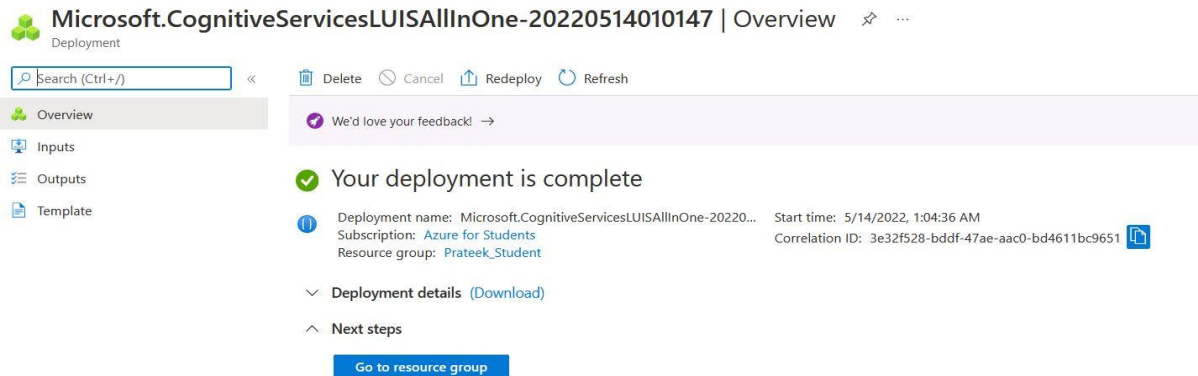


SIT 788

Assignment 7.1: Natural language processing (LUIS)

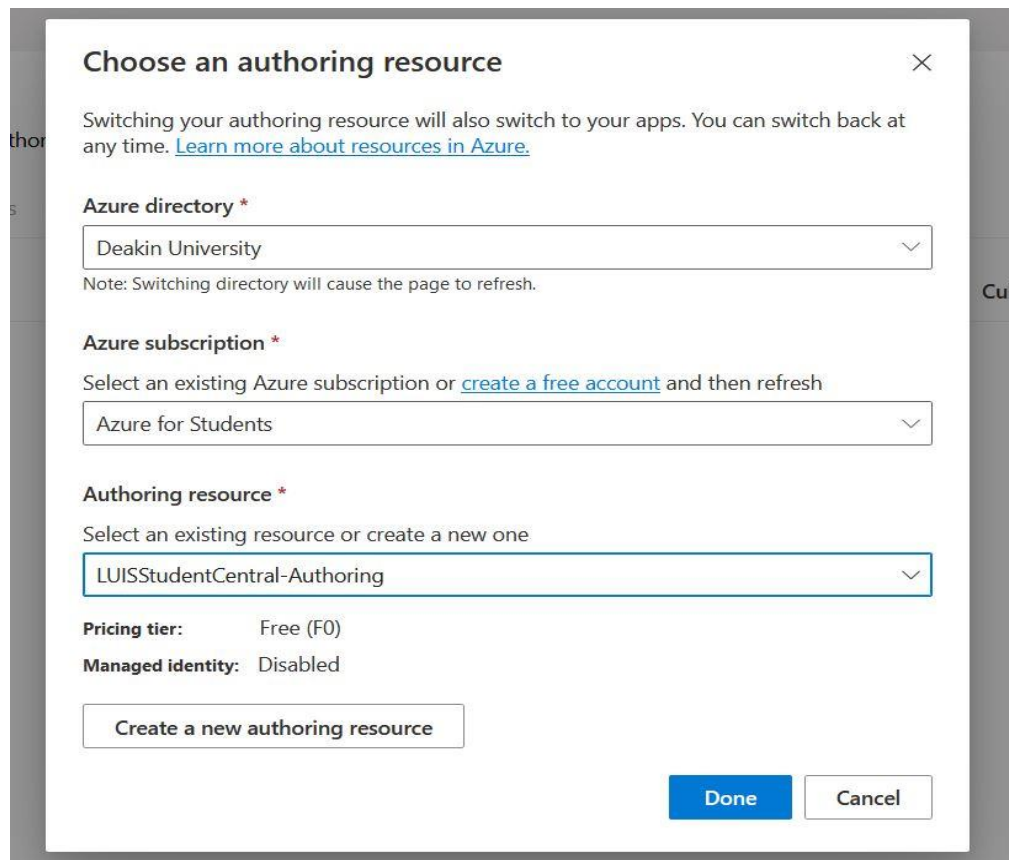
In this task we use LUIS to create a language understanding model which can understand the intent of user based on natural language utterance. The use case for these utterances is to answer student central queries.

