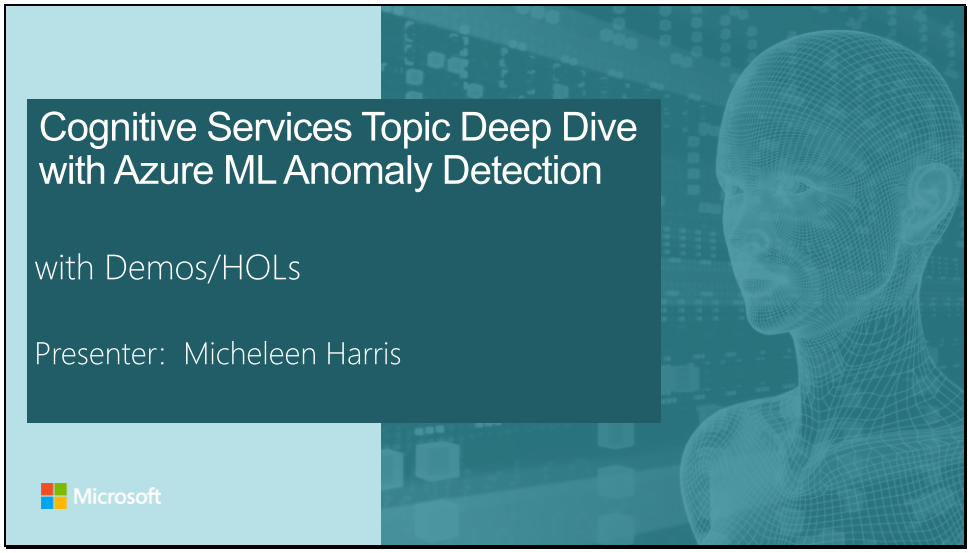
Slide 1


Cognitive Services Topic Deep Dive with Azure ML Anomaly Detection
with Demos/HOLs
Presenter: Micheleen Harris
Microsoft

Slide 2

What you'll know at the end of this session

1. How to use the API Reference for Cognitive Services Entity Linking Intelligent Service (ELIS)
2. What Cognitive Services Text Analytics API detectors entail
3. How to interface programmatically with Azure ML Anomaly Detection
4. How to create a model with Cognitive Services Language Understanding and Intelligent Service (LUIS)

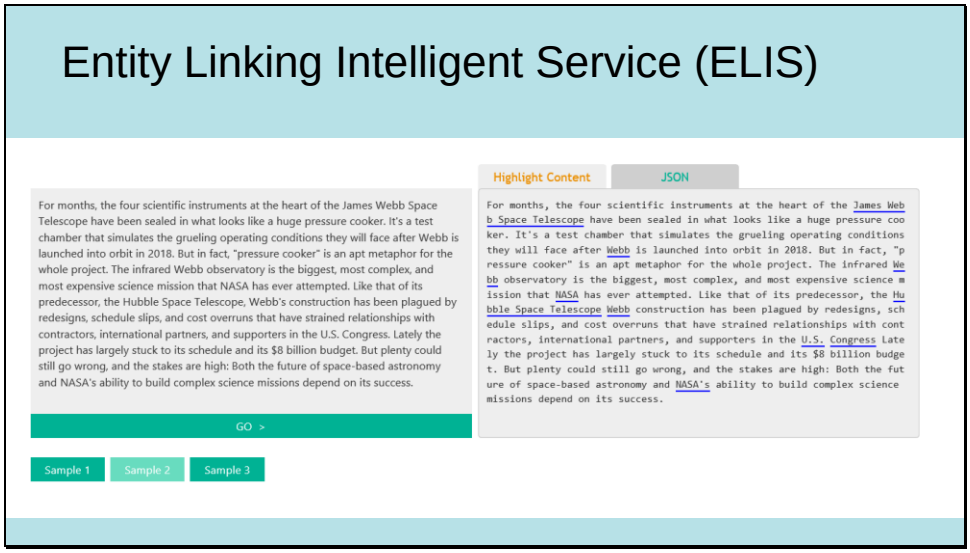
Slide 3


Powering products across Microsoft
Vision
Speech
Language
Knowledge
Search

Slide 4


Cognitive Services Entity Linking Intelligent Service (ELIS)

Slide 5

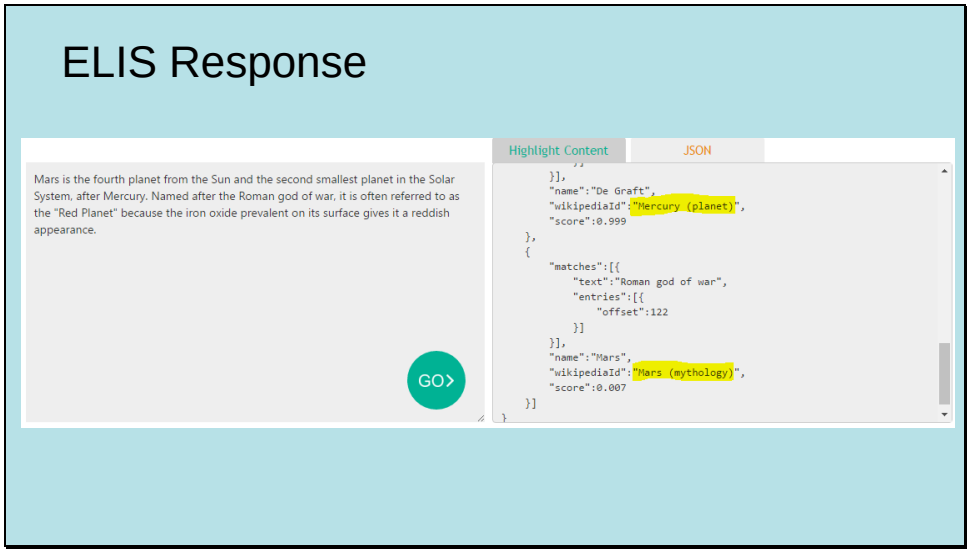


Docs: https://www.microsoft.com/cognitive-services/en-us/entitylinking-api/documentation/overview
Getting started: https://www.microsoft.com/cognitive-services/en-us/entitylinking-api/documentation/GettingStarted

