

# Azure AI-900 Exam Notes / Preparation Repository

---

## Purpose

This repository is designed to assist you in preparing for the AI-900 exam. Unlike other exams, this one is relatively straightforward if you thoroughly understand the content covered in the official [learning paths](#). Utilizing practice questions helped me pass the exam on my first attempt. [Verify my certification](#).

**Official Website:** [Microsoft Azure AI Fundamentals](#)

**Official Study Material:** [Microsoft Certified: Azure AI Fundamentals](#)

**Practice Tests:** [Official](#), [Free](#), [Recommended](#)

I have been exploring a lot of resources for the AI-900 exam, especially to cram for it, and I have compiled a list of resources that I found helpful. I found banks of questions which were behind a paywall ranging from \$5 to \$75. I don't think it's needed. I compiled a list of questions from the web and the official practice tests myself, and I am providing it to you for free. Don't pay for any services online. You can pass this exam with the resources I have provided.

## Skills Measured

- Describe Artificial Intelligence workloads and considerations
- Describe fundamental principles of machine learning on Azure
- Describe features of computer vision workloads on Azure
- Describe features of Natural Language Processing (NLP) workloads on Azure
- Describe features of generative AI workloads on Azure

## Preparation Strategy 2024

**Preparation time:** 1-2 weeks, depending on your current knowledge of AI and Azure.

The Azure AI-900 exam has evolved over the years, with recent additions such as Generative AI, making it essential to prepare accordingly.

## Recommended Strategy

1. **Official Learning Path:** Begin with the [official learning path](#) from Microsoft for a comprehensive overview of the exam topics.
2. **YouTube Videos:** Watch the latest videos on YouTube. This video from FCC covers almost everything you need. Take notes or screenshots. [YouTube Video](#)
3. **Practice Previous Exam Questions:** These resources will provide a good understanding of the exam questions, which are not limited to multiple-choice questions. I highly recommend reviewing these:
  - [YouTube Video 1](#)
  - [YouTube Video 2](#)

4. **Official Practice Tests:** Microsoft offers free practice tests for the AI-900 exam. These are an excellent way to test your knowledge and get familiar with the question format. [Official Practice Tests](#)
5. **Review Repository Questions:** This repository contains questions I prepared, providing a realistic understanding of exam questions.

[Notes](#) | [Questions](#)

## Cram Strategy 2024

We all know that engineering undergrads do things last minute, worry not. I have a cram strategy for you which worked for me and my friend, since this was a fairly easy exam you should be able to pass it with this strategy:

**Preparation time:** 1-2 days, 4-8 hours total.

### Recommended Cram Strategy

1. **YouTube Video:** Watch the FCC video, taking notes or screenshots. [YouTube Video](#)
2. **Limited Learning Path:** Focus on Responsible AI, Generative AI, and machine learning (clustering, regression, and classification). [Official Learning Path](#)
3. **Review Repository Questions:** This repository contains questions I prepared, providing a realistic understanding of exam questions. [Notes](#) | [Questions](#)

## Notes

# What are Metrics?

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Performance/Evaluation Metrics** are used to evaluate different Machine Learning Algorithms

For different types of problems different metrics matter, (*this is not an exhaustive list*)

- Classification Metrics (accuracy, precision, recall, F1-score, ROC, AUC)
- Regression Metrics (MSE, RMSE MAE)
- Ranking Metrics (MRR, DCG, NDCG)
- Statistical Metrics (Correlation)
- Computer Vision Metrics (PSNR, SSIM, IoU)
- NLP Metrics (Perplexity, BLEU, METEOR, ROUGE)
- Deep Learning Related Metrics (Inception score, Frechet Inception distance)

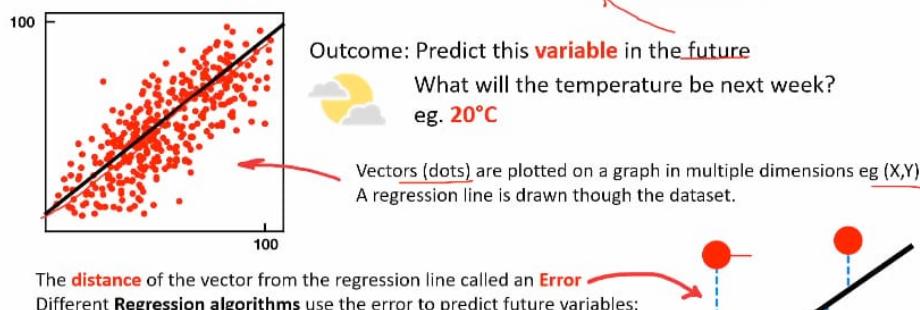
There are two categories of evaluation metrics

- Internal Evaluation — metrics used to evaluate the internals of the ML model
  - Accuracy, F1 Score, Precision, Recall (The Famous Four) used in all kinds of models
- External Evaluation — metrics used to evaluate the final prediction of the ML model

# Regression

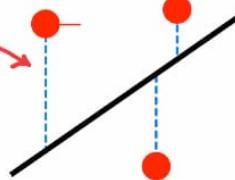
Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Regression** is a process of finding a function to **correlate a labeled dataset into continuous variable/number.**



The **distance** of the vector from the regression line called an **Error**.  
 Different **Regression algorithms** use the error to predict future variables:

- Mean squared error (MSE)
- Root mean squared error (RMSE)
- Mean absolute error (MAE)



# Classification Metrics – Confusion Matrix

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A confusion matrix is table to visualize the **model predictions** (predicted) vs **ground truth labels** (actual)  
 Also known as an error matrix. They are useful in classification problems



How many people ate the banana?

	Predicted <b>NO</b> <b>negative</b>	Predicted <b>YES</b> <b>positive</b>	
Actual <b>NO</b> <b>false</b>	75 False Negatives (FN)	25 False Positives (FP)	Our ground truth had 100 labeled items Total False (tF)
Actual <b>YES</b> <b>true</b>	50 True Negatives (TN)	20 True Positives (TP)	Our model made 70 predictions Total True (tT)

100 were NO  
Total Negative (tN)

75 were YES  
Total Positive (tP)

The size of matrix is dependent on the labels:  
 Apple, Banana, Orange 3x2 = 6 cells

We have total 170 items  
Total (t)

# Classification

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Classification** is a process of finding a function to **divide a labeled dataset into classes/categories**

Outcome: Predict **category** to apply to the inputted data

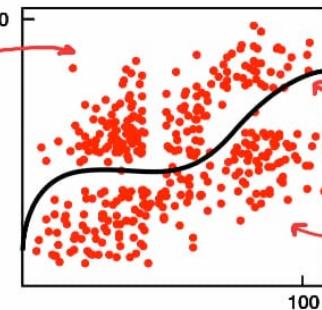


Will it rain next Saturday?

eg. **Sunny, Rainy**

## Classification Algorithms

- Logistic Regression
- Decision Tree/Random Forest
- Neural Networks
- Naive Bayes
- K-Nearest Neighbors



A **classification line** divides the dataset

Data over here will be **Rainy**

# Classification

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Classification** is a process of finding a function to **divide a labeled dataset into classes/categories**

Outcome: Predict **category** to apply to the inputted data

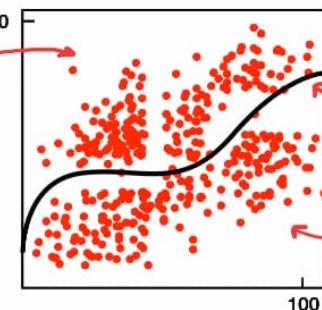


Will it rain next Saturday?

eg. **Sunny, Rainy**

## Classification Algorithms

- Logistic Regression
- Decision Tree/Random Forest
- Neural Networks
- Naive Bayes
- K-Nearest Neighbors
- Support Vector Machines



A **classification line** divides the dataset

Data over here will be **Rainy**

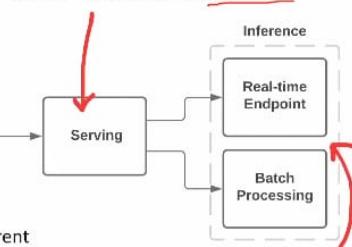
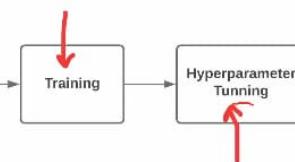
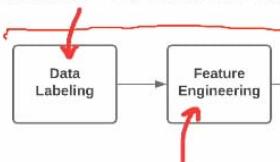
# ML Pipeline

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

For supervised learning you need to label your data so the ML model can learn by example during training

Your model needs to learn how to become smarter. It will perform multiple iterations getting smarter with each iteration

We need to make our ML model accessible, so we serve by hosting in a virtual machine or container.



ML models only work with numerical data. So you need to translate it into a format that it can understand, extract out the important data that the ML needs to focus on.