Step 1: First we create a LUIS resource in Azure portal.



The screenshot shows the Azure portal interface for a Microsoft Cognitive Services LUIS All-in-One resource. The breadcrumb navigation at the top reads "Microsoft.CognitiveServicesLUISAllInOne-20220514010147 | Overview". Below this, there's a "Deployment" section with a search bar and action buttons: "Delete", "Cancel", "Redeploy", and "Refresh". A left-hand navigation pane lists "Overview" (selected), "Inputs", "Outputs", and "Template". A feedback banner says "We'd love your feedback". A green checkmark icon indicates "Your deployment is complete". Below this, deployment details are listed: "Deployment name: Microsoft.CognitiveServicesLUISAllInOne-20220...", "Subscription: Azure for Students", "Resource group: Prateek_Student", "Start time: 5/14/2022, 1:04:36 AM", and "Correlation ID: 3e32f528-bddf-47ae-aac0-bd4611bc9651". There are expandable sections for "Deployment details (Download)" and "Next steps", and a blue button labeled "Go to resource group".

Step 2: Once the resource is created, we create an app on LUIS.ai using the created resource.



The screenshot shows a "Choose an authoring resource" dialog box. It contains the following fields and options:

- Azure directory ***: A dropdown menu showing "Deakin University". A note below states: "Note: Switching directory will cause the page to refresh."
- Azure subscription ***: A dropdown menu showing "Azure for Students". Text above the dropdown says: "Select an existing Azure subscription or [create a free account](#) and then refresh".
- Authoring resource ***: A dropdown menu showing "LUISStudentCentral-Authoring". Text above the dropdown says: "Select an existing resource or create a new one".
- Pricing tier**: Set to "Free (F0)".
- Managed identity**: Set to "Disabled".
- A button labeled "Create a new authoring resource".
- At the bottom right, there are "Done" and "Cancel" buttons.

Step 3: The following figure shows the app creation screen.

The screenshot shows a 'Create new app' dialog box with the following fields and values:

- Name ***: StudentCentralApp
- Culture ***: English (with an information icon)
- Description**: Answers queries for student central. (with a green circular icon and a refresh icon)
- Prediction resource ⓘ**: LUISStudentCentral

At the bottom right, there are two buttons: 'Done' (blue) and 'Cancel' (white).

Step 4: Once the app is created, we can see the app in the LUIS.ai dashboard.

Name ▾	Last modified ↓ ▾	Culture ▾	Endpoint hits ▾
StudentCentralApp	14/5/2022	en-US	0

Step 5: After creating the app we populate the intent with sample utterances in each category.

<input type="radio"/> Name ↑ ▾	Examples ▾	Features ▾
<input type="radio"/> Applying for intermission	15	+ Add feature
<input type="radio"/> Exams and Timetable help	17	+ Add feature
<input type="radio"/> Finding locations	17	+ Add feature
<input type="radio"/> Greeting	15	+ Add feature
<input type="radio"/> Important dates	16	+ Add feature
<input type="radio"/> None	530	+ Add feature

8 intents have been used to categorize the queries. Each intent uses around 15 utterances and are used to train the model.