Slide 6

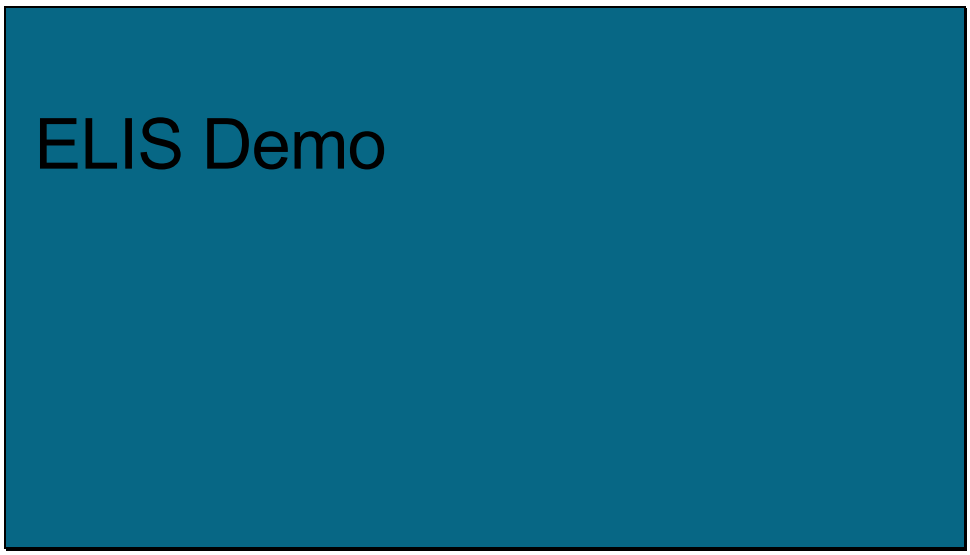
ELIS – Identifying from context

Slide 7



(entity linking)

Slide 8



Obtaining the subscription and using the API Reference (follow along if you like):
Go to: https://www.microsoft.com/cognitive-services/en-us/documentation
Go to: My account (upper right corner)
Request new trials
Select “Entity Linking”, Agree, Subscribe
Once you have a subscription to a service, if you go back to Documentation page, click ELIS drop-down
Go to: API Reference
This is where you’ll find technical info like the Request URL, params, and response, etc. Plus code samples in many programming languages.

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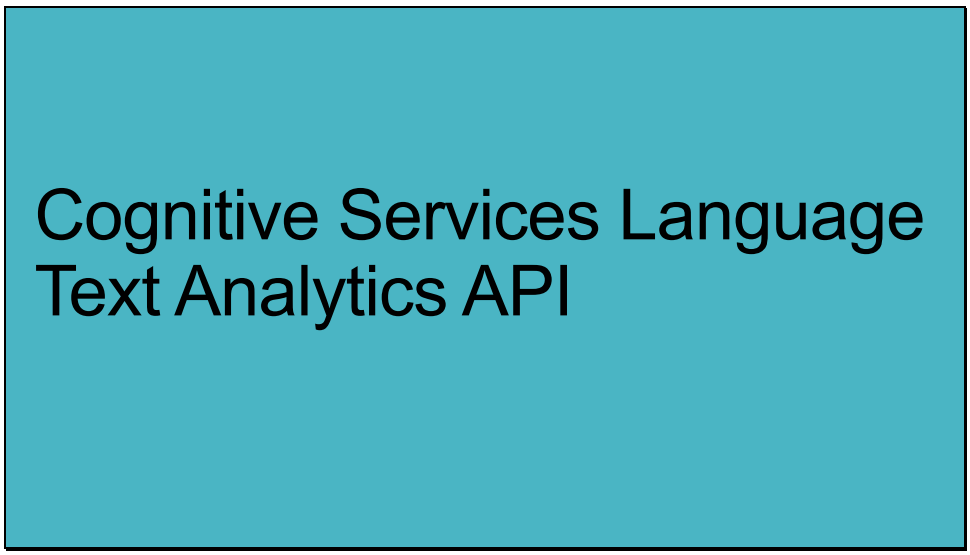
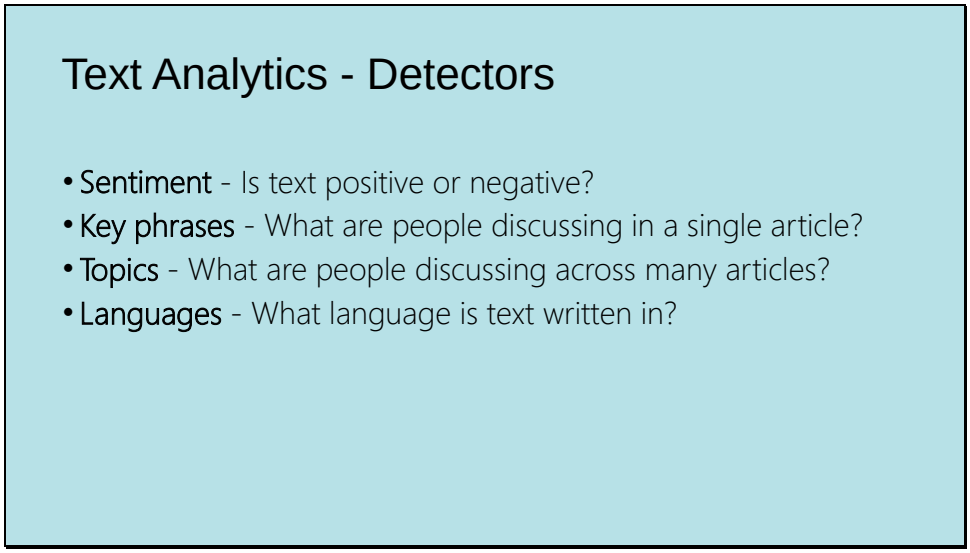


Slide 10



Notes:
Language – 120 languages available as labels
Key phrase – talking points, English only currently
Topic detection – identify main topics over several articles, will need at least 100 documents as input

Nice quick start guide: https://azure.microsoft.com/en-us/documentation/articles/cognitive-services-text-analytics-quick-start/

Tip: for sentiment analysis it's a good idea to split text into sentences to gain higher precision.