An ML model can have different parameters, we can use ML to try out many different parameters to optimize the outcome

Inference is the act of requesting to make a prediction

*Very simplified ML pipeline*

## Responsible AI – Fairness

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### AI systems should treat all people fairly

AI systems can reinforce existing societal stereotypical  
Bias can be introduced during the development of a pipeline

AI systems that are used to  
allocate or withhold:

- opportunities
- resources
- Information

In domains:

- Criminal Justice
- Employment and Hiring
- Finance and Credit

e.g. an ML model designed to select final applicants for a hiring pipeline  
without incorporating any bias based on gender, ethnicity or may result in an unfair advantage

Azure ML can tell you how each feature can influence a model's prediction for bias



**Fairlearn** is an open-source python project to help data  
scientist to improve fairness in their AI systems

## Computer Vision

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)



**Seeing AI** is an AI app developed by Microsoft for iOS

Seeing AI uses the device camera to **identify people and objects**, and then the app audibly  
**describes those objects for people with visual impairment.**

Azure's Computer Vision Service Offering:



**Computer Vision** analyze images and video, and extract descriptions, tags, objects, and text



**Custom Vision** custom image classification and object detection models using your own images



**Face Detect** and identify people and emotions in images.



**Form Recogniser** translate scanned documents into key /value or tabular editable data

## Responsible AI – Reliability and safety

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### AI systems should perform reliably and safely

AI software must be **rigorous tested** to ensure they  
work as expected before release to the end user

If there are scenarios where AI is making mistakes its important to release a report **quantified risks and harms** to end-users so they are informed of the short-comings of an AI solution

AI where concern for reliability and safety for humans is critically important:

- Autonomous Vehicle
- AI health diagnosis, AI suggesting prescriptions
- **Autonomous Weapon Systems**

## Conversational AI

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Conversational AI is technology that can **participate in conversations with humans.**

- Chatbots
- Voice Assistants
- Interactive Voice Recognition Systems (IVRS)

### Use Cases

- **Online Customer Support** — replaces human agents for replying about customer FAQs, shipping
- **Accessibility** — voice operated UI for those who are visually impaired
- **HR processes** — employee training, onboarding, updating employee information
- **Health Care** — accessible and affordable health care eg. claim processes
- **Internet of Things (IoT)** — Amazon Alexa, Apple Siri and Google Home
- **Computer Software** — autocomplete search on phone or desktop



**QnA Maker** Create a conversational question-and-answer bot from your existing content (Knowledge base).



**Azure Bot Service** Intelligent, serverless bot service that scales on demand. Used for creating, publishing, and managing bots

## Responsible AI – Privacy and security

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**AI systems should be secure and respect privacy**

AI can require vast amounts of data to train Deep Learning ML models.  
The nature of the ML model may require **Personally identifiable information (PII)**

It is important that we ensure protection of user data that it is not leaked or disclosed

In some cases ML Models can be run locally on a user's device so their PII remains on their device avoiding that vulnerability

AI Security Principles to detect malicious actors:

- Data Origin and Lineage
- Data Use Internal vs External
- Data Corruption Considerations
- Anomaly detection

## Responsible AI – Accountability

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**People should be accountable for AI systems**

The structure put in place to consistently enacting AI principles and taking them into account

AI systems should work within:

- framework of governance
- organizational principles

ethical and legal standards

that are clearly defined

Principles guide Microsoft on how they **Develop, Sell and Advocate** when working with third-parties and this can push towards regulations towards AI Principles

# Clustering

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Clustering** is a process **grouping unlabeled data based on similarities and differences.**

Outcome: Group data based on their similarities or differences

100  
100

Recommend purchasing a **Windows** Computer

Recommend purchasing a **Mac** Computer

**Clustering Algorithms**

- K-means
- K-medoids
- Density Based
- Hierarchical

## Azure-AI-Fundamentals-Certification-2024\_1 Responsible AI – Inclusiveness

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**AI systems should empower everyone and engage people**

If we can design AI solutions for the **minority** of users  
Then we can design AI solutions for the majority of users

**Minority Groups**

- physical ability
- gender
- sexual orientation
- ethnicity
- other factors

|| 44:11 4:23:51 1.0x :

### Azure Cognitive Services

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Decision**

- **Anomaly Detector** — Identify potential problems early on.
- **Content Moderator** — Detect potentially offensive or unwanted content.
- **Personaliser** — Create rich, personalised experiences for every user.

**Language**

- **Language Understanding** — Build natural language understanding into apps, bots and IoT devices.
- **QnA Maker** — Create a conversational question and answer layer over your data.
- **Text Analytics** — Detect sentiment, key phrases and named entities.
- **Translator** — Detect and translate more than 90 supported languages.

**Speech**

- **Speech to Text** — Transcribe audible speech into readable, searchable text.
- **Text to Speech** — Convert text to lifelike speech for more natural interfaces.
- **Speech Translation** — Integrate real-time speech translation into your apps.
- **Speaker Recognition** — Identify and verify the people speaking based on audio.

**Vision**

- **Computer Vision** — Analyze content in images and video.
- **Custom Vision** — Customize image recognition to fit your business needs.
- **Face** — Detect and identify people and emotions in images.

# Computer Vision

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Computer Vision** is when we use Machine Learning Neural Networks to  
**gain high-level understanding from digital images or video**

## Computer Vision Deep Learning Algorithms:

- **Convolutional neural network (CNN)** — image and video recognition
  - Inspired after how human eyes actually process information and send it back to brain to be processed
- **Recurrent neural network (RNN)** — handwriting recognition or speech recognition

## Types of Computer Vision

- **Image Classification** — look at an image or video and classify (place it in a category)
- **Object Detection** — identify objects within an image or video and apply labels and location boundaries
- **Semantic Segmentation** — identify segments or objects by drawing pixel mask (great for objects in movement)
- **Image Analysis** — analyze an image or video to apply descriptive and context labels
  - eg. An employee sitting at a Desk in Tokyo
- **Optical Character Recognition** — Find text in images or videos and extract them into digital text for editing
- **Facial Detection** — detect faces in a photo or video, draw a location boundary, label their expression

# Responsible AI

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Responsible AI** focuses on **ethical, transparent and accountable** use of AI technologies

Microsoft puts into practice Responsible AI via its six **Microsoft AI principles**

1. **Fairness** — AI systems should treat all people fairly
2. **Reliability and Safety** — AI systems should perform reliably and safely
3. **Privacy and Security** — AI systems should be secure and respect privacy
4. **Inclusiveness** — AI systems should empower everyone and engage people
5. **Transparency** — AI systems should be understandable
6. **Accountability** — People should be accountable for AI systems

# Responsible AI – Transparency

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**AI systems should be understandable**

Interpretability / Intelligibility is when end-users can understand the behaviour of the UI

Transparency of AI systems can result in

- Mitigating unfairness
- Help developers debug their AI systems
- Gaining more trust from our users

Those build AI systems should be:

- open about the why they are using AI
- open about the limitations of their AI systems

Adopting an open-source AI framework can provide transparency (at least from a technical perspective) on the internal workings of an AI systems

# Knowledge Mining – Use Cases

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

## Content research

When organizations task employees to review and research of technical data, it can be tedious to read page after page of dense text. Knowledge mining helps employees quickly review these dense materials.

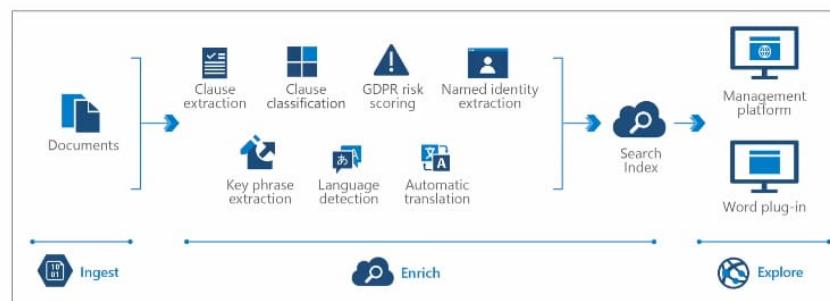


# Knowledge Mining – Use Cases

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

## Auditing, risk, and compliance management

Developers could use knowledge mining to help attorneys quickly identify entities of importance from discovery documents and flag important ideas across documents.

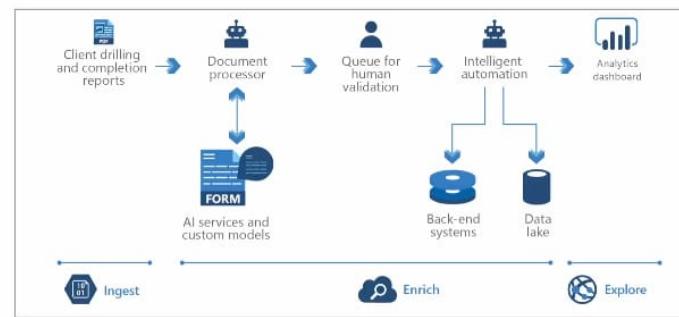


# Knowledge Mining – Use Cases

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

## Business process management

In industries where bidding competition is fierce, or when the diagnosis of a problem must be quick or in near real-time, companies can use knowledge mining to avoid costly mistakes.

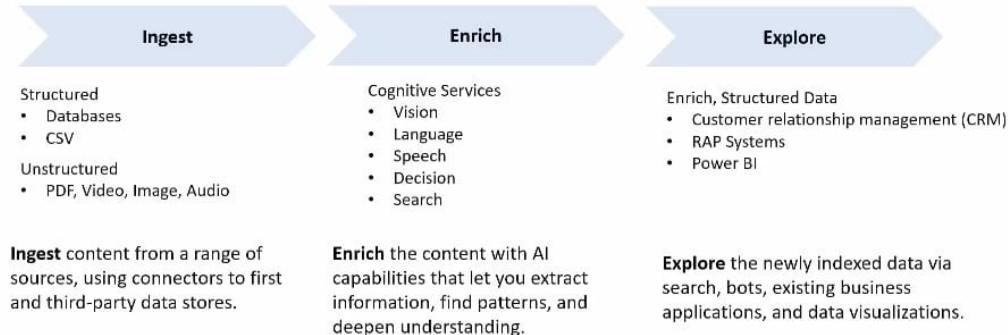


# Knowledge Mining

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Knowledge mining** is a **discipline** in AI that uses a **combination of intelligent services** to quickly learn from vast amounts of information.

It allows organizations to deeply understand and easily explore information, uncover hidden insights, and find relationships and patterns at scale.