The intents described for this use case are:

- **Greeting:** This intent describes the user intent of greeting. Sample utterance:

<input type="radio"/> hello there	0.936
<input type="radio"/> how is it going ?	0.882
<input type="radio"/> <u>good day</u> keyPhrase	0.968
<input type="radio"/> how are you ?	0.957
<input type="radio"/> hey	0.967

- **Applying for intermission:** This intent captures the user's request to provide information related to intermission. Sample utterance:

<input type="radio"/> i can not attend <u>campus</u> for next <u>semester</u> keyPhrase keyPhrase	0.909
<input type="radio"/> i need to defer my <u>studies</u> keyPhrase	0.881
<input type="radio"/> i need a <u>break</u> from <u>studies</u> keyPhrase keyPhrase	0.938
<input type="radio"/> i can not continue this <u>semester</u> keyPhrase	0.919
<input type="radio"/> i need a <u>break</u> from this <u>semester</u> keyPhrase keyPhrase	0.960

- **Exams and Timetable help:** This intent captures the requests related to examination and timetable queries.

<input type="radio"/>	<u>schedule</u> for this <u>trimester</u> keyPhrase keyPhrase	0.885
<input type="radio"/>	what ' s the <u>schedule</u> of this <u>unit</u> ? keyPhrase keyP...	0.824
<input type="radio"/>	when is this <u>class</u> scheduled ? keyPhr...	0.884
<input type="radio"/>	where can i view my <u>timetable</u> ? keyPhrase	0.935
<input type="radio"/>	can i set my <u>timetable</u> ? keyPhrase	0.948

- **Finding locations:** This intent is related to requests which inquire about the location of any place.

<input type="radio"/>	<u>library</u> of deakin ? keyPhrase	0.890
<input type="radio"/>	<u>sports complex</u> of deakin geographyV2 keyPhrase	0.925
<input type="radio"/>	<u>location</u> of the <u>library</u> keyPhrase keyPhrase	0.917
<input type="radio"/>	where is the <u>auditorium</u> ? keyPhrase	0.893
<input type="radio"/>	find the <u>university center</u> geographyV2 keyPhrase	0.903
<input type="radio"/>	find the <u>sports ground</u> geographyV2	0.960

- **Important dates:** This intent is for categorization of the requests which are related to upcoming events and important dates in a calendar year.

<input type="radio"/>	i need <u>information</u> for <u>important dates</u> keyPhrase keyPhrase	0.904
<input type="radio"/>	i need <u>information</u> for <u>upcoming events</u> keyPhrase keyPhrase	0.952
<input type="radio"/>	<u>upcoming events</u> keyPhrase	0.966
<input type="radio"/>	when is the <u>graduation ceremonies</u> keyPhrase	0.874
<input type="radio"/>	<u>information</u> on <u>upcoming events</u> keyPhrase keyPhrase	0.960
<input type="radio"/>	<u>information</u> on <u>important dates</u> keyPhrase keyPhrase	0.912

- **Transportation help:** This intent group is responsible for the queries associated with transportation issues.

<input type="radio"/>	how do i use the <u>bus service</u> to deakin ? <small>keyPhrase</small>	0.919
<input type="radio"/>	how do i reach deakin from <u>sydney</u> ? <small>geograp... keyPhrase</small>	0.965
<input type="radio"/>	how do i <u>travel</u> to deakin ? <small>keyPhrase</small>	0.997
<input type="radio"/>	how do i reach deakin from <u>airport</u> ? <small>keyPhrase</small>	0.969

- **Provide Unit info:**

<input type="radio"/>	<u>number of hours</u> for this <u>unit</u> <small>keyPhrase keyP...</small>	0.952
<input type="radio"/>	provide <u>unit information</u> <small>keyPhrase</small>	0.959
<input type="radio"/>	<u>units information</u> <small>keyPhrase</small>	0.947
<input type="radio"/>	where can i <u>search available units</u> <small>keyPhrase</small>	0.896
<input type="radio"/>	i need <u>help</u> in selecting <u>units</u> <small>keyP... keyPhr...</small>	0.895
<input type="radio"/>	i need <u>information</u> for <u>unit</u> <small>keyPhrase keyP...</small>	0.976

- **Provide Course info:**

<input type="radio"/>	what <u>courses</u> are available at deakin <small>keyPhrase</small>	0.799
<input type="radio"/>	where can i find the <u>information</u> related to this <u>course</u> <small>keyPhrase keyPhrase</small>	0.957
<input type="radio"/>	what is this <u>course</u> <small>keyPhrase</small>	0.976
<input type="radio"/>	what is <u>masters of applied ai</u> <small>keyPhrase</small>	0.912
<input type="radio"/>	am i eligible for this <u>course</u> <small>keyPhrase</small>	0.914
<input type="radio"/>	is this <u>course available</u> <small>keyPhrase</small>	0.980
<input type="radio"/>	i want <u>course structure</u> <small>keyPhrase</small>	0.941

Note: The course info and unit info can be clubbed together but as the queries can be very vast in both the categories hence, they have been assigned separate intents.