For a Bot example leveraging text analytics see: http://docs.botframework.com/en-us/bot-intelligence/language/#example-emotional-bot

key phrases e.g. 'different country' and 'common phrases' in the sentence 'When I travel to a different country, I always like to try to learn how to say common phrases like hello and thank you.'
topic e.g. id main issues in user feedback forms
key phrase and sentiment currently support English, Spanish, German and Japanese

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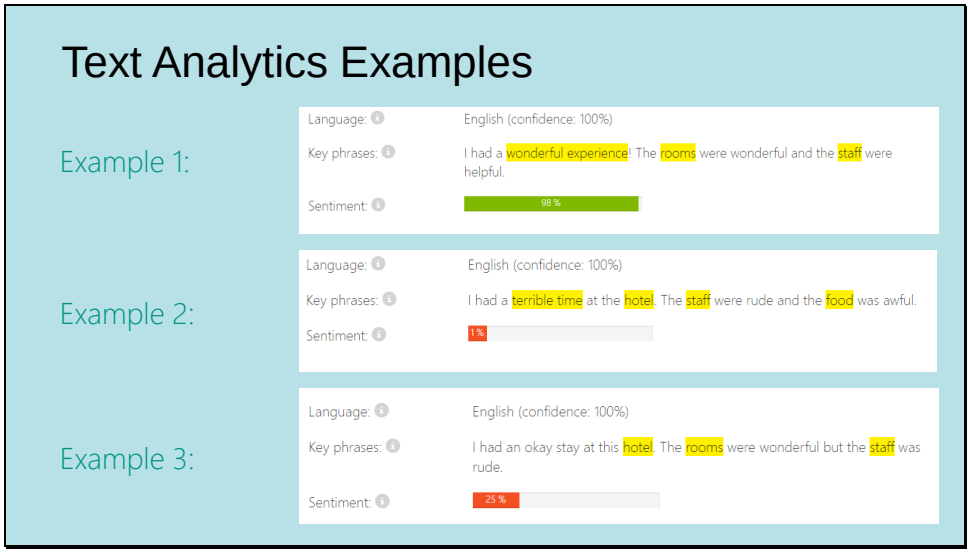
Text Analytics Examples
Example 1:
Language:
English (confidence: 100%)
Key phrases:
I had a wonderful experience! The rooms were wonderful and the staff were helpful.
Sentiment:
98 %
Example 2:
Language:
English (confidence: 100%)
Key phrases:
I had a terrible time at the hotel. The staff were rude and the food was awful.
Sentiment:
1%
Example 3:
Language:
English (confidence: 100%)
Key phrases:
I had an okay stay at this hotel. The rooms were wonderful but the staff was rude.
Sentiment:
25 %

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https://text-analytics-demo.azurewebsites.net/

Another resource:
API Demo - https://text-analytics-demo.azurewebsites.net/Home/SampleCode

Also, check out the API Reference site for this API by clicking on this link on the Documentation page

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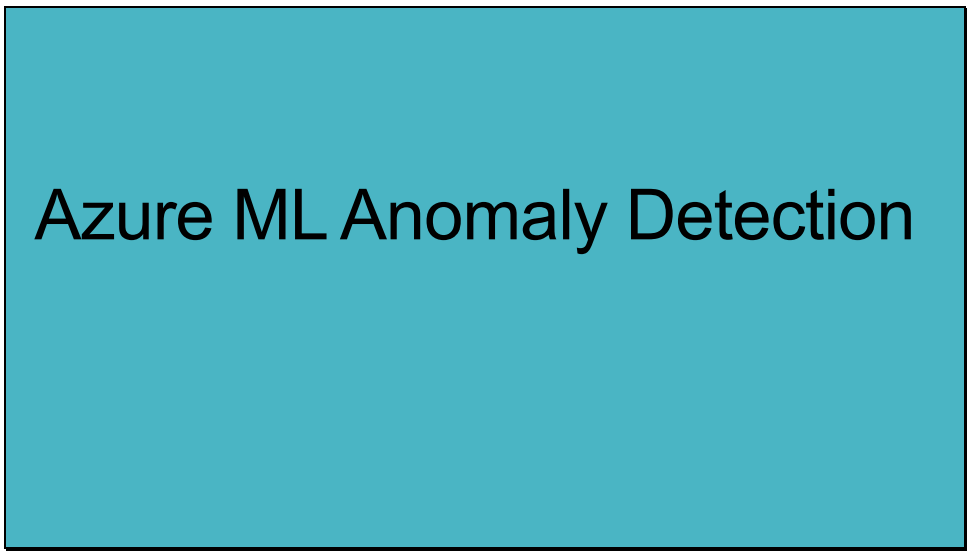

General Azure ML docs: https://azure.microsoft.com/en-us/documentation/services/machine-learning/