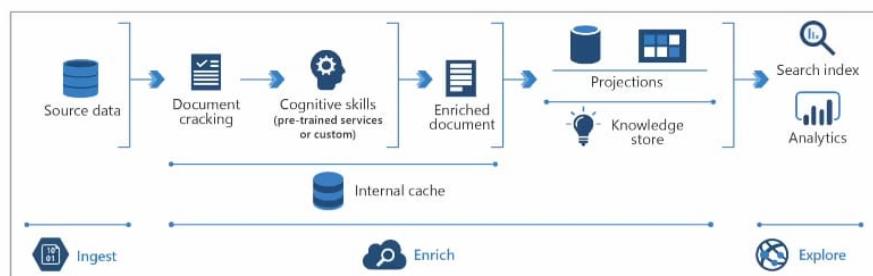


## Knowledge Mining – Use Cases

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Customer support and feedback analysis

For many companies, customer support is costly and inefficient. Knowledge mining can help customer support teams quickly find the right answer for a customer inquiry or assess customer sentiment at scale.

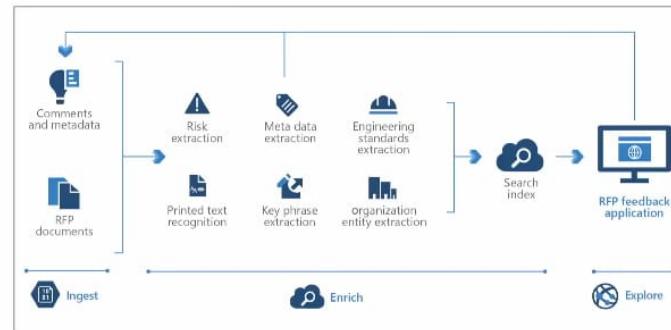


## Knowledge Mining – Use Cases

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Contract management

Many companies create products for multiple sectors, hence the business opportunities with different vendors and buyers increases exponentially. Knowledge mining can help organizations to scour thousands of pages of sources to create an accurate bid.

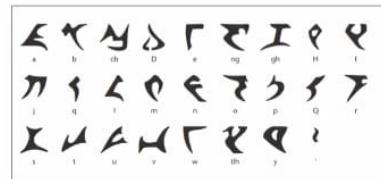


## Speech and Translate Service

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)



- Azure's Translate service is a **translation service**.
  - It can translate 90 languages and dialects
    - It even supports **Klingon!** 
  - It uses Neural Machine Translation (NMT) replacing its legacy **Statistical Machine Translation (SMT)**
  - Custom Translator** allows you to extend the service for translation based on your business and domain use case



Azure Speech service can **speech synthesis service** speech-to-text, text-to-speech, and speech-translation

### Speech-to-Text

- Real-time Speech-to-text
- Batch Speech-to-Text
- Multi-device Conversation
- Conversation Transcription
- Create Custom Speech Models

### Text-to-Speech

- using Speech Synthesis Markup Language (SSML)
- Create Custom Voices

### Voice Assistance

### Speech Recognition

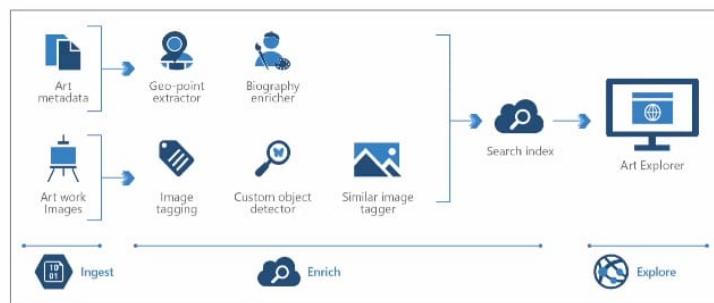
- integrates with Bot Framework SDK

## Knowledge Mining – Use Cases

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Digital asset management

Given the amount of unstructured data created daily, many companies are struggling to make use of or find information within their files. Knowledge mining through a search index makes it easy for end customers and employees to locate what they are looking for faster.



## Text Analytics

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Text Analytics API is a **Natural Language Processing (NLP)** service for **text mining and text analysis**

Text Analytics can perform:

- sentiment analysis**
  - find out what people think of your brand or topic
  - feature provides sentiment labels (such as "negative", "neutral" and "positive")
- opinion mining**
  - aspect-based sentiment analysis
  - granular information about the opinions related to aspects
- key phrase extraction**
  - quickly identify the main concepts in text.
- language detection**
  - detect the language an input text is written in
- named entity recognition (NER)**
  - Identify and categorize entities in your text as people, places, organizations, quantities
  - Subset of NER is Personally Identifiable Information (PII)

# { } Language Understanding Service (LUIS)

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Language Understanding (LUIS) is a no-code ML service to build natural language into apps, bots, and IoT devices.

Quickly create enterprise-ready, custom models that continuously improve.

LUIS is accessed via its own isolate domain at [luis.ai](https://luis.ai)

LUIS utilizes Natural Language Processing (NLP) and **Natural Language Understanding (NLU)**

NLU is the ability to *transform* a linguistic statement to a representation that enables you to understand your users naturally

LUIS is intended to focus on **intention** and **extraction**:

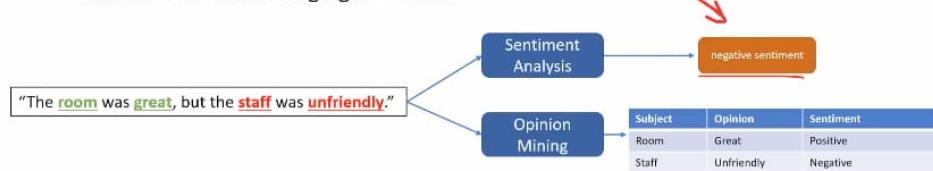
- What the user wants
- What they are talking about

## NLP – Sentiment Analysis

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Sentiment analysis will apply labels and confidence score to text at the **sentence and document level**.

- Labels include **negative, positive, mixed or neutral**
- Confidence scores ranging from 0 to 1



**Opinion mining** will provide more granular data with a **Subject** and **Opinion** tied to a Sentient

# { } Language Understanding Service (LUIS)

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A LUIS application is composed of a **schema** →  
This schema is autogenerated for you when you use the LUIS.ai web interface

The schema defines:

- **intentions** — what the user is asking for
  - a LUIS app always contains a **None** Intent
- **entities** — what parts of the intent is used to determine the answer
- **utterances** — Examples of user input that includes intent and entities to train the ML model to match predictions against real user input
  - An intent requires one or more example utterance for training
    - It is recommended to have 15-30 example utterances
  - To explicitly train to ignore an utterance use the None Intent

**Intents** **classify** user utterances

**Entities** **extract** data from utterance

```
{
  "luis_schema_version": "7.0.0",
  "intents": [
    {
      "name": "None",
      "features": []
    }
  ],
  "entities": [],
  "hierarchicals": [],
  "composites": [],
  "closedlists": [],
  "prebuiltEntities": [],
  "utterances": [],
  "versionId": "0.1",
  "name": "example-app",
  "desc": "",
  "culture": "en-us",
  "tokenizerVersion": "1.0.0",
  "patternAnyEntities": [],
  "regex_entities": [],
  "phraseLists": [
  ],
  "regex_features": [],
  "patterns": [],
  "settings": []
}
```

## {} Language Understanding Service (LUIS)

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A LUIS application is composed of a **schema** →  
This schema is autogenerated for you when you use the LUIS.ai web interface

The schema defines:

- **intentions** — what the user is asking for
  - a LUIS app always contains a **None** Intent
- **entities** — what parts of the intent is used to determine the answer
- **utterances** — Examples of user input that includes intent and entities to train the ML model to match predictions against real user input
  - An intent requires one or more example utterance for training
    - It is recommended to have 15-30 example utterances
  - To explicitly train to ignore an utterance use the None Intent

**Intents** **classify** user utterances  
**Entities** **extract** data from utterance

```
{
  "luis_schema_version": "7.0.0",
  "intents": [
    {
      "name": "None",
      "features": []
    }
  ],
  "entities": [],
  "hierarchicals": [],
  "composites": [],
  "closedlists": [],
  "prebuiltEntities": [],
  "utterances": [],
  "versionId": "0.1",
  "name": "example-app",
  "desc": "",
  "culture": "en-us",
  "tokenizerVersion": "1.0.0",
  "patternAnyEntities": [],
  "regex_entities": [],
  "phraselists": [],
  "regex_features": [],
  "patterns": [],
  "settings": []
}
```

## QnA Maker Service – Chat box

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

You converse with your bot through a Chat Box. There are many opportunities to interact with your bot in QNAMaker.ai, Azure Bot Service, Bot Composer.

Via Channels you can even get embeddable chatbox code

**Multi-turn conversation**

## {} Language Understanding Service (LUIS)

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A LUIS application is composed of a **schema** →  
This schema is autogenerated for you when you use the LUIS.ai web interface

The schema defines:

- **intentions** — what the user is asking for
  - a LUIS app always contains a **None** Intent
- **entities** — what parts of the intent is used to determine the answer
- **utterances** — Examples of user input that includes intent and entities to train the ML model to match predictions against real user input
  - An intent requires one or more example utterance for training
    - It is recommended to have 15-30 example utterances
  - To explicitly train to ignore an utterance use the None Intent

**Intents** **classify** user utterances  
**Entities** **extract** data from utterance

```
{
  "luis_schema_version": "7.0.0",
  "intents": [
    {
      "name": "None",
      "features": []
    }
  ],
  "entities": [],
  "hierarchicals": [],
  "composites": [],
  "closedlists": [],
  "prebuiltEntities": [],
  "utterances": [],
  "versionId": "0.1",
  "name": "example-app",
  "desc": "",
  "culture": "en-us",
  "tokenizerVersion": "1.0.0",
  "patternAnyEntities": [],
  "regex_entities": [],
  "phraselists": [],
  "regex_features": [],
  "patterns": [],
  "settings": []
}
```

## {} Language Understanding Service (LUIS)

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A LUIS application is composed of a **schema** →

This schema is autogenerated for you when you use the LUIS.ai web interface

The schema defines:

