

# Developing and Deploying Intelligent Chat Bots



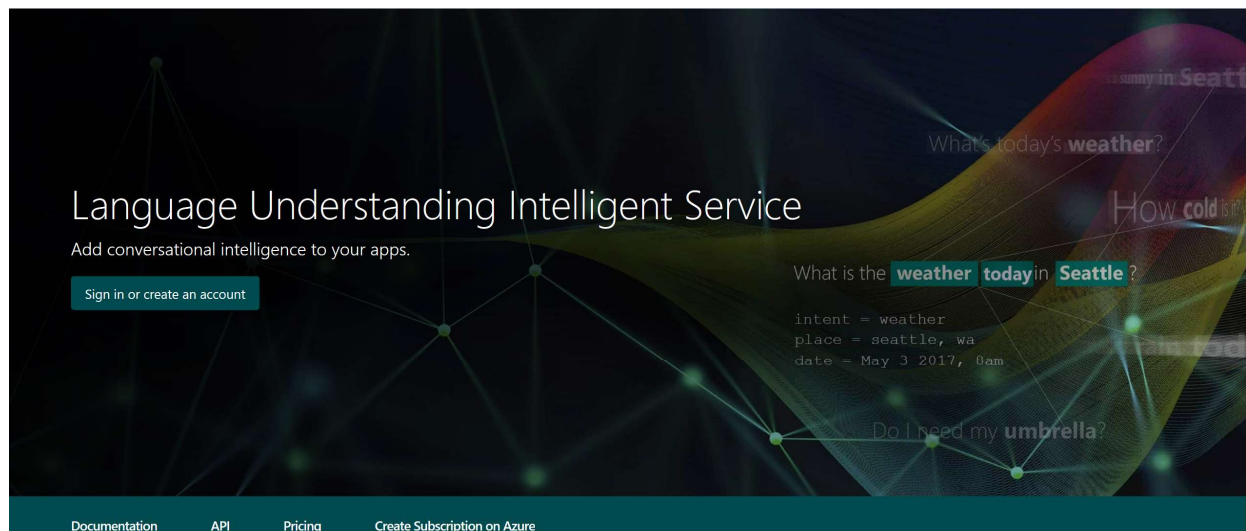
## LUIS Application

# Objectives

The aim of this lab is to create a LUIS app through a real-life example and understand the various components of LUIS. In this lab, we will create a LUIS app for grocery support. The idea here is to define intents and entities related to buying grocery products.

## Create App













1. Go to <https://www.luis.ai> and sign in if you have an account. If you do not have an account, create an account. LUIS homepage at <https://www.luis.ai> looks like the below image:



2. On successful login, you will be taken to *My Apps*. The existing apps created are displayed here. To create a new app, select *New App*.

## My Apps

Create and manage your LUIS applications ...[Learn more](#)

| New App |         | Import App               |               |   |
|---------|---------|--------------------------|---------------|---|
| Name ↓  | Culture | Created date             | Endpoint hits | Controls  |
| HydLab3 | en-us   | Apr 26, 2017 8:01:19 PM  | 0             |     |
| VMLApp  | en-us   | Jun 1, 2017 8:06:41 AM   | 0             |     |
| testApp | en-us   | Jan 16, 2017 11:05:45 PM | 0             |     |

- Fill out the fields in *Create a new app* window. Ensure the key used is BootstrapKey. BootstrapKey is used for testing purposes.

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## My Apps

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New App Import App

| Name ↓                  | Culture | Created date             | Endpoint hits | Controls             |                         |
|-------------------------|---------|--------------------------|---------------|----------------------|-------------------------|
| <a href="#">HydLab3</a> | en-us   | Apr 26, 2017 8:01:19 PM  | 0             | <a href="#">Edit</a> | <a href="#">Refresh</a> |
| <a href="#">VMLApp</a>  | en-us   | Jun 1, 2017 8:06:41 AM   | 0             | <a href="#">Edit</a> | <a href="#">Refresh</a> |
| <a href="#">testApp</a> | en-us   | Jan 16, 2017 11:05:45 PM | 0             | <a href="#">Edit</a> | <a href="#">Refresh</a> |

### Create a new app

Name (REQUIRED)

GroceryApp

Culture (REQUIRED)

English

\* App culture is the language that your app understands and speaks, not the interface language.