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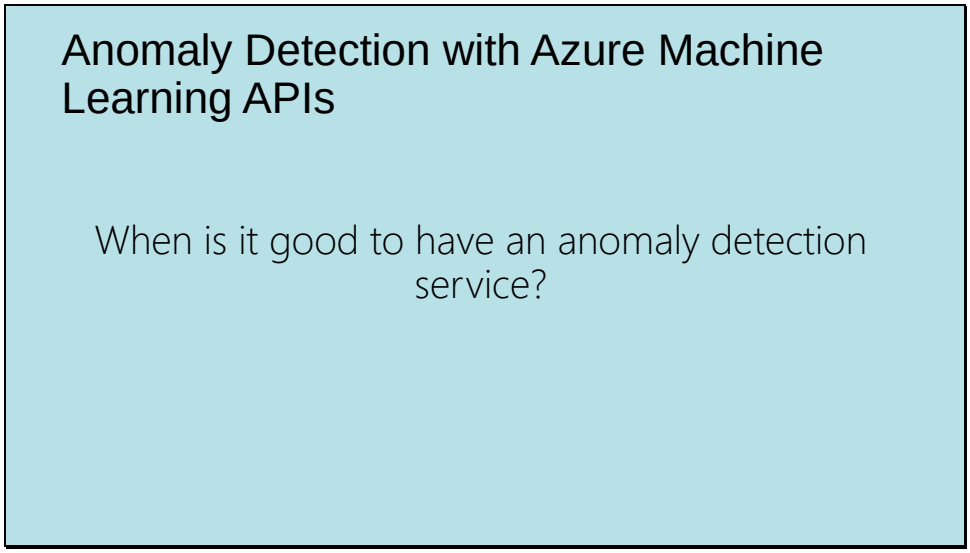
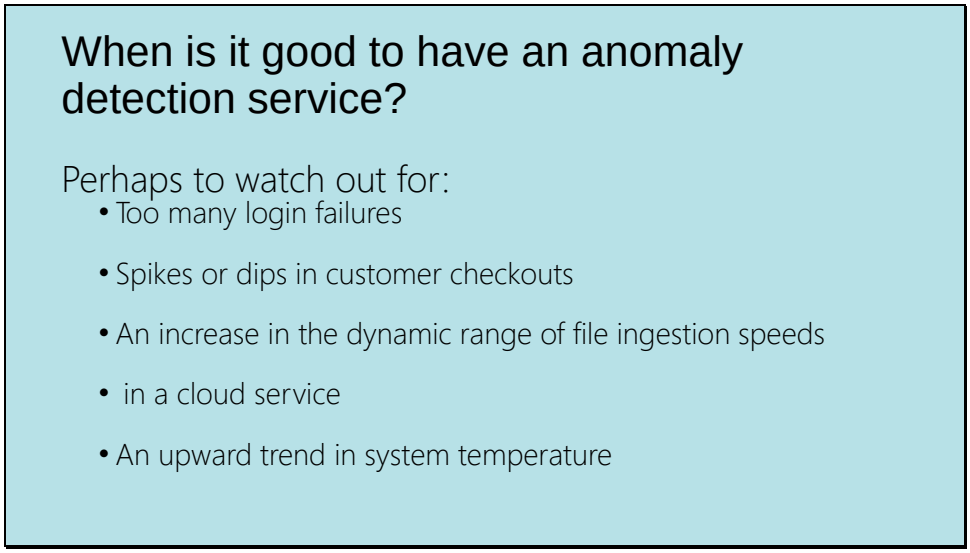


Please, share your thoughts with the class.

Slide 15



These are cases found from monitoring a system where a closer look may be called for. They are indicative of abnormal or anomalous behavior and could indicate a problem. The data could be streaming from a device or come from log files, but no matter the source an anomaly detection model could help predict when a system needs to be examined further.

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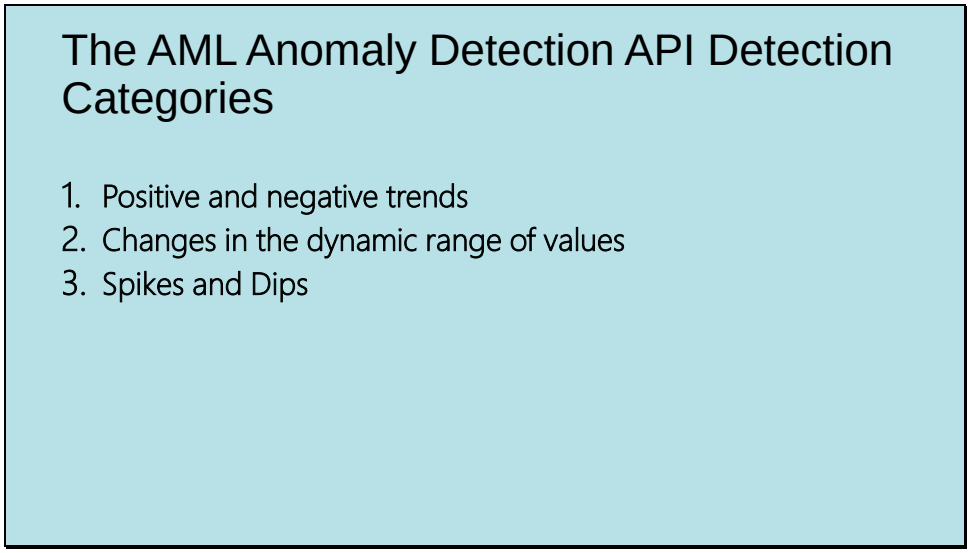

These machine learning detectors track such changes in values over time and reports ongoing changes in their values as anomaly scores. They do not require adhoc threshold tuning and their scores can be used to control false positive rate.

Some more scenarios are:
service monitoring by tracking KPIs over time, usage monitoring through metrics such as number of searches, numbers of clicks, performance monitoring through counters like memory, CPU, file reads, etc. over time.