- **intentions** — what the user is asking for
  - a LUIS app always contains a **None** Intent
- **entities** — what parts of the intent is used to determine the answer
- **utterances** — Examples of user input that includes intent and entities to train the ML model to match predictions against real user input
  - An intent requires one or more example utterance for training
    - It is recommended to have 15-30 example utterances
  - To explicitly train to ignore an utterance use the None Intent

**Intents** **classify** user utterances

**Entities** **extract** data from utterance

**Example Utterance**

book me **two** flights to **Toronto**

Entities

```
{
  "luis_schema_version": "7.0.0",
  "intents": [
    {
      "name": "None",
      "features": []
    }
  ],
  "entities": [],
  "hierarchicals": [],
  "composites": [],
  "closedlists": [],
  "prebuiltEntities": [],
  "utterances": [],
  "versionId": "0.1",
  "name": "example-app",
  "desc": "",
  "culture": "en-us",
  "tokenizerVersion": "1.0.0",
  "patternAnyEntities": [],
  "regex_entities": [],
  "phraseLists": [
  ],
  "regex_features": [],
  "patterns": [],
  "settings": []
}
```

## {} Optical Character Recognition (OCR)

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Azure has **two different APIs** that can perform OCR: **OCR API** and **Read API**

### OCR API

- older recognition model
- supports only images
- executes synchronously
  - returning immediately with the detected text
  - Suited for less text
- Support more languages
- Easier to implement

### Read API

- updated recognition model
- Supports images and PDFs
- Executes asynchronously
  - parallelizes tasks per line for faster results
  - Suited for lots of text
- Supports fewer languages
- A bit more difficult to implement



OCR is performed via the **Computer Vision SDK**

## QnA Maker Service – Chit Chat

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Chit-chat

- None
- Professional
- Friendly
- Witty
- Caring
- Enthusiastic

The chit-chat feature in QnA maker allows you to easily add a **pre-populated set of the top chit-chat**, into your knowledge base.

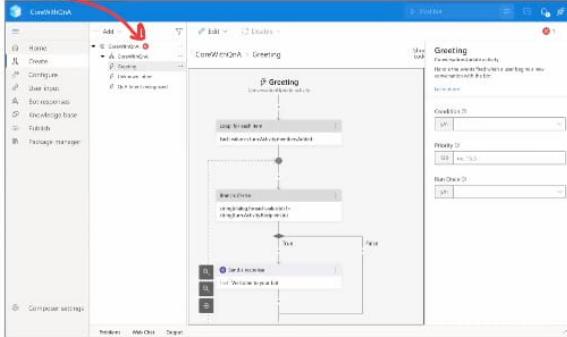
## Bot Framework Composer

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Bot Framework Composer**, built on the Bot Framework SDK, is an **open-source IDE for developers** to **author, test, provision and manage** conversational experiences.

Composer is downable app available for Windows, OSX and Linux

- You can use either C# or Node to build your bot
- Deploy your bots to:
  - Azure Web App
  - Azure Functions
- Templates to build:
  - QnA Maker Bot
  - Enterprise or Personal Assistant Bot
  - Language Bot
  - Calendar or People Bot
- Test and debug via the Bot Framework Emulator
- Built in Package manager



## Azure Machine Learning Service

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Azure Machine Learning Studio (classic)**  
An older service that manages AI/ML workloads. Does not have a pipeline and other limitations.  
Workloads are not easily transferable to from classic to the new service.

**Azure Machine Learning Service**  
A service that simplifies running AI/ML related workloads allowing you to build flexible Automated ML Pipelines. Use Python or R, Run DL workloads such as Tensorflow

**Jupyter Notebooks**  
• build and document your machine learning models as you build them, share and collaborate

**Azure Machine Learning SDK for Python**  
• An SDK designed specifically to interact with Azure Machine Learning Services

**MLOps**  
• end to end automation of ML model pipelines eg. CI/CD, training, inference

**Azure Machine Learning Designer**  
• drag and drop interface to visually build, test, and deploy machine learning models

**Data Labeling Service**  
• ensemble a team of humans to label your training data

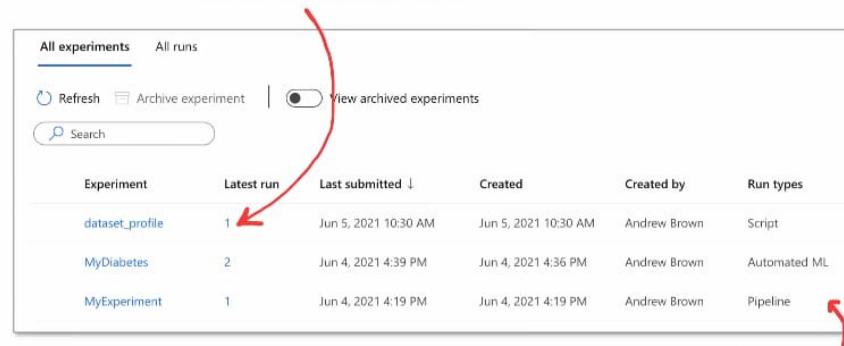
**Responsible Machine Learning**

## Azure Machine Learning Studio – Experiments

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Experiments** is a **logical grouping** Azure Runs

**Runs** are the **act of running an ML task** on a virtual machine or container



Experiment	Latest run	Last submitted ↓	Created	Created by	Run types
dataset_profile	1	Jun 5, 2021 10:30 AM	Jun 5, 2021 10:30 AM	Andrew Brown	Script
MyDiabetes	2	Jun 4, 2021 4:39 PM	Jun 4, 2021 4:36 PM	Andrew Brown	Automated ML
MyExperiment	1	Jun 4, 2021 4:19 PM	Jun 4, 2021 4:19 PM	Andrew Brown	Pipeline

Experiments do not include *Inference*

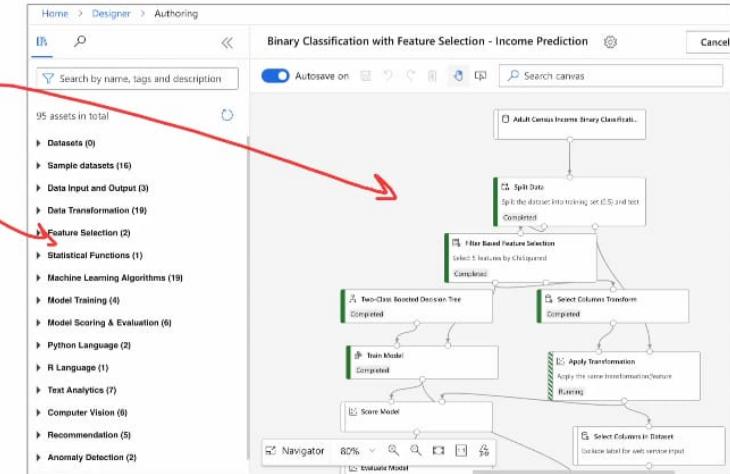
The contents of a run will vary based on its **Run Type**

## Azure Machine Learning Studio – ML Designer

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

The Azure Machine Learning Designer lets you **quickly build Azure ML Pipelines without having to write code.**

You can **drag out various templated steps** called assets to quickly prototype your pipeline



## Azure Machine Learning Studio – Endpoints

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Azure ML Endpoints allow you to deploy machine learning models as a web service**

The workflow for deploying a model:

- Register the model
- Prepare an entry script
- Prepare an inference configuration
- Deploy the model locally to ensure everything works
- Choose a compute target
- Re-deploy the model to the cloud
- Test the resulting web service

### Realtime endpoints

An endpoint that provides remote access to invoke the ML model service running on either:

- Azure Kubernetes Service (AKS)
- Azure Container Instance (ACI)

### Pipeline endpoints

An endpoint that provide remote access to invoke an ML pipeline.

You can parametrize the pipeline endpoint for managed repeatability in batch scoring and retraining scenarios.

## Azure Machine Learning Studio – Compute

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Azure Machine Learning Studio has **4 kinds of compute:**

Compute		
Compute instances	Compute clusters	Inference clusters
+ New	Start	Stop
myjupytercompute	Running	JupyterLab Jupyter VS Code RStudio Terminal

1. **Compute Instances** — Development workstations that data scientists can use to work with data and models.
2. **Compute Clusters** — Scalable clusters of virtual machines for on-demand processing of experiment code.
3. **Inference Clusters** — Deployment targets for predictive services that use your trained models.
4. **Attached Compute** — Links to existing Azure compute resources, such as Virtual Machines or Azure Databricks clusters.

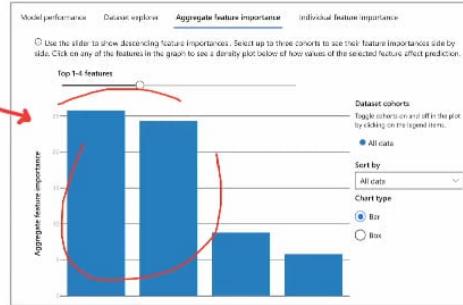
## AutoML – Explanation

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**ML Explainability (MLX)** is the process of **explaining and interpreting** ML and deep learning models. MLX can help machine learning developers to better understand and interpret the model's behavior

After your top candidate model is selected by Azure AutoML you can get an explanation of the internals on various factors:

- Model Performance
- Dataset explorer
- **Aggregate feature importance**
- Individual feature importance



## AutoML

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Automated machine learning (AutoML) automates the process of creating an ML model.**

With Azure AutoML you

- supply a dataset
- **Choose a Task Type** (Classification, Regression or Time Series Forecasting)
- Then AutoML will train and tune your model

### Classification

When you need to make a prediction based on several classes:

- binary classification: Yes or No
- multi-class classification: Red, Green, Blue

Select task type	Description
<input checked="" type="radio"/> Classification	To predict one of several categories in the target column: yes/no, blue, red, green.
<input type="radio"/> Regression	To predict continuous numeric values
<input type="radio"/> Time series forecasting	To predict values based on time

## Azure Machine Learning Studio – Data Stores

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Datastores securely connect to your storage service** on Azure without **putting your authentication credentials** and the integrity of your original data source **at risk**.