Step 6: Once we have created the intents, we can then populate the entities. As the queries can be varied in nature the most important entity for this use case is the key phrase entity which extracts the key phrase which is then used to map the intent of the user.

Entities ⓘ

+ Create Add prebuilt entity Add prebuilt domain entity Rename Delete

Search

<input type="radio"/>	Name ↑ ▾	Type ▾
<input type="radio"/>	boolean	Prebuilt
<input type="radio"/>	datetimeV2	Prebuilt
<input type="radio"/>	dimension	Prebuilt
<input type="radio"/>	geographyV2	Prebuilt
<input type="radio"/>	keyPhrase	Prebuilt
<input type="radio"/>	number	Prebuilt
<input type="radio"/>	ordinal	Prebuilt

After both intent and entities are populated then we move to train the model.

Step 7: Once the model is trained, we can test it using test utterances to find the predicted intent.

Test ✕

Start over Batch testing panel

Type a test utterance ...

where can i get sit788 unit information?
provide unit info (0.895) Inspect

hello
Greeting (0.973) Inspect

when is the lab for this class?
Exams and Timetable help (0.226) Inspect

when is the final examination?
Exams and Timetable help (0.168) Inspect

where is the sports complex?
Finding locations (0.926) Inspect

where is my classroom?
Finding locations (0.121) Inspect

Step 8: Once we are satisfied with model testing, we publish the model. The published model with the endpoint.

The screenshot shows the Azure LUIS portal interface. The top navigation bar includes 'My LUIS / StudentCentralApp v3.1', 'DASHBOARD', 'BUILD', 'MANAGE' (selected), 'Train', 'Test', and 'Publish'. The left sidebar contains 'Settings', 'Publish Settings', 'Azure Resources' (selected), and 'Versions'. The main content area is titled 'Prediction Resources' and 'Authoring Resource'. It features a blue button 'Add prediction resource' and a link 'Un-assign key'. Below this, the resource details for 'LUISStudentCentral' are listed: Resource group: Prateek_Student, Location: australiaeast, Primary Key: c5cfd8aa3d84305bca921cababbb685, Secondary Key: 31a5147ed7a04ab09d85588830229dde, Endpoint URL: https://luisstudentcentral.cognitiveservices.azure.com/, Pricing Tier: S0 (Standard), and Example Query: https://luisstudentcentral.cognitiveservices.azure.com/luis/prediction/v3.0/apps/a4d343ff-a5be-4fdd-9c02-61380fba5e40/slots/production/predict?verbose=true&show-all-intents=true&log=true&subscription-key=c5cfd8aa3d84305bca921cababbb685&query=YOUR_QUERY_HERE. A 'Change query parameters' link is also present.

Endpoint with sample query:

<https://luisstudentcentral.cognitiveservices.azure.com/luis/prediction/v3.0/apps/a4d343ff-a5be-4fdd-9c02-61380fba5e40/slots/production/predict?verbose=true&show-all-intents=true&log=true&subscription-key=c5cfd8aa3d84305bca921cababbb685&query=when is the last date to pay my fees>

Result for sample query: *when is the last date to pay my fees*

```
query: "when is the last date to pay my fees"
prediction:
  topIntent: "Important dates"
  intents:
    Important dates:
      score: 0.9188628
    None:
      score: 0.059562802
    Exams and Timetable help:
      score: 0.0052344482
    Finding locations:
      score: 0.0025977434
    Applying for intermission:
      score: 0.0023786696
    Provide Course Info:
      score: 0.0021076638
    provide unit info:
      score: 0.0017238725
    Transportation help:
      score: 0.0013202347
    Greeting:
      score: 0.00011646181
```