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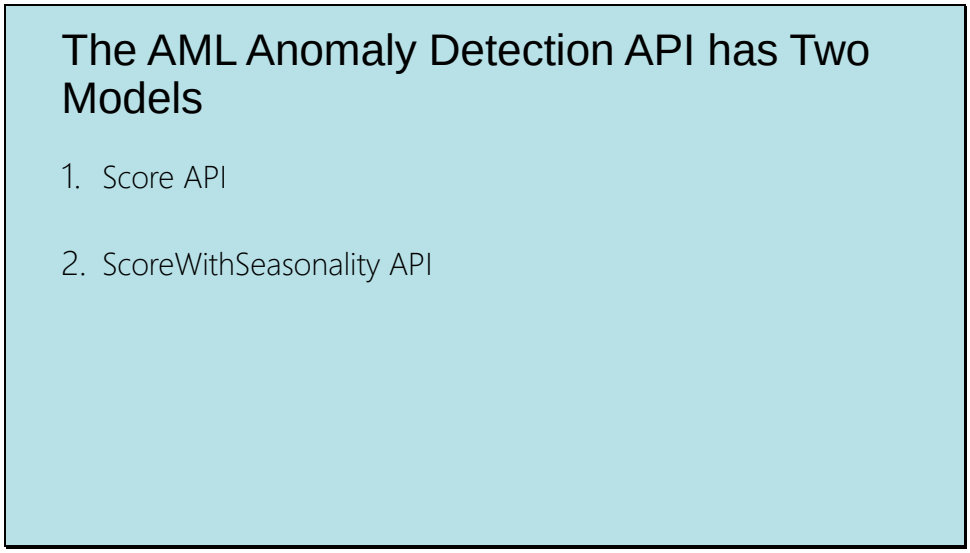

- The Score API is used for running anomaly detection on non-seasonal time series data.
- The ScoreWithSeasonality API is used for running anomaly detection on time series that have seasonal patterns. This API is useful to detect deviations in seasonal patterns.

The APIs run a number of anomaly detectors on the data and returns their anomaly scores.

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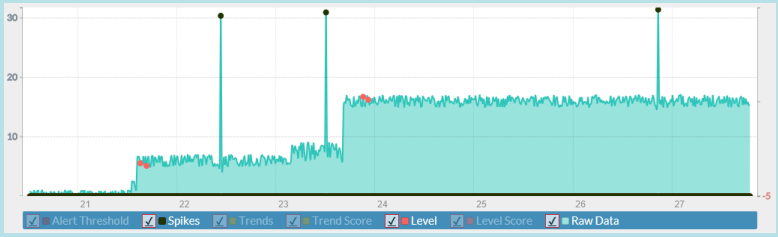
AML Anomaly Detection Score API

Figure representing common input data (time series, non-seasonal)



This time series has 2 distinct level changes, and 3 spikes. The red dots show the time at which the level change is detected, while the black dots show the detected spikes.

We'd use the

- Level change detectors
- Spike detectors

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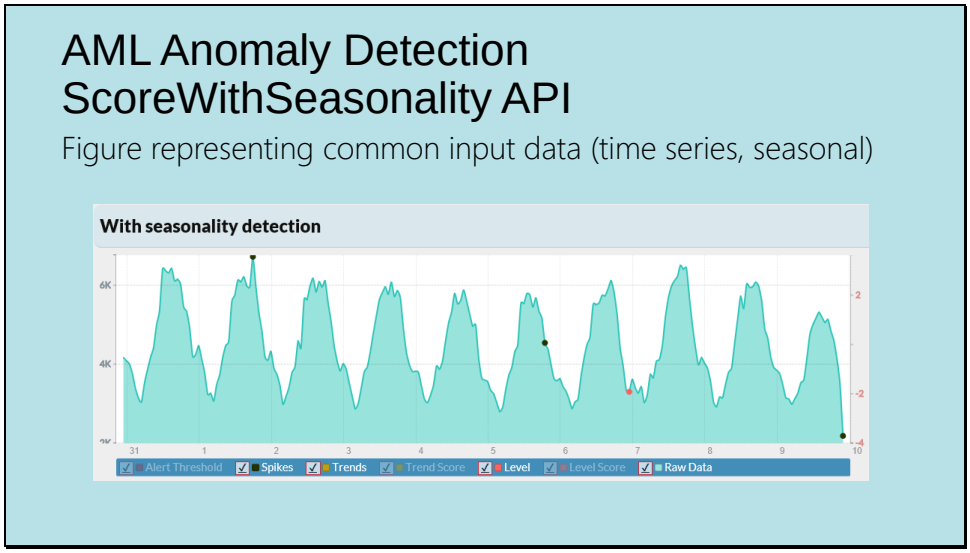

The time series has one spike (the 1st black dot), two dips (the 2nd black dot and one at the end), and one level change (red dot).

We'd use the

- Level change detectors
- Spike detectors (it's actually for spikes *and* dips)

Note that both the dip in the middle of the time series and the level change are only discernable after seasonal components are removed from the series.

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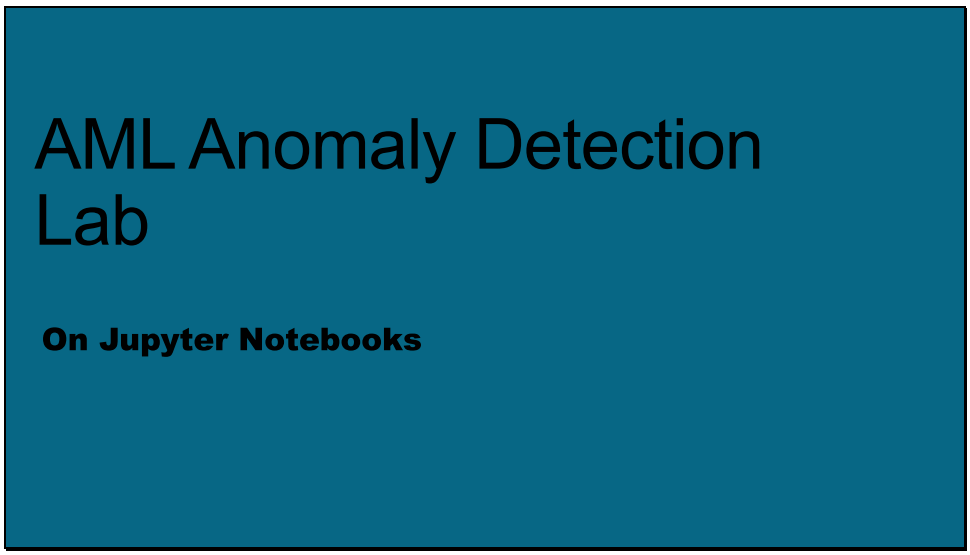