Datastore type *
Azure Blob Storage
Azure Blob Storage
Azure file share
Azure Data Lake Storage Gen1
Azure Data Lake Storage Gen2
Azure SQL database
Azure PostgreSQL database
Azure MySQL database

### Azure Blob Storage

data is stored as objects, distributed across many machines

### Azure File Share

a mountable file share via SMB and NFS protocols

### Azure Data Lake Storage (Gen 2)

Azure Blob storage designed for vast amounts of data for Big Data analytics

### Azure SQL database

Full-managed MS SQL relational database

### Azure Postgres database

open-source relational database

## AutoML – Primary Metrics – Classification

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Classification Scenarios

- Suited for larger datasets that well-balanced
  - **accuracy** — Image classification, Sentiment analysis, Churn prediction
  - **average\_precision\_score\_weighted** — Sentiment analysis
  - **norm\_macro\_recall** — Churn prediction
  - **precision\_score\_weighted**
- Suited for small dataset that are imbalanced
  - **AUC\_weighted** — Fraud detection, Image classification, Anomaly detection/spam detection

## AutoML – Time Series Forecasting

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Advanced forecasting configuration includes:

- holiday detection and featurization
- time-series and DNN learners (Auto-ARIMA, Prophet, ForecastTCN)
- many models support through grouping
- rolling-origin cross validation
- configurable lags
- rolling window aggregate features

## AutoML – Data Guard Rails

Cheat sheets, Practice Exams and Flash cards  [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Data guardrails are run by Azure AutoML when **automatic featurization** is enabled.  
A **sequence of checks** to **ensure high quality input data** is being used to train model.



Type	Status	Description	
Validation split handling	Done	The input data has been split for validation to improve model performance. <a href="#">Learn more about validation data.</a>	

[+ View additional details](#)

Type	Status	Description	
Missing feature values imputation	Passed	No feature missing values were detected in the training data. <a href="#">Learn more about missing value imputation.</a>	
High cardinality feature detection	Passed	Your inputs were analyzed, and no high cardinality features were detected. <a href="#">Learn more about high cardinality feature detection.</a>	

## AutoML – Time Series Forecasting

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Forecast revenue, inventory, sales, or customer demand

An automated time-series experiment is treated as a **multivariate regression problem**

Past time-series values are "pivoted" to become additional dimensions for the regressor together with other predictor

unlike classical time series methods, has an advantage of naturally incorporating multiple contextual variables and their relationship to one another during training

**Time series forecasting**  
To predict values based on time

The time series forecasting method requires some additional information.

**Time column**: Select a time column...

**Time series identifier(s)**: Select column(s)...

**Frequency**: Autodetect

**Forecast horizon**: Autodetect

Enable deep learning

## AI vs Generative AI

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Generative AI

**AI** Generative AI is a subset of AI that focuses on **creating new content or data** that is novel and realistic. It does not just interpret or analyze data but **generates new data itself**. It includes **generating text, images, music, speech, and other forms of media**.

 It often involves advanced machine learning techniques, particularly deep learning models like **Generative Adversarial Networks (GANs)**, **Variational Autoencoders (VAEs)**, and **Transformer models (like GPT)**.

 Generative AI is used in a range of applications including creating realistic **images and videos**, generating **human-like text**, composing **music**, creating virtual environments, and even drug discovery.

 **Examples:** Tools like **GPT (Generative Pre-trained Transformer)** for text generation, **DALL-E** for image creation, and various deep learning models that compose music.

## AutoML – Primary Metrics – Classification

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

### Regressions Scenarios

- Works well when value to predict encompasses a large range eg. 10K to 200K
  - **spearman\_correlation**
  - **r2\_score** — Airline delay, Salary estimation, Bug resolution time
- Works well when value to predict encompasses a smaller range eg. 10-20K
  - **normalized\_root\_mean\_squared\_error** — Price prediction (house/product/tip), Review score prediction
  - **normalized\_mean\_absolute\_error**



 **Custom Vision – Training**

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Once the **Classification** training job is complete we will get a report of the evaluation metrics **outcome**

**Precision**

- being exact and accurate
- select items that are relevant

**Recall** (Sensitivity or True Positive Rate)

- How many relevant items returned

**Average Precision (AP)**

Iteration 1

Finished training on 6/6/2021, 1:30:00 PM using General [A2] domain  
Iteration id: 4aa2a4af-ad99-445c-b416-91186856a9f1  
Classification type: Multiclass (Single tag per image)

	Precision	Recall	AP
	100.0%	100.0%	100.0%

Performance Per Tag

Tag	Precision	Recall	A.P.	Image count
worl	100.0%	100.0%	100.0%	9
data	100.0%	100.0%	100.0%	9
crashin	100.0%	100.0%	100.0%	5

**Time Series Scenarios**

- Works well when value to predict encompasses a large range eg. 10K to 200K
  - **spearman\_correlation**
  - **r2\_score** — Price prediction (forecasting), Inventory optimization, Demand forecasting
- Works well when value to predict encompasses a smaller range eg. 10-20K
  - **normalized\_root\_mean\_squared\_error** — Price prediction (forecasting), Inventory optimization, Demand forecasting
  - **normalized\_mean\_absolute\_error**

 **Automic – Primary Metrics – Time Series**

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

 **What is a Large Language Model (LLM)?**

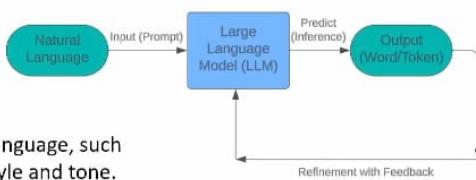
Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A Large Language Model (LLM) such as GPT (Generative Pre-trained Transformer) works in a way that's similar to a complex, **automatic system that recognizes patterns and makes predictions**.

**Training on Large Datasets:** Initially, the model is trained on massive amounts of text data. This data can include **books, articles, websites, and other written material**.

During this training phase, the model learns patterns in language, such as grammar, word usage, sentence structure, and even style and tone.

**Understanding Context:** The model's design allows it to consider a wide context. This means it doesn't just focus on single words, but understands them in **relation to the words and sentences** that come **before and after**. This context understanding is important for generating coherent and relevant text.





# AI vs Generative AI

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Feature	Artificial Intelligence (AI)	Generative AI
Functionality	Regular AI focuses on understanding and decision-making	Generative AI is about creating new, original outputs.
Data Handling	AI typically analyzes and makes decisions based on existing data	Generative AI uses existing data to generate new, unseen outputs.
Applications	Its applications span across various sectors, including data analysis, automation, natural language processing, and healthcare.	Its applications are more creative and innovative, focusing on content creation, synthetic data generation, deepfakes, and design.

		Predicted Class		
		Positive	Negative	
Actual Class	Positive	True Positive (TP)	False Negative (FN) <b>Type II Error</b>	<b>Sensitivity</b> $\frac{TP}{(TP + FN)}$
	Negative	False Positive (FP) <b>Type I Error</b>	True Negative (TN)	<b>Specificity</b> $\frac{TN}{(TN + FP)}$
	<b>Precision</b> $\frac{TP}{(TP + FP)}$	<b>Negative Predictive Value</b> $\frac{TN}{(TN + FN)}$	<b>Accuracy</b> $\frac{TP + TN}{(TP + TN + FP + FN)}$	



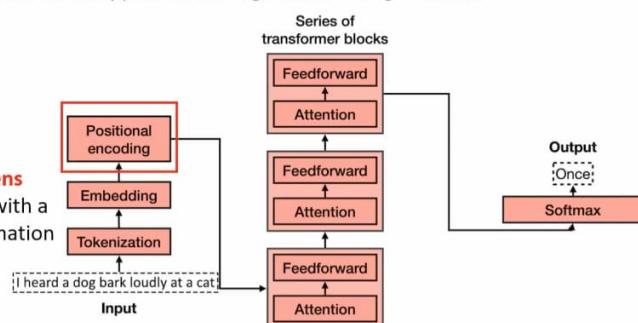
## Positional encoding

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Positional encoding** is a technique used to ensure that a language model, such as GPT (Generative Pre-trained Transformer) doesn't lose the **order of words** when processing natural language. This is important because the order in which words appear can change the meaning of a sentence.

Let's take the sentence "I heard a dog bark loudly at a cat" from our previous example:

Without positional encoding, if we simply tokenize this sentence and convert the **tokens** into **embedding vectors**, we might end up with a set of vectors that **lose the sequence information**



Positional encoding adds a **positional vector** to each word to keep track of the positions of the words.



## Embeddings

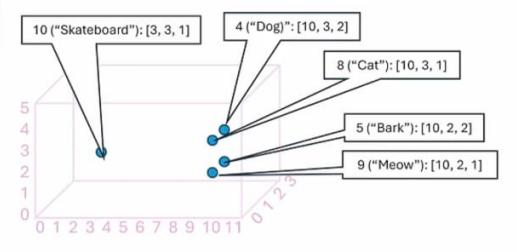
Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

To help a computer understand language, we turn words into tokens and then give each token a special **numeric code**, called an **embedding**. These embeddings are like a secret code that captures the meaning of the word.

As a simple example, suppose the embeddings for our tokens consist of **vectors** with three elements, for example:

- 4 ("dog"): [10,3,2]
- 5 ("bark"): [10,2,2]
- 8 ("cat"): [10,3,1]
- 9 ("meow"): [10,2,1]
- 10 ("skateboard"): [3,3,1]

Words that have **similar meanings** or are used in similar ways get **codes that look alike**. So, "dog" and "bark" might have similar codes because they are **related**.



