt Agents

end conversation
SAVE

⚠ Template phrases are deprecated and will be ignored in training time. [More details here.](#)

When a user says something similar to a training phrase, Dialogflow matches it to the intent. You don't have to create an exhaustive list. Dialogflow will fill out the list with similar expressions. To extract parameter values, use [annotations](#) with available system or [custom](#) entity types.

" Add user expression
" end
" no t haven't
" no

Action and parameters

Enter action name

REQUIRED	PARAMETER NAME	ENTITY	VALUE	IS LIST

Try it now

Figure 19 Configuration - End conversation

Global

ischool
en

Intents
Entities
Knowledge [beta]
Fulfillment
Integrations
Training
Validation
History
Analytics
Prebuilt Agents

end conversation
SAVE

Responses

DEFAULT

Text Response

1 thank you for contacting ischool our support team will contact to you soon. Bye.
2 Enter a text response variant

ADD RESPONSES

☒ Set this intent as end of conversation

Fulfillment

☒ Enable webhook call for this intent.

☐ Enable webhook call for slot filling

Try it now

Figure 20 Configuration - End conversation (adding responses)

Dialogflow Essentials
Global

ischool

en

+

Intents

+

Entities

+

Knowledge [beta]

Fulfillment

Integrations

Training

Validation

History

Analytics

Prebuilt Agents

ischool FQA

SAVE

Try it now

Search documents

Q

Document Name	Knowledge Type	Mime Type	Source/Path
ischool.FQA (View Detail)	FAQ	text/csv	File uploaded

+ New Document

Responses

DEFAULT

+

Text Response

1 \$Knowledge.Answer[1]

2 Enter a text response variant

Please use test console above to try a sentence.

Figure 21 Configuration - FAQ (dataset)

Telegram
A new era of messaging.

Build a conversational bot for Telegram.

When your Dialogflow agent is ready, follow these instructions to connect it to your Telegram bot:

- Get a Telegram access token from BotFather and insert it in the 'Telegram Token' field.
- Click 'START' below.

More in documentation.

Telegram token

5578313275.AAFk9PF-ovl0HGozmn6waWAN2hC-F4Qnz5c

Active environment: Draft

CLOSE

STOP

Figure 22 Configuration - Telegram token [1]

Web Demo

Test the agent on its own page. Share the link to the page or embed the ' widget in other websites to get more conversations going. More in documentation.

<https://bot.dialogflow.com/edc2c2db-045b-48f6-80c5-d90bd1759d39>

Seems that your agent info is not filled yet. Set icon and description for better end-user experience.

Add this agent to your website by copying the code below:

```

<iframe
  allow="microphone;"
  width="350"
  height="430"
  src="https://console.dialogflow.com/api-client/demo/embedded/edc2c2db-045b-48f6-80c5-d90bd1759d39"
>
</iframe>

```

CLOSE

DISABLE

Figure 23 Configuration - Web demo

Part of the Frequently asked questions (FAQ):