Instructions for getting to notebook:

1. This is where you will use the DSVM username and password on the slip of paper
2. Go https://aka.ms/botnotebooks You may encounter a certificate error in the browser you are in, but rest assured this is expected behavior right now.
    - On chrome: Click “Advanced” and then “proceed to….”
    - On IE: “Continue to this website”…
3. Use the credentials to log in to jupyter
4. Navigate to the “cogservices_samples” folder
5. Go to the AnomalyDetection.ipynb
    - **Save your work as you go** and it will persist and, note, you do not have to download anything until the VM is pulled down on Sept. 5 at EOD PST)
    - Submit bugs, errors, any problems to the email michhar@microsoft.com (Micheleen Harris)

Also, you can obtain this notebook on the bot-education github repository here: https://github.com/michhar/bot-education/tree/master/AzureMachineLearning/Samples

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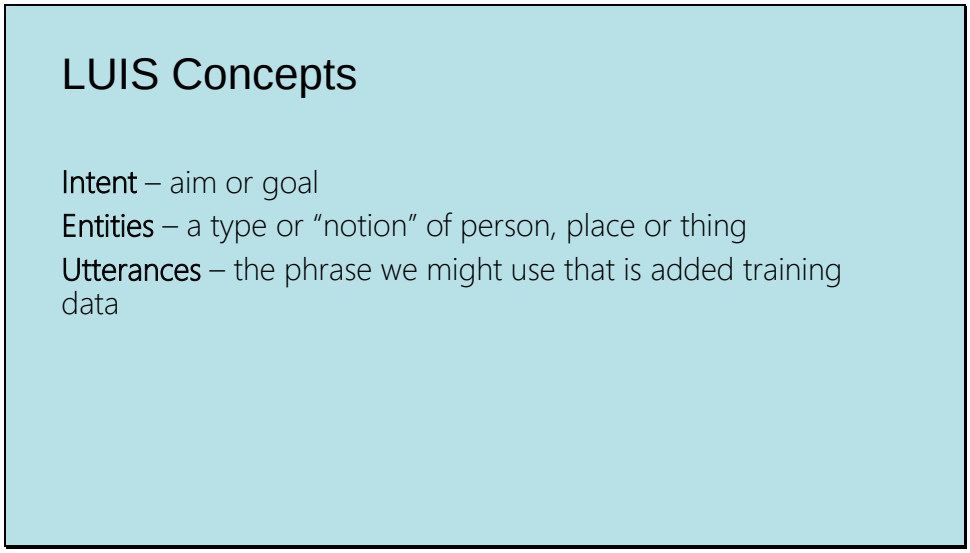
Cognitive Services Language Understanding Intelligent Service (LUIS)

Slide 22



Utterances
If you have unlabeled utterances that your application should handle, they will be available when you edit the application under the "Search" and "Suggest" tabs.

Can link intents to actions and specify requirements for the action

Export LUIS app
Can download your work into a JSON file. This lets you share you application with other developers, or check your LUIS application into your version control.

Pre-Built:
LUIS also provides access to pre-built LUIS applications that use many of the same models found in Microsoft Cortana.

example:
intent – find news on topic and possibly share with another person
entities - We'd like to be able to say what kind of news we are interested in, and also, for sharing, to say who we'd like to share a story with. In order to capture the notion of a news topic, and a recipient for sharing, let's create two entity types: "Topic" and "Recipient".

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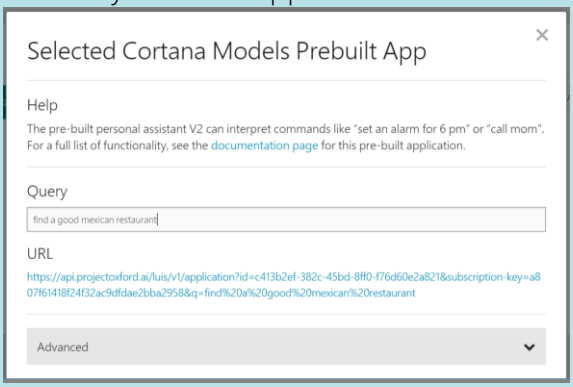
Pre-built LUIS Cortana model

Just save id and key to use in app



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LUIS Concepts - Entities

Hierarchical entities – entity that inherits from other entities (start date and end date can inherit from the general date entity)

Composite entities - an entity that is form of a set of existing entities (e.g. a ticket entity as a composite of count and class)

hierarchical entities - The generic entity acts as the parent and the children are the specific types, or sub-groups, under the parent, yet both share the same characteristics. e.g. Date (Start Date and End Date)
composite - In a flight booking app, a user may say “Book 2 adult tickets to Paris next Monday”. In this example, we may create a composite entity called “Tickets”, including the component entities “number” and “category” to capture the number and category of tickets to be booked. If not already existing, you need to define both entities before defining the composite.