Embedding: Turning words (tokens) into vectors (lists of numbers)

This way, the computer can figure out which words are **similar to each other** just by looking at their codes. It's like giving each word a home on a map, and words that are neighbors on this map have related meanings.



## Tokenization

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Tokenization** in a transformer model is like turning a sentence into a puzzle. For example, you have the sentence: "I heard a dog bark loudly at a cat." To help a computer understand it, we chop up the sentence into pieces called '**t**o**k**e**n**ts'. Each piece can be a word or even a part of a word. So, for our sentence, we give each word a number, like this:

- "I" might be 1
- "heard" might be 2
- "a" might be 3
- "dog" might be 4
- "bark" might be 5
- "loudly" might be 6
- "at" might be 7
- "a" is already tokenized as 3
- "cat" might be 8



Tokenization: Turning words into tokens

Now, our sentence becomes a series of numbers: [1, 2, 3, 4, 5, 6, 7, 8]. This is like giving each word a **special code**. The computer uses these codes to **learn about the words and how they fit together**.

If a word repeats, like "a", we use its code again instead of making a new one.

- As the computer reads more text, it keeps turning new words into new tokens with new numbers.
- If it learns the word "meow," it might call it 9, and "skateboard" could be 10.



## Transformer models

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

A transformer model is a type of machine learning model that's especially good at **understanding and generating language**.

It's built using a structure called the transformer architecture, which is really effective for tasks involving **natural language processing (NLP)**, like **translating languages or writing text**.

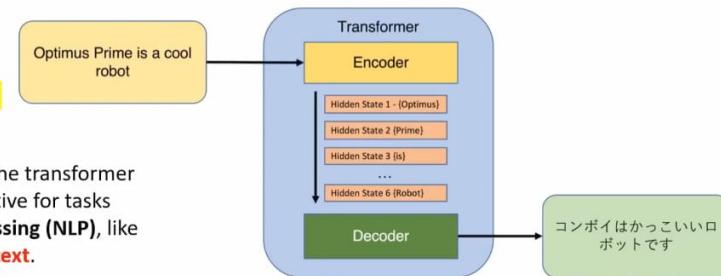


Image credits: domino.ai

Transformer model architecture consists of **two components**, or **blocks**:

1. **Encoder**: This part **reads and understands the input text**. It's like a smart system that goes through everything it's been taught (which is a lot of text) and picks up on the meanings of words and how they're used in different contexts.
2. **Decoder**: Based on what the encoder has learned, this part **generates new pieces of text**. It's like a skilled writer that can make up sentences that flow well and make sense.

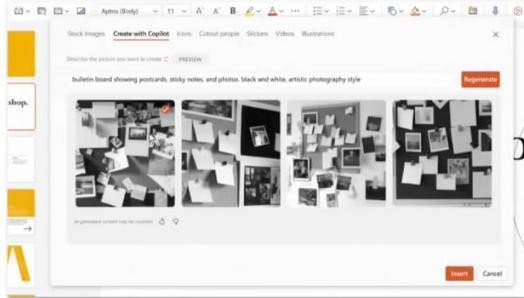
# Copilot Examples

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)



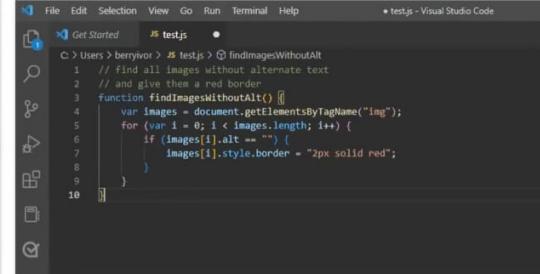
**Microsoft 365 Copilot** is designed to be a partner in your workflow, integrated with productivity and communication tools like **PowerPoint** and **Outlook**.

- It's there to help you craft effective **documents**, design **spreadsheets**, put together **presentations**, manage emails, and streamline other tasks.



## GitHub Copilot

**GitHub Copilot** is a tool that helps software developers, offering real-time assistance as they **write code**. It offers more than suggesting code snippets; it can help in **documenting the code** for better understanding and maintenance.



# Attention

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Attention in AI, especially in transformer models, is a way the model figures out how **important each word (or token) is to the meaning of a sentence**, particularly in **relation** to the other words around it. Let's reuse the sentence "**I heard a dog bark loudly at a cat**" to explain this better:

**Self-Attention:** Imagine each word in the sentence shining a flashlight on the other words.

- 1 The brightness of the light shows how much one word should pay attention to the others when understanding the sentence.

For "**bark**", the light might shine brightest on "**dog**" because they're closely related.

**Encoder's Role:** In the encoder part of a transformer model, attention helps decide **how to represent each word as a number (or vector)**. It's not just the word itself, but also its context that matters.

For example, "**bark**" in "**the bark of a tree**" would have a different representation than "**bark**" in "**I heard a dog bark**", because the surrounding words are different.



# Attention

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Decoder's Role:** When generating new text, like completing a sentence, the decoder uses attention to figure out which words it already has are **most important** for **deciding what comes next**. If our sentence is "**I heard a dog**," the model uses **attention** to know that "**heard**" and "**dog**" are key to adding the next word, which might be "**bark**."

**Multi-Head Attention:** It's like having multiple flashlights, each **highlighting different aspects of the words**. Maybe one flashlight looks at the **meaning** of the word, another looks at its **role** in the sentence (like subject or object), and so on. This helps the model get a richer understanding of the text.

**Building the Output:** The decoder builds the sentence one word at a time, using **attention** at each step. It looks at the sentence so far, decides what's important, and then **predicts** the next word. It's an ongoing process, with each **new word influencing the next**.

Attention in transformer models is like a guide that helps the AI understand and create language by focusing on the most relevant parts of the text, considering both individual word meanings and their relationships within the sentence.

## Azure OpenAI Service

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

Azure OpenAI Service is a cloud-based platform designed to **deploy and manage advanced language models from OpenAI**. This service combines OpenAI's latest language model developments with the robust security and scalability of Azure's cloud infrastructure.

Azure OpenAI offers several **types of models** for different purposes:



- GPT-4 Models:** These are the newest in the line of GPT models and can create **text and programming code** when given a prompt written in natural language.
- GPT-3.5 Models:** Similar to GPT-4, these models also create text and code from natural language prompts. The GPT-3.5-turbo version is specially designed for **conversations**, making it a great choice for **chat applications and other interactive AI tasks**.
- Embedding Models:** These models turn written **text into number sequences**, which is helpful for analyzing and comparing different pieces of text to find out how **similar** they are.
- DALL-E Models:** These models can make **images from descriptions** given in words. The DALL-E models are still being tested and aren't shown in the Azure OpenAI Studio, so you don't have to set them up for use manually.



## Grounding

Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

**Grounding** in prompt engineering is a technique used in large language models (LLMs) where you provide **specific, relevant context within a prompt**. This helps the AI to produce a more accurate and related response.

For example, if you want an LLM to summarize an email, you would include the actual email text in the prompt along with a command to summarize it. This approach allows you to leverage the LLM for tasks it wasn't explicitly trained on, without the need for retraining the model.

### Prompt engineering vs Grounding

**Prompt engineering** broadly refers to the art of crafting effective prompts to produce the desired output from an AI model. **Grounding** specifically involves enriching prompts with relevant context to improve the model's understanding and responses.

**Grounding** ensures the AI has **enough information to process the prompt** correctly, whereas **prompt engineering** can also include techniques like format, style, and the strategic use of examples or questions to guide the AI.