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
134	Are the courses Online or offline?	We have both online and offline batches as per your need.													
135	Are the batches Online or offline?	We have both online and offline batches as per your need.													
136	Online teaching mode or offline teaching?	We have both online and offline batches as per your need.													
137	timing for weekday batches	We have sent an email to the support team. They are going to contact you with all these details													
138	what is timing for weekday batches	We have sent an email to the support team. They are going to contact you with all these details													
139	what are the timings of courses?	We have sent an email to the support team. They are going to contact you with all these details													
140	what are the timings of the batches?	We have sent an email to the support team. They are going to contact you with all these details													
141	what about course timings?	We have sent an email to the support team. They are going to contact you with all these details													
142	What are the other things we can get from this course	1. You'll get free lifetime acces to the material;2. Live mentoring and doubt clearing;3. Recorded sessions in your dashboard if you miss the class;4. Industry													
143	what are the payment options?	You can pay in full or in installments based on the course that you select. You'll get a call from the support tem soon.After your conversation with our suppo													
144	Where we have to pay?	You can pay in full or in installments based on the course that you select. You'll get a call from the support tem soon.After your conversation with our suppo													
145	what if i want to stop attending the course	A refund is only provided till one month of joining													
146	how many members are going to join	For the affordable AI courses the strength generally is around 800. For Datascience masters the stenth is not more than 50													
147	What will be the number of people in the batch?	For the affordable AI courses the strength generally is around 800. For Datascience masters the stenth is not more than 50													
148	What will be the number of people in the course?	For the affordable AI courses the strength generally is around 800. For Datascience masters the stenth is not more than 50													
149	batch strength?	For the affordable AI courses the strength generally is around 800. For Datascience masters the stenth is not more than 50													
150	Did we need to learn statistics as well?	Yes a basic understanding of the Mathematical concepts is necessary for understanding the algorithms.													
151	What is the process of joining offline courses?	An email with your details have already been sent to the support team. They are going to contact you soon with all the information.													
152	What is the process of joining online courses?	An email with your details have already been sent to the support team. They are going to contact you soon with all the information.													
153	How to join online batch?	An email with your details have already been sent to the support team. They are going to contact you soon with all the information.													
154	How to join offline batch?	An email with your details have already been sent to the support team. They are going to contact you soon with all the information.													
155	you will develop our resume?	We are responsible for building your resume. So a well-structured plan will be drawn out for each candidate resume concerning years of experience; projects													
156	Will you help with my resume building	We are responsible for building your resume. So a well-structured plan will be drawn out for each candidate resume concerning years of experience; projects													
157	what about interviews?	We'll conduct atleast 3 mock interviews for candidates just like the original job interview.													
158	Do you conduct interview sessions also?	We'll conduct atleast 3 mock interviews for candidates just like the original job interview.													
159	Which mode is good? Online or offline?	Both the modes have equal quality of the content delivered. As per your convenience you can choose any of those.													
160	What is good? Online or offline?	Both the modes have equal quality of the content delivered. As per your convenience you can choose any of those.													
161	to whom i can ask my study related doubts?	There will be dedicated doubt clearing session for each of the batches for live doubt clearing. You can share your screen and ask your queries. You can also s													
162	who will clear our doubts?	There will be dedicated doubt clearing session for each of the batches for live doubt clearing. You can share your screen and ask your queries. You can also s													