Description (OPTIONAL)

An App for Buying Groceries

Key to use (OPTIONAL)

BootstrapKey

Create

- After creating the app, you will be able to see your newly created app in *My apps*. In this example, notice GroceryApp listed in *My apps*.

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# My Apps

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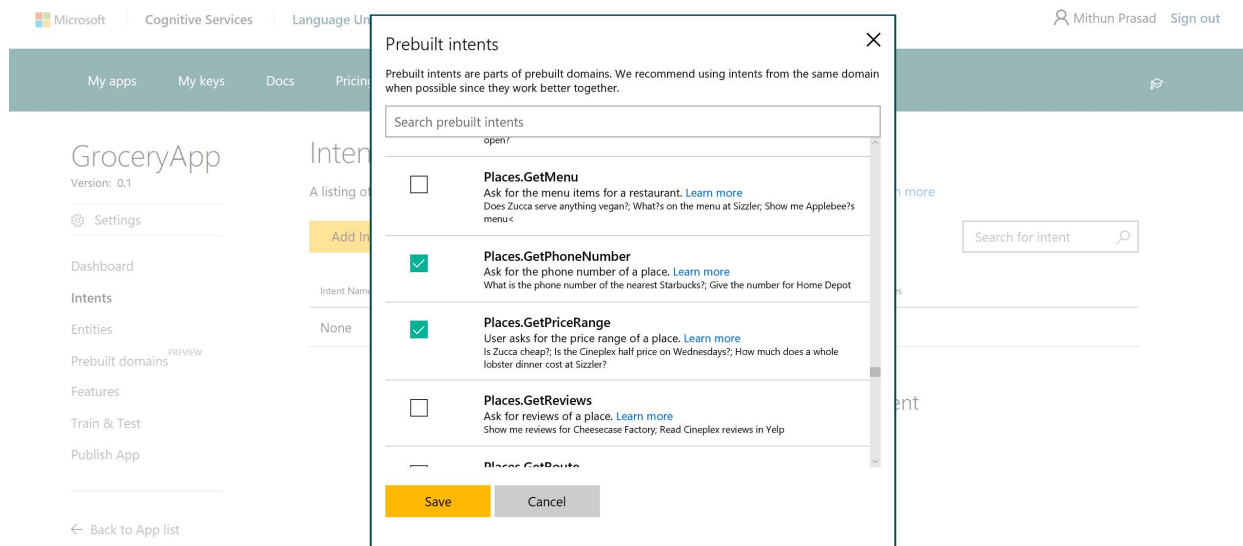
New AppImport App

| Name ↓                     | Culture | Created date             | Endpoint hits | Controls   |
|----------------------------|---------|--------------------------|---------------|--|
| <a href="#">GroceryApp</a> | en-us   | Jun 30, 2017 4:38:20 PM  | 0             | <a href="#">Edit</a> <a href="#">Refresh</a> <a href="#">JSON</a> <a href="#">Delete</a> |
| <a href="#">HydLab3</a>    | en-us   | Apr 26, 2017 8:01:19 PM  | 0             | <a href="#">Edit</a> <a href="#">Refresh</a> <a href="#">JSON</a> <a href="#">Delete</a> |
| <a href="#">VMLApp</a>     | en-us   | Jun 1, 2017 8:06:41 AM   | 0             | <a href="#">Edit</a> <a href="#">Refresh</a> <a href="#">JSON</a> <a href="#">Delete</a> |
| <a href="#">testApp</a>    | en-us   | Jan 16, 2017 11:05:45 PM | 0             | <a href="#">Edit</a> <a href="#">Refresh</a> <a href="#">JSON</a> <a href="#">Delete</a> |