## Positional encoding

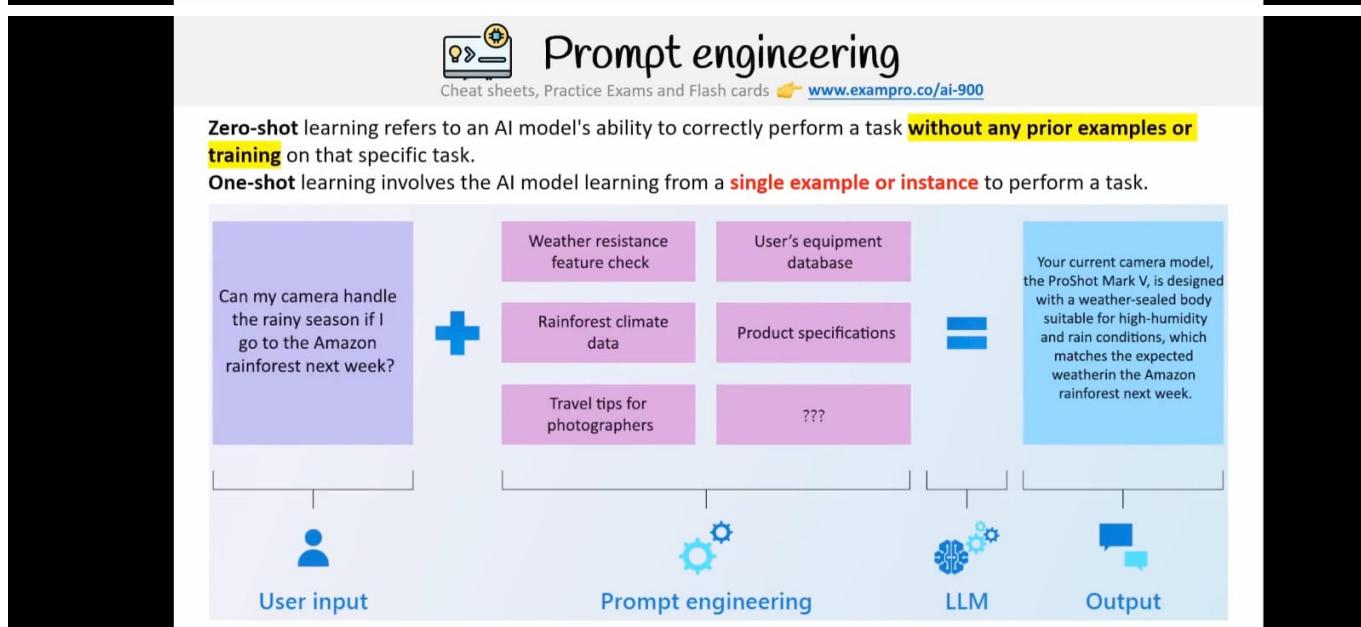
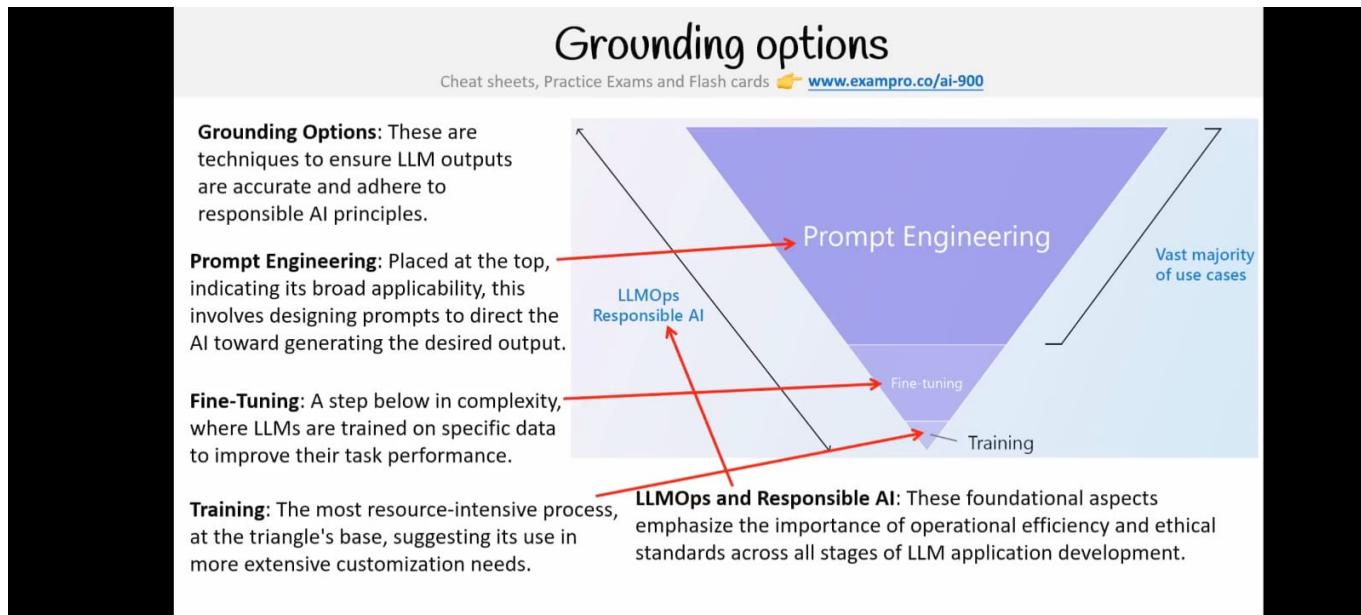
Cheat sheets, Practice Exams and Flash cards [www.exampro.co/ai-900](http://www.exampro.co/ai-900)

However, by adding **positional encoding vectors to each word's embedding**, we ensure that each **position** in the sentence is uniquely identified:

- The embedding for "I" would be modified by adding a positional vector corresponding to position 1, labeled "**I (1)**".
- The embedding for "heard" would be altered by a vector for position 2, labeled "**heard (2)**".
- The embedding for "a" would be updated with a vector for position 3, labeled "**a (3)**", and reused with the same positional vector for its second occurrence.
- This process continues for each word/token in the sentence, with "**dog (4)**", "**bark (5)**", "**loudly (6)**", "**at (7)**", and "**cat (8)**" all receiving their unique positional encodings.

As a result, the sentence "**I heard a dog bark loudly at a cat**" is represented not just by a sequence of vectors for its words, but by a sequence of vectors that are influenced by the **position** of each word in the sentence.

This means that even if another sentence had the same words in a different order, its overall representation would be different because the positional encodings would differ, reflecting the different sequence of words.



## Questions

### QUESTION: 1

A company employs a team of customer service agents to provide telephone and email support to customers.

The company develops a webchat bot to provide automated answers to common customer queries. Which business benefit should the company expect as a result of creating the webchat bot solution?

1. increased sales
2. a reduced workload for the customer service agents
3. improved product reliability

**Answer(s): B**

### QUESTION: 2

For a machine learning progress, how should you split data for training and evaluation?

1. Use features for training and labels for evaluation.
2. Randomly split the data into rows for training and rows for evaluation.
3. Use labels for training and features for evaluation.
4. Randomly split the data into columns for training and columns for evaluation.

**Answer(s): B**

**Explanation:**

The Split Data module is particularly useful when you need to separate data into training and testing sets. Use the Split Rows option if you want to divide the data into two parts. You can specify the percentage of data to put in each split, but by default, the data is divided 50-50. You can also randomize the selection of rows in each group, and use stratified sampling.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/split-data>

### QUESTION: 3

HOTSPOT (Drag and Drop is not supported)

You are developing a model to predict events by using classification.

You have a confusion matrix for the model scored on test data as shown in the following exhibit.

		Actual
		1
Predicted	0	11
	1	5
0	1033	13951

Use the drop-down menus to select the answer choice that completes each statement based on the information presented in the graphic.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

There are [answer choice] correctly predicted positives.

5
11
1,033
13,951

There are [answer choice] false negatives.

5
11
1,033
13,951

**Answer(s): A**

**Explanation:**

## Answer Area

There are [answer choice] correctly predicted positives.

5
11
1,033
13,951

There are [answer choice] false negatives.

5
11
1,033
13,951

Box 1: 11

		Predicted	
		Positive	Negative
Actual True	TP	FN	
	FP	TN	

TP = True Positive.

The class labels in the training set can take on only two possible values, which we usually refer to as positive or negative. The positive and negative instances that a classifier predicts correctly are called true positives (TP) and true negatives (TN), respectively. Similarly, the incorrectly classified instances are called false positives (FP) and false negatives (FN).

Box 2: 1,033

FN = False Negative

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio/evaluate-model-performance>

**QUESTION: 4**

You build a machine learning model by using the automated machine learning user interface (UI).

You need to ensure that the model meets the Microsoft transparency principle for responsible AI.

What should you do?

1. Set Validation type to Auto.
2. Enable Explain best model.
3. Set Primary metric to accuracy.
4. Set Max concurrent iterations to 0.

**Answer(s): B**

**Explanation:**

Model Explain Ability.

Most businesses run on trust and being able to open the ML “black box” helps build transparency and trust. In heavily regulated industries like healthcare and banking, it is critical to comply with regulations and best practices. One key aspect of this is understanding the relationship between input variables (features) and model output. Knowing both the magnitude and direction of the impact each feature (feature importance) has on the predicted value helps better understand and explain the model. With model explainability, we enable you to understand feature importance as part of automated ML runs.

**Reference:**

<https://azure.microsoft.com/en-us/blog/new-automated-machine-learning-capabilities-in-azure-machine-learning-service/>

**QUESTION: 5**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Statements	Yes	No
Forecasting housing prices based on historical data is an example of anomaly detection.	<input type="radio"/>	<input type="radio"/>
Identifying suspicious sign-ins by looking for deviations from usual patterns is an example of anomaly detection.	<input type="radio"/>	<input type="radio"/>
Predicting whether a patient will develop diabetes based on the patient's medical history is an example of anomaly detection.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
Forecasting housing prices based on historical data is an example of anomaly detection.	<input type="radio"/>	<input checked="" type="radio"/>
Identifying suspicious sign-ins by looking for deviations from usual patterns is an example of anomaly detection.	<input checked="" type="radio"/>	<input type="radio"/>
Predicting whether a patient will develop diabetes based on the patient's medical history is an example of anomaly detection.	<input type="radio"/>	<input checked="" type="radio"/>

Anomaly detection encompasses many important tasks in machine learning:

Identifying transactions that are potentially fraudulent.

Learning patterns that indicate that a network intrusion has occurred.

Finding abnormal clusters of patients.

Checking values entered into a system.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/anomaly-detection>

## QUESTION: 6

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

The handling of unusual or missing values provided to an AI system is a consideration for the Microsoft principle for responsible AI.

inclusiveness
privacy and security
reliability and safety
transparency

**Answer(s): A**

**Explanation:**

## Answer Area

The handling of unusual or missing values provided to an AI system is a consideration for the Microsoft principle for responsible AI.

inclusiveness
privacy and security
reliability and safety
transparency

**Reliability and safety:**

AI systems need to be reliable and safe in order to be trusted. It is important for a system to perform as it was originally designed and for it to respond safely to new situations. Its inherent resilience should resist intended or unintended manipulation. Rigorous testing and validation should be established for operating conditions to ensure that the system responds safely to edge cases, and A/B testing and champion/challenger methods should be integrated into the evaluation process.

An AI system's performance can degrade over time, so a robust monitoring and model tracking process needs to be established to reactively and proactively measure the model's performance and retrain it, as necessary, to modernize it.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

## QUESTION: 7

DRAG DROP (Drag and Drop is not supported)

Match the types of AI workloads to the appropriate scenarios.

To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Workloads Types	Answer Area	
Anomaly detection	Workload Type	An automated chat to answer questions about refunds and exchange
Computer vision	Workload Type	Determining whether a photo contains a person
Conversational AI	Workload Type	Determining whether a review is positive or negative
Knowledge mining		
Natural language processing		

**Answer(s): A**

**Explanation:**

Workloads Types	Answer Area	
Anomaly detection	Conversational AI	An automated chat to answer questions about refunds and exchange
Computer vision	Computer vision	Determining whether a photo contains a person
Conversational AI	Natural language processing	Determining whether a review is positive or negative
Knowledge mining		
Natural language processing		

### Box 3: Natural language processing

Natural language processing (NLP) is used for tasks such as sentiment analysis, topic detection, language detection, key phrase extraction, and document categorization.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

### QUESTION: 8

You are designing an AI system that empowers everyone, including people who have hearing, visual, and other impairments.