Figure 24 FAQ

System Output

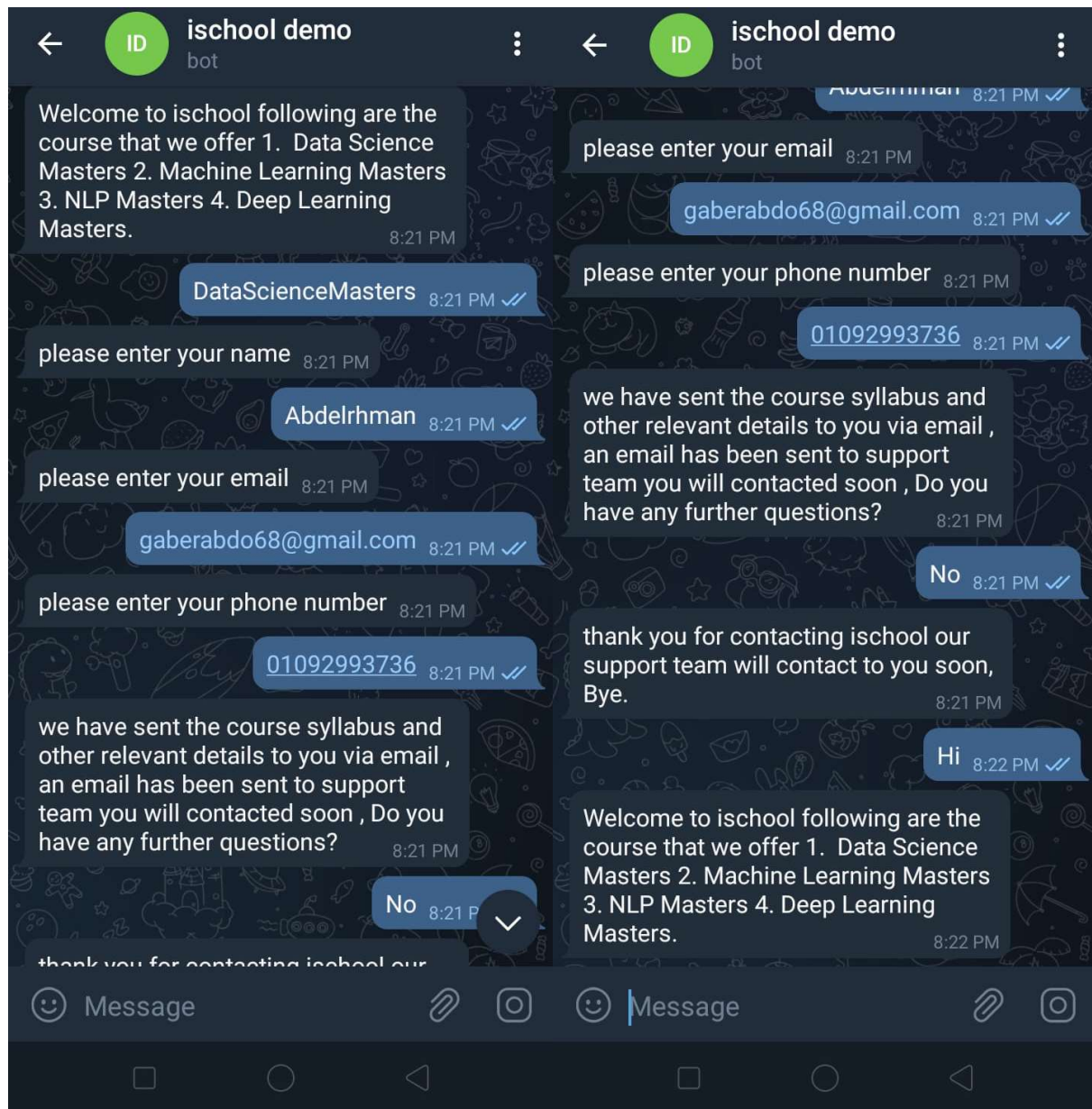


Figure 26 Chatbot interactions - 1

Figure 25 Chatbot interactions - 2

Evaluation

We chose 5 types of questions

- 1- Welcoming (hi, hello, good morning, welcome, good afternoon)
- 2- Ending or thanking like (thanks, thank you, good-bye, see you later, by)
- 3- Details about our service (price, instructor, date, and time of course)
- 4- Discounts
- 5- Content of course and technical questions

Type	Q1	Q2	Q3	Q4	Q5	TOTAL
Welcoming	1	1	1	0	0	3
Ending or thanking	0	0	0	0	0	0
Details about our service	1	1	1	1	0	4
Discounts	1	1	1	1	1	5
Content	1	1	1	0	1	4

1. Welcome sentences

When we test our chatbot with different Welcome sentences

We found that our chatbot can't answer so we add more Welcome sentences

Like good morning and good afternoon.

2. When we entered closing phrases to our bot to end the conversation, such as thank you or goodbye, it did not recognize it.
3. When the user enters his email to reserve a course our chatbot, it does not check whether the user's email is correct or not, so a pre-trained model from google was used to check his email.
4. When the user enters his phone number to reserve a course our chatbot, it does not check whether the user's phone is correct or not, so a pre-trained model from google was used to check the phone number.
5. When it is asked the question "Is there a discount?" it replied: "No. Currently, we do not offer any scholarships."
But when it is asked the same question, but when the letter S is added in "Are there discounts?" it couldn't recognize the question.

After knowing the weaknesses of the chatbot, it was retrained to avoid these mistakes.

References

[1] t.me/ischooldemo_bot (telegram link)

[2] “Build chatbots with Dialogflow,” *Google Developers*.
<https://developers.google.com/learn/pathways/chatbots-dialogflow>