Microsoft

Microsoft Cloud Workshop

Cognitive Services and deep learning

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Abstract and learning objectives

In this workshop, you will learn to combine both pre-built artificial intelligence (AI) in the form of various Cognitive Services, with custom AI in the form of services built and deployed with Azure Machine Learning service. You will learn to create intelligent solutions atop unstructured text data by designing and implementing a text analytics pipeline. You will also learn how to build a binary classifier using a simple neural network that can be used to classify the textual data. Also, you will learn how to deploy multiple kinds of predictive services using Azure Machine Learning and learn to integrate with the Computer Vision API and the Text Analytics API from Cognitive Services.

Along the way, you will get to consider the following technologies and services:

- Azure Machine Learning service
- Cognitive Services
- Computer Vision API
- Text Analytics API
- Keras
- TensorFlow
- ONNX

Step 1: Review the customer case study

Outcome

Analyze your customer needs

Timeframe

15 minutes

Customer situation

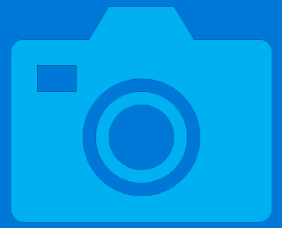
Contoso Ltd, operating in the United States, provides insurance packages for U.S. consumers. They are:

- Looking to build a next-generation platform for its insurance products
- Have identified claims processing as the area of focus
- Concerned that it currently takes significant time for an agent to read through and process the content submitted with each claim
- Finding that it is difficult for agents to find particular claim artifacts when returning to a claim after a while

Customer situation

Two sets of issues where they envision amplifying the capabilities of their agents with AI:

- Processing free text responses:
  - Classifying claims as “home” or “auto”
  - Scoring claim sentiment
  - Summarize long claim text



- Processing images for searchability:
  - Automatic captioning of image contents
  - Tagging of images
  - Extracting any text in the image

Customer needs

- We receive a lot of useful information in the free text responses, but because they can be long agents sometimes skip over them, miss important details or must spend too much time looking for a particular detail when returning to a claim. We aren't certain this can be automated, but we would like to have a standardized process the identifies the key entities in a claim and pulls them out into a separate list that agents can more easily review and then select to view the entity in the context of the claim.

- We need a solution that can "look" at a photo and give us a description of the content of the photo, and tag the photo with keywords so agents can more easily find and refer to the photo later.

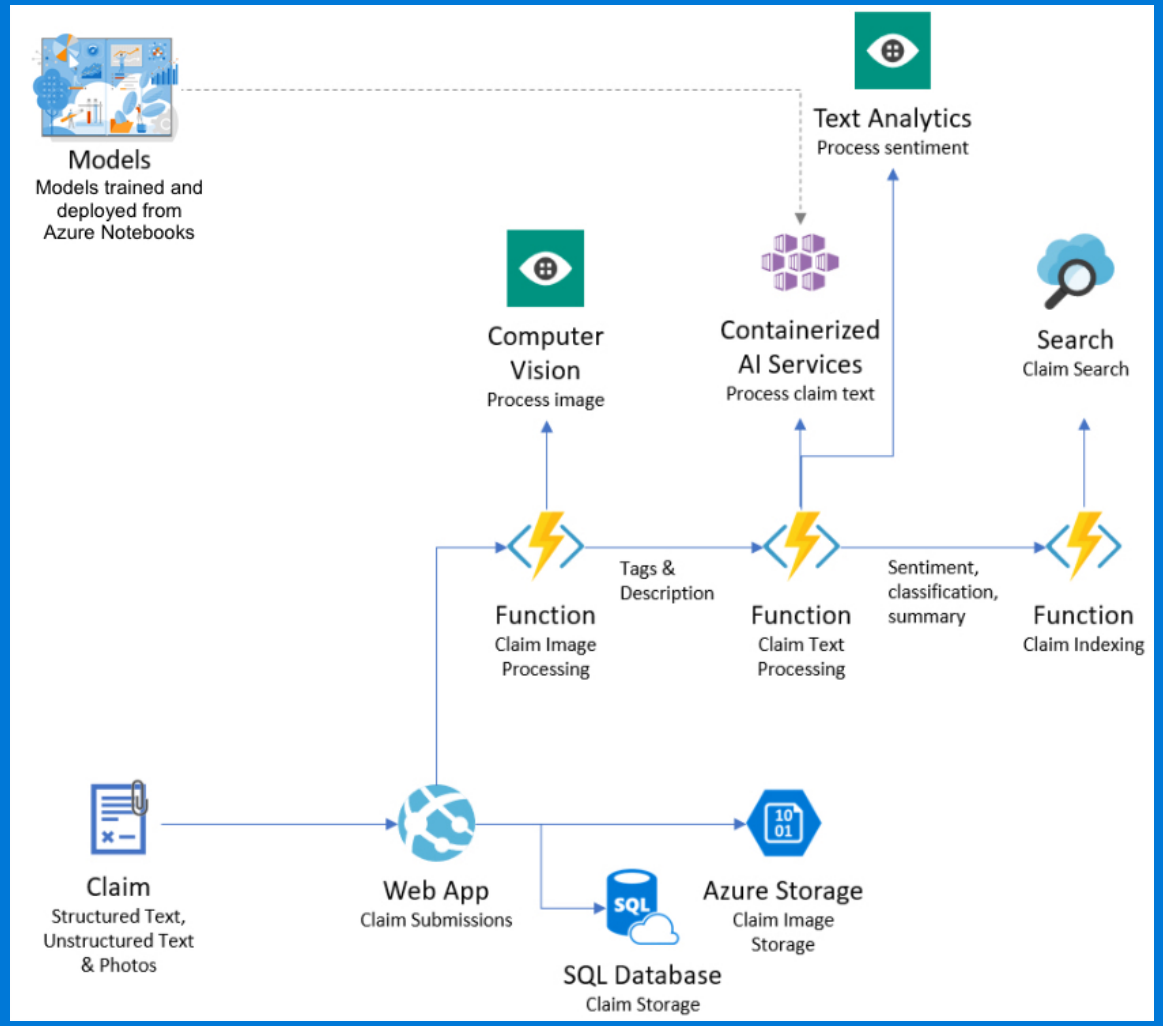
- We are looking to amplify the capabilities of our agents and improve their claims processing capabilities- not replace them. We want a solution that does the same.