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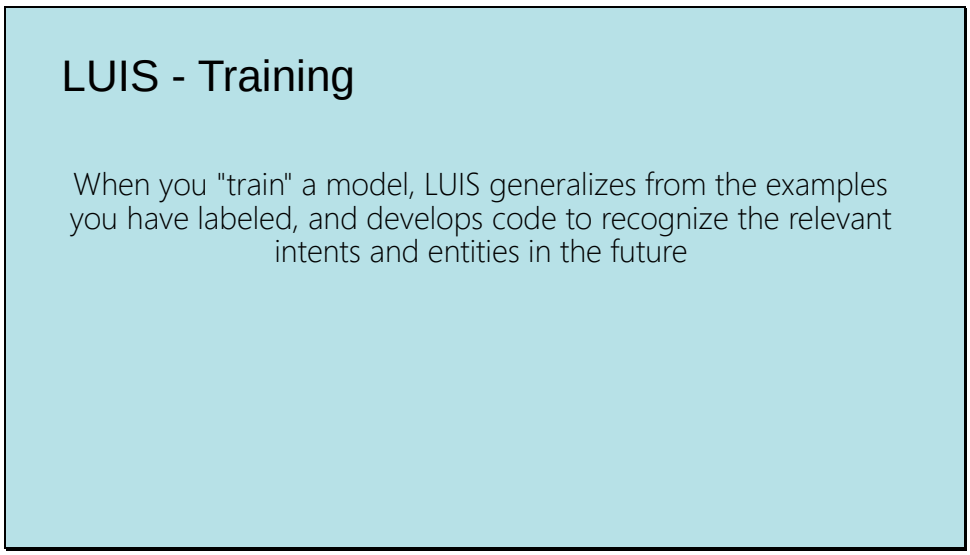

Internally, LUIS uses logistic regression classifiers to determine intents, and conditional random fields (CRFs) to determine the entities. The training process results in optimized classifiers and CRFs, referred to as models, that LUIS can use in the future.

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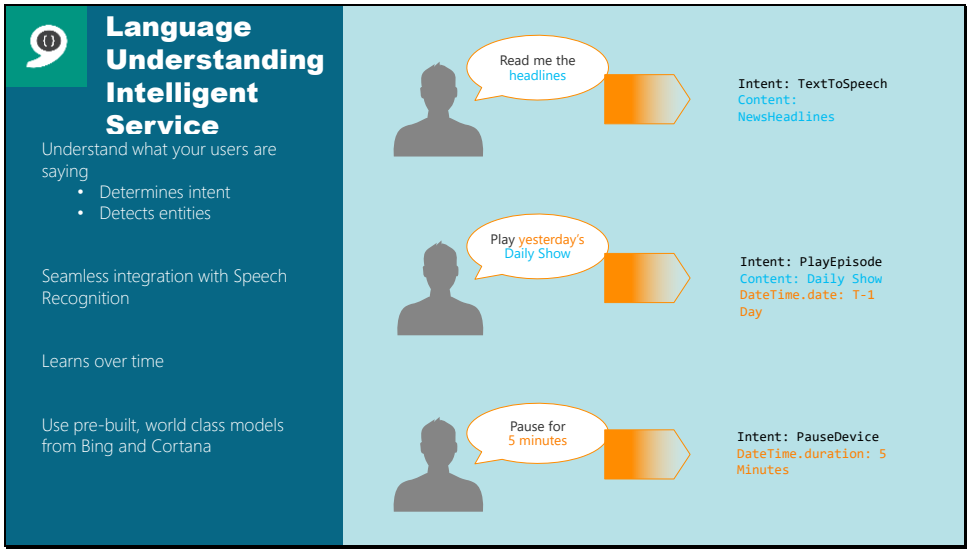
Language Understanding Intelligent Service
Understand what your users are saying
• Determines intent
• Detects entities
Seamless integration with Speech Recognition
Learns over time
Use pre-built, world class models from Bing and Cortana
Read me the headlines
Intent: TextToSpeech
Content: NewsHeadlines
Play yesterday's Daily Show
Intent: PlayEpisode
Content: Daily Show
DateTime.date: T-1 Day
Pause for 5 minutes
Intent: PauseDevice
DateTime.duration: 5 Minutes

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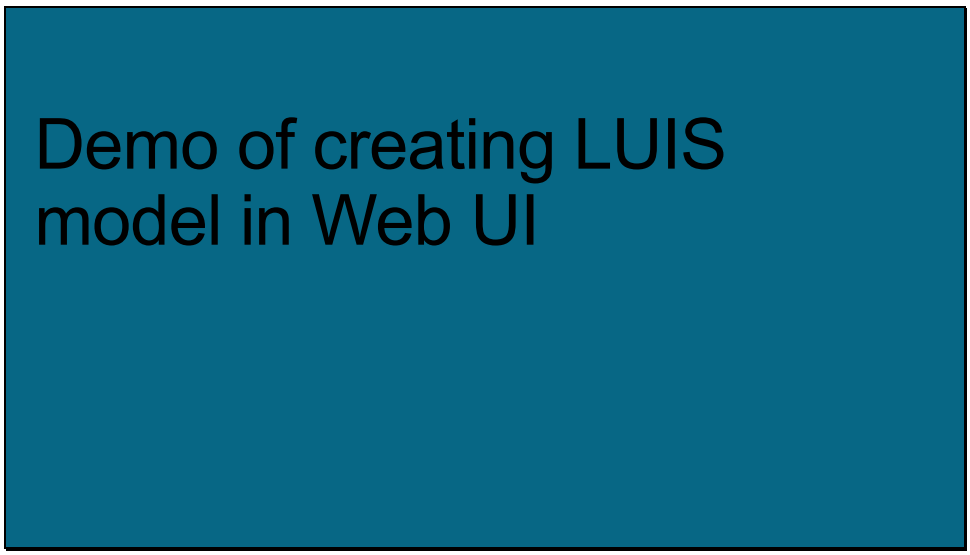

https://www.luis.ai/ - create an app here (a model that's used for intents in natural language later on)
https://www.luis.ai/Help#CreatingApplication - for a complete guide on creating a LUIS model and app for consumption