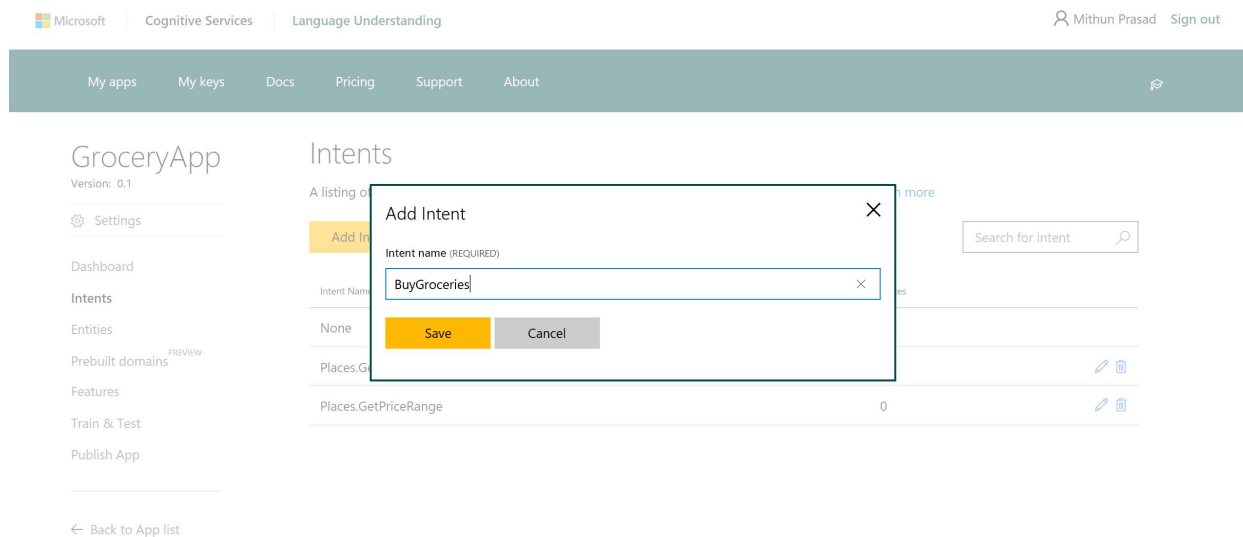
## Intents

1. The core part of any LUIS app is intents. Let us begin by adding prebuilt intents by selecting *Add Prebuilt intents*. We can add `Places.GetPhoneNumber` and `Places.GetPriceRange` for our prebuilt intents.

`Places.GetPhoneNumber` can be useful for a grocery support system where a user may call and ask for a local branch address and phone number. Similarly, `Places.GetPriceRange` would be useful when users query for grocery product prices.



2. Next, let's add our own intent. In this case, we can call it *BuyGroceries*.



3. For the intent *BuyGroceries*, add utterances related to buying groceries.

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## GroceryApp

Version: 0.1

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## BuyGroceries

Here you are in full control of this intent; you can manage its utterances, used entities and suggested utterances ... [Learn more](#)

Utterances Entities in use Suggested utterances

Type a new utterance & press Enter ...

Save Discard Delete Reassign Intent ▾

Labels view (Ctrl+E): Entities ▾

Search in utterances ...

| Utterance text | Predicted Intent |
|----------------|------------------|
|                |                  |

- For the utterance text, you can select token(s) and assign entities by right-clicking and creating an entity. For example, in the utterance text "I want to buy milk", milk can be assigned to an entity GroceryProducts.

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## BuyGroceries

Here you are in full control of this intent; you can manage its utterances, used entities and suggested utterances ... [Learn more](#)

Utterances Entities in use Suggested utterances

Type a new utterance & press Enter ...

Save Discard Delete Reassign Intent ▾

Labels view (Ctrl+E): Entities ▾

Search in utterances ...

| Utterance text   | Predicted Intent |
|--|------------------|
| <input checked="" type="checkbox"/> i want to buy [milk] | Not trained      |

GroceryProducts

GroceryProducts

+ Create entity

Features

Features are a great way to add similar tokens. Features help LUIS recognize both intents and entities, by providing hints to LUIS that certain words and phrases are part of a category or follow a pattern. When the app has difficulty identifying an entity, adding a feature and retraining the LUIS app can often help improve the detection of related intents and entities.

1. Begin by adding phrase list for grocery store names. We can call this GroceryStores. It is worth noting that when you add a value for a grocery store such as "Whole Foods", LUIS makes suggestions to similar values. Not all of them are related, however. Drag the ones that you think are similar to the phrase list.