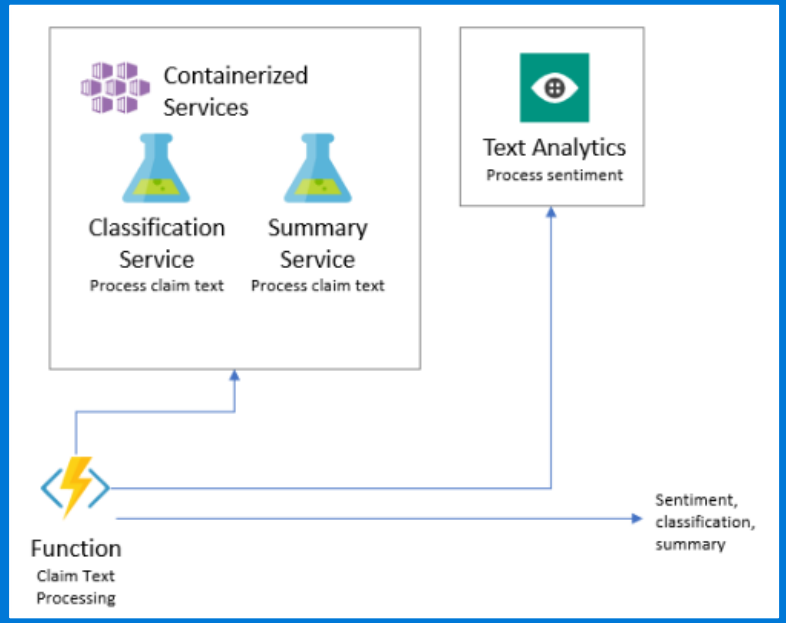
Customer objections

- We are skeptical about all the hype surrounding these “AI” solutions. It’s hard to know what is feasible versus what is not possible with today’s technology and Azure.
- We know that are both pre-built AI and custom AI options. We are confused as to when to choose one over the other.
- We expect some part of our solution would require deep learning; do you have any prescriptive guidance on how we might choose between investing in learning and using TensorFlow or the Microsoft Cognitive Toolkit (CNTK)?