Note that sentences longer than 500 characters will result in an error message.
The sentences that LUIS receives are automatically logged for future use.
LUIS returns a JSON object, with fields and scores for each of the entities and models you have created
- all on the help like above

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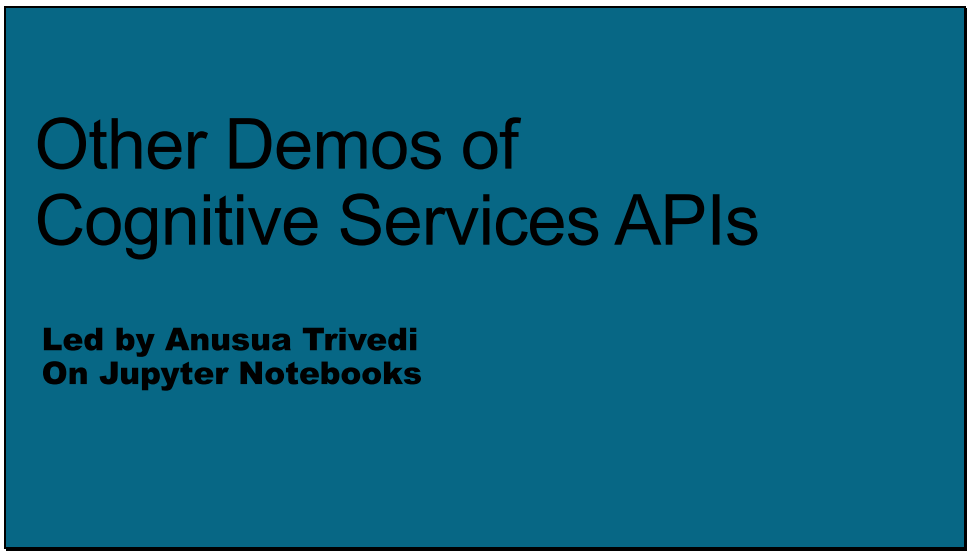

See jupyter notebooks on repository: https://github.com/michhar/bot-education/tree/master/AzureMachineLearning/Samples
and https://github.com/michhar/bot-education/tree/master/CognitiveServices/Samples

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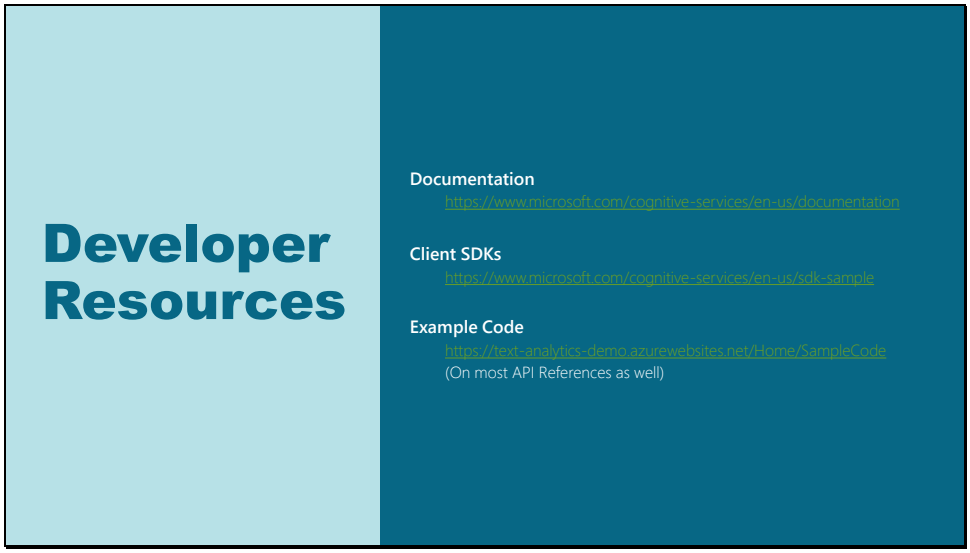
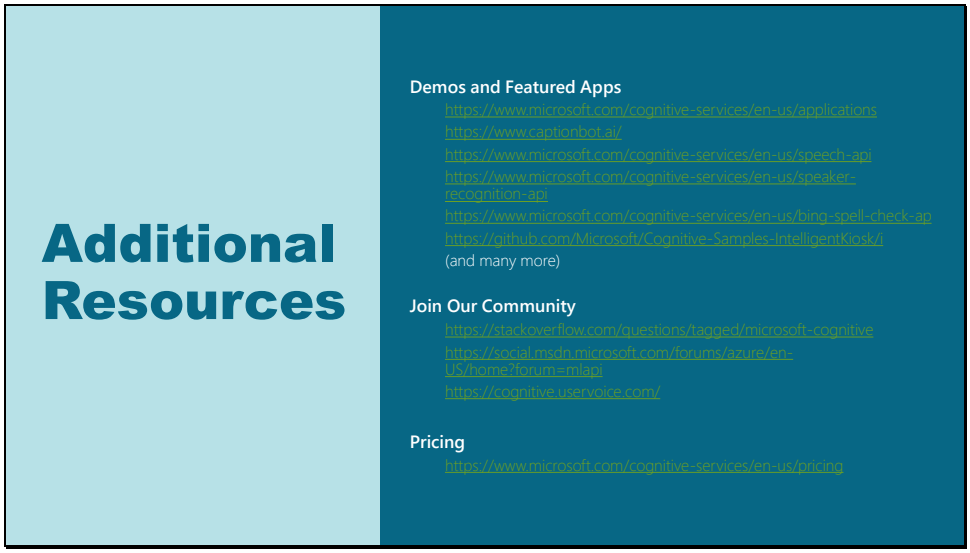


Access to strong documentation, sample code and community resources is critical for developers to be able to understand and become users of Cognitive Services. Customize these links based on your own resources or use the ones listed here.

Slide 30



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Slide 31