The screenshot shows the 'Add Phrase list' interface in the LUIS portal. The 'Phrase list name' is 'GroceryStores'. The 'Value' field is empty with the placeholder 'Type and press enter ...'. The 'Hide related values' toggle is turned on. The 'Phrase list values' section contains 'Whole Foods'. The 'Related Values' section lists suggestions: 'starbucks', 'whole food', 'all organic', 'publix', 'costco', 'vegan/vegetarian', 'non processed', 'walgreens', 'macrobiotics', and 'trader joes'. At the bottom, there are checkboxes for 'Is exchangeable?' and 'Is active?', both of which are checked. 'Save' and 'Cancel' buttons are at the bottom right.

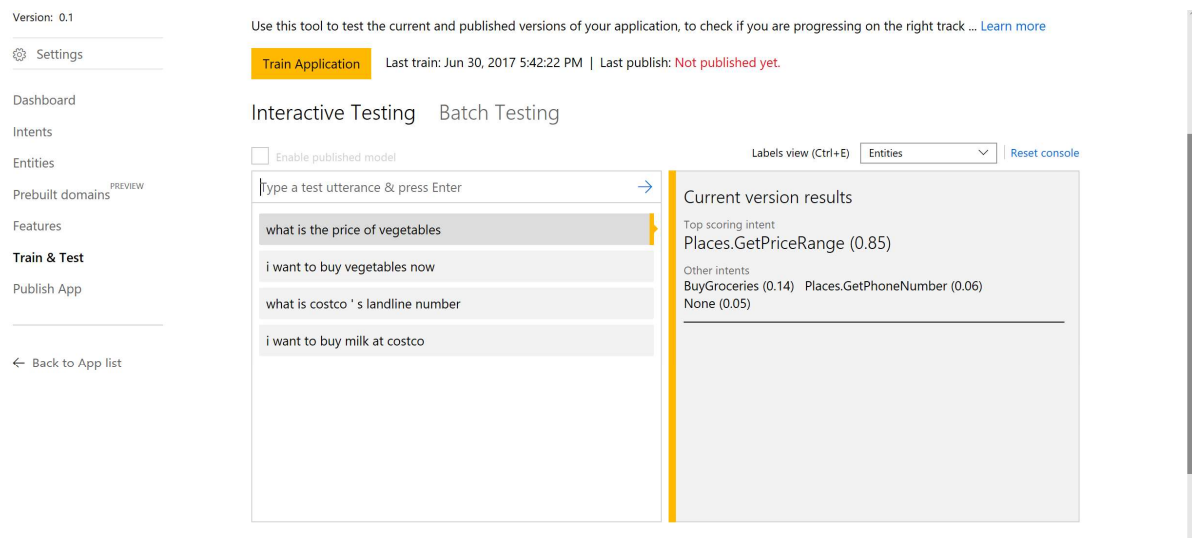
- Features are "exchangeable" in the sense that an utterance where one word/phrase appears would be labeled similarly if the word/phrase were \*exchanged\* with another. For example, for exchangeable phrases "January" and "February", "show the calendar for January" has the same intent as "show the calendar for February".
- Is active makes the phrase list active for the app.

## Train & Test

Development of a robust natural language understanding system would take quite a bit of refinement. When you think you have a rich amount of entities, intents or utterances in your current model, train your app before testing and publishing. With training a model, LUIS generalizes from the examples you have labeled, and builds model to recognize the relevant intents and entities in the future, thus improving its classification accuracy.

There are two ways of testing your app – interactive and batch.

1. Begin with interactive testing by submitting a test utterance in the console. For a test utterance, you will see intents with different scores. LUIS also lists out the intent with the highest score.



2. Batch testing allows for testing of a large number of utterances. Since a dataset is submitted for testing, LUIS also generates a confusion matrix from validation which can help users identify areas to improve.