Preferred solution

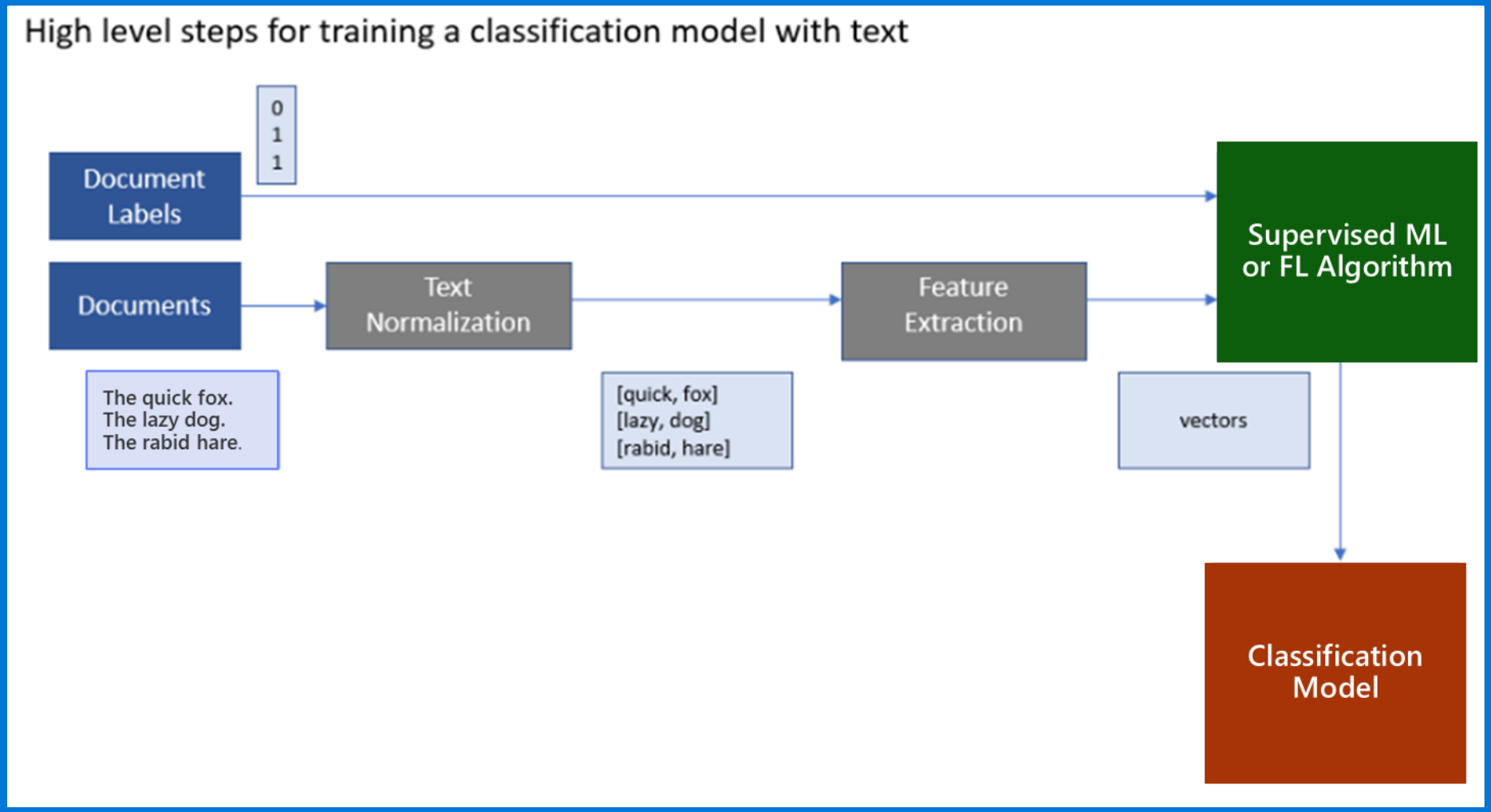
High-level architecture





Preferred solution

Classifying claim-text data



General pipeline for text analytics

Preferred solution

Classifying claim-text data

What data would they need to train the model?

- Contoso would need to have a certain amount of historical claim text and have it labeled as home or auto in order to train a model.

Preferred solution

Classifying claim-text data

What are the common approaches to handle texts for machine learning? Is there a recommended approach to dealing with long descriptive texts that are typically found in claims data?

Preferred solution

Classifying claim-text data

Could they use a Deep Neural Networks (DNN) for this?

Preferred solution

Classifying claim-text data

Would Keras provide a good starting point for them to work with DNN's and TensorFlow?

Preferred solution

Classifying claim-text data

Describe at a high level, how you would deploy this trained model so it is available as a web service that can be integrated with the rest of the solution. What Azure Service(s) would be involved?

Preferred solution

Identifying free-text sentiment

How would you recommend Contoso identify the sentiment in the free-response text provided associated with a claim? Would this require you to build a custom AI model is there a pre-built AI service you could use?

For the solution you propose, what is the range of value of the sentiment score and how would you interpret that value?

Preferred solution

Summarizing claim text

Can they deploy a predictive web service to Azure Machine Learning services that does not utilize an external model (as in the case with Gensim for summarization) or would support an unsupervised approach (such as clustering)?

Preferred solution

Captions, tags, and “reading” images

How would you recommend Contoso implement support for automatically creating captions and tagging the claim photos?

Preferred solution

Enabling search

What service would you recommend Contoso use to enable greater searchability over the claim data, inclusive of the new data fields created by your text processing and image processing components?

Would they be able to keep their claims data in the existing database and layer in this search capability? If so, explain how.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