This is an example of which Microsoft guiding principle for responsible AI?

1. fairness
2. inclusiveness
3. reliability and safety

#### 4. accountability

**Answer(s): B**

**Explanation:**

Inclusiveness: At Microsoft, we firmly believe everyone should benefit from intelligent technology, meaning it must incorporate and address a broad range of human needs and experiences. For the 1 billion people with disabilities around the world, AI technologies can be a game-changer.

**Reference:**

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

#### QUESTION: 9

DRAG DROP (Drag and Drop is not supported)

Match the Microsoft guiding principles for responsible AI to the appropriate descriptions.

To answer, drag the appropriate principle from the column on the left to its description on the right. Each principle may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Principles	Answer Area
Accountability	Principle Ensure that AI systems operate as they were originally designed, respond to unanticipated conditions, and resist harmful manipulation.
Fairness	Principle Implementing processes to ensure that decisions made by AI systems can be overridden by humans.
Inclusiveness	Principle Provide consumers with information and controls over the collection, use, and storage of their data.
Privacy and security	
Reliability and safety	

**Answer(s): A**

**Explanation:**

Principles	Answer Area
Accountability	Reliability and safety Ensure that AI systems operate as they were originally designed, respond to unanticipated conditions, and resist harmful manipulation.
Fairness	Accountability Implementing processes to ensure that decisions made by AI systems can be overridden by humans.
Inclusiveness	Privacy and security Provide consumers with information and controls over the collection, use, and storage of their data.
Privacy and security	
Reliability and safety	

#### Box 1: Reliability and safety

To build trust, it's critical that AI systems operate reliably, safely, and consistently under normal circumstances and in unexpected conditions. These systems should be able to operate as they were originally designed, respond safely to unanticipated conditions, and resist harmful manipulation.

#### Box 2: Accountability

The people who design and deploy AI systems must be accountable for how their systems operate. Organizations should draw upon industry standards to develop accountability norms. These norms can ensure that AI systems are not the final authority on any decision that impacts people's lives and that humans maintain meaningful control over otherwise highly autonomous AI systems.

#### Box 3: Privacy and security

As AI becomes more prevalent, protecting privacy and securing important personal and business information is becoming more critical and complex. With AI, privacy and data security issues require especially close attention because access to data is essential for AI systems to make accurate and informed predictions and decisions about people. AI systems must comply with privacy laws that require transparency about the collection, use, and storage of data and mandate that consumers have appropriate controls to choose how their data is used

#### Reference:

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

#### QUESTION: 10

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

When developing an AI system for self-driving cars, the Microsoft for responsible AI should be applied to ensure consistent operation system during unexpected circumstances.

inclusiveness
accountability
reliability and safety
fairness

principle  
of the

Answer(s): A

**Explanation:**

When developing an AI system for self-driving cars, the Microsoft principle of the for responsible AI should be applied to ensure consistent operation system during unexpected circumstances.

inclusiveness
accountability
reliability and safety
fairness

Reliability and safety: To build trust, it's critical that AI systems operate reliably, safely, and consistently under normal circumstances and in unexpected conditions.

These systems should be able to operate as they were originally designed, respond safely to unanticipated conditions, and resist harmful manipulation.

**Reference:**

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

**QUESTION: 11**

You are building an AI system.

Which task should you include to ensure that the service meets the Microsoft transparency principle for responsible AI?

1. Ensure that all visuals have an associated text that can be read by a screen reader.
2. Enable autoscaling to ensure that a service scales based on demand.
3. Provide documentation to help developers debug code.
4. Ensure that a training dataset is representative of the population.

**Answer(s): C****Reference:**

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

**QUESTION: 12**

DRAG DROP (Drag and Drop is not supported)

Match the types of AI workloads to the appropriate scenarios.

To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

**Workload Types**

- Anomaly detection
- Computer vision
- Machine Learning (Regression)
- Natural language processing

**Answer Area**

- |               |   |
|---------------|---|
| Workload Type | Identify handwritten letters.                 |
| Workload Type | Predict the sentiment of a social media post. |
| Workload Type | Identify a fraudulent credit card payment.    |
| Workload Type | Predict next month's toy sales.               |

**Answer(s): A****Explanation:****Workload Types**

- Anomaly detection
- Computer vision
- Machine Learning (Regression)
- Natural language processing

**Answer Area**

- |                               |   |
|-------------------------------|---|
| Computer vision               | Identify handwritten letters.                 |
| Natural language processing   | Predict the sentiment of a social media post. |
| Anomaly detection             | Identify a fraudulent credit card payment.    |
| Machine Learning (Regression) | Predict next month's toy sales.               |

**Reference:**

<https://docs.microsoft.com/en-us/learn/patterns/get-started-with-artificial-intelligence-on-azure/>

**QUESTION: 13**

Your company is exploring the use of voice recognition technologies in its smart home devices. The company wants to identify any barriers that might unintentionally leave out specific user groups.

This is an example of which Microsoft guiding principle for responsible AI?

1. accountability
2. fairness
3. inclusiveness
4. privacy and security

**Answer(s): C****Reference:**

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

**QUESTION: 14**

What are three Microsoft guiding principles for responsible AI? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. knowledgeability
2. decisiveness
3. inclusiveness
4. fairness
5. opinionatedness
6. reliability and safety

**Answer(s):** C,D,F

**Reference:**

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

### **QUESTION: 15**

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

#### **Answer Area**

Returning a bounding box that indicates the location of a vehicle in an image is an example of

image classification.
object detection.
optical character recognizer (OCR).
semantic segmentation.

**Answer(s): A**

**Explanation:**

## Answer Area

Returning a bounding box that indicates the location of a vehicle in an image is an example of

- image classification.
- object detection.
- optical character recognizer (OCR).
- semantic segmentation.

### Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-object-detection>

## QUESTION: 16

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

is used to generate additional features.

- Feature engineering
- Feature selection
- Model evaluation
- Model training

### Answer(s): A

### Explanation:

## Answer Area

is used to generate additional features.

- Feature engineering
- Feature selection
- Model evaluation
- Model training

### Reference:

<https://docs.microsoft.com/en-us/azure/machine-learning/team-data-science-process/create-features>

### QUESTION: 17

You run a charity event that involves posting photos of people wearing sunglasses on Twitter.

You need to ensure that you only retweet photos that meet the following requirements:

- Include one or more faces.
- Contain at least one person wearing sunglasses.

What should you use to analyze the images?

1. the Verify operation in the Face service
2. the Detect operation in the Face service
3. the Describe Image operation in the Computer Vision service
4. the Analyze Image operation in the Computer Vision service

**Answer(s): B**

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/face/overview>

### QUESTION: 18

When you design an AI system to assess whether loans should be approved, the factors used to make the decision should be explainable.

This is an example of which Microsoft guiding principle for responsible AI?

1. transparency
2. inclusiveness
3. fairness
4. privacy and security

**Answer(s): A**

**Explanation:**

Achieving transparency helps the team to understand the data and algorithms used to train the model, what transformation logic was applied to the data, the final model generated, and its associated assets. This information offers insights about how the model was created, which allows it to be reproduced in a transparent way.

Incorrect Answers:

B: Inclusiveness mandates that AI should consider all human races and experiences, and inclusive design practices can help developers to understand and address potential barriers that could unintentionally exclude people.

Where possible, speech-to-text, text-to-speech, and visual recognition technology should be used to empower people with hearing, visual, and other impairments.

C: Fairness is a core ethical principle that all humans aim to understand and apply. This principle is even more important when AI systems are being developed.

Key checks and balances need to make sure that the system's decisions don't discriminate or run a gender, race, sexual orientation, or religion bias toward a group or individual.

D: A data holder is obligated to protect the data in an AI system, and privacy and security are an integral part of this system. Personal needs to be secured, and it should be accessed in a way that doesn't compromise an individual's privacy.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/strategy/responsible-ai>

**QUESTION: 19**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
Providing an explanation of the outcome of a credit loan application is an example of the Microsoft transparency principle for responsible AI.	<input type="radio"/>	<input type="radio"/>
A triage bot that prioritizes insurance claims based on injuries is an example of the Microsoft reliability and safety principle for responsible AI.	<input type="radio"/>	<input type="radio"/>
An AI solution that is offered at different prices for different sales territories is an example of the Microsoft inclusiveness principle for responsible AI.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

**Answer Area**

Statements	Yes	No
Providing an explanation of the outcome of a credit loan application is an example of the Microsoft transparency principle for responsible AI.	<input checked="" type="radio"/>	<input type="radio"/>
A triage bot that prioritizes insurance claims based on injuries is an example of the Microsoft reliability and safety principle for responsible AI.	<input type="radio"/>	<input checked="" type="radio"/>
An AI solution that is offered at different prices for different sales territories is an example of the Microsoft inclusiveness principle for responsible AI.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: Yes

Achieving transparency helps the team to understand the data and algorithms used to train the model, what transformation logic was applied to the data, the final model generated, and its associated assets. This

information offers insights about how the model was created, which allows it to be reproduced in a transparent way.

#### Box 2: No

A data holder is obligated to protect the data in an AI system, and privacy and security are an integral part of this system. Personal needs to be secured, and it should be accessed in a way that doesn't compromise an individual's privacy.

#### Box 3: No

Inclusiveness mandates that AI should consider all human races and experiences, and inclusive design practices can help developers to understand and address potential barriers that could unintentionally exclude people.

Where possible, speech-to-text, text-to-