The dataset has to have a .json extension and must follow the below json format:

```
[
  {
    "text": "I want to buy milk",
    "intent": "None",
    "entities": [
      {
        "entity": "GroceryProducts",
        "startPos": 14,
        "endPos": 17
      }
    ]
  }
]
```



```

    },
    {
      "text": "I want to buy chocolates at costco",
      "intent": "None",
      "entities": [
        {
          "entity": "GroceryProducts",
          "startPos": 14,
          "endPos": 23
        }
      ]
    }
  ]
}
]

```

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### GroceryApp

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### Test

Use this to

Train App

Interact

Import dataset

Status

Test

### Import dataset

Dataset name (REQUIRED)

GroceryDataset

Dataset JSON file (REQUIRED)

C:\Users\miprasad\Downloads\groceryDataset.json Browse...

[Learn about the supported dataset syntax](#)

Save Cancel

| Status          | Test Success | Controls       |
|-----------------|--------------|----------------|
| GroceryDataTest | 2            | Not tested yet |
|                 |              | Not tested yet |

- On successful import, you will be able to view the results (confusion matrix) by selecting *See results*.

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## Test your application

Use this tool to test the current and published versions of your application, to check if you are progressing on the right track ... [Learn more](#)

[Train Application](#)
Last train: Jun 30, 2017 5:44:43 PM | Last publish: Not published yet.

[Interactive Testing](#)
[Batch Testing](#)

[Import dataset](#)

| Status   | Name           | Utterance Count | Last Test Date          | Last Test Success | Controls  |
|--|----------------|-----------------|-------------------------|-------------------|---|
| <span style="color: red;">✖</span> <a href="#">See results</a> | groceryDataset | 2               | Jun 30, 2017 6:03:05 PM | Not tested yet    | <a href="#">↓</a> <a href="#">✎</a> <a href="#">🗑</a> |

You will be able to select different confusion matrix views by selecting entities/intents

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### groceryDataset results

Click a data point or a section title (e.g. True positive) in the graph to see its corresponding utterance(s) in the table below.

Quick Overview (0/2)

**Intents**

- BuyGroceries (0/2)
- None (0/2)
- Places.GetPhoneNumber (2/2)
- Places.GetPriceRange (2/2)

**Entities**

- GroceryProducts (1/2)

"GroceryProducts" results summary

**Precision: (1)   Recall: (0.5)   F-measure: (0.67)**

## Publish App

On successful testing, you are ready to publish your app. Select *Publish App* from the left panel. The BootstrapKey we initially setup for the app was for testing purposes only. Click *Add a new key to your account* to obtain a new key and ensure the *Endpoint slot* is set to Production.

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Publish App

Publish your app as a web service or as a chat bot. You can publish a new app or an updated version of a published app ... [Learn more](#)

Essentials

Latest publish: You haven't published your application yet

Endpoint Key (REQUIRED)

BootstrapKey

This key is for experimental use, you get 1000 endpoint hits per month.

[Add a new key to your account](#)

Publish settings

Endpoint slot

Production

This slot has no published application.

Train Publish

External Key Associations

Add Key Association

You will get an *Endpoint url* after publishing to use in your app as shown below:

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Publish App

Publish your app as a web service or as a chat bot. You can publish a new app or an updated version of a published app ... [Learn more](#)

Essentials

Latest publish: Just now

Endpoint Key (REQUIRED)

BootstrapKey

This key is for experimental use, you get 1000 endpoint hits per month.

[Add a new key to your account](#)

Publish settings

Endpoint slot

Production

Slot info

Published version id: 0.1

Published date: Jun 30, 2017 6:07:56 PM

Endpoint url

<https://westus.api.cognitive.microsoft.com/luis/v2.0/apps/c984d76-c429-4703-b118-33e9bb526a33?subscription-key=9df84fefdee644f5848964c79bf55b7b&verbose=true&timezon=eOffset=0&tz=GMT>

☒ Add verbose flag

☐ Enable bing spell checker

Timezone

(GMT) Western Europe Time, London, Lisbon, C

Train Publish

External Key Associations

Add Key Association

# Exercise

1. For the grocery app, can you add more entities and intents related to grocery shopping?
2. Can you include more features to capture similar milk products? For example, almond milk, soy milk, lactose free milk, etc.
3. Perform batch setting with a larger dataset (about 500 utterances) and investigate the results (confusion matrix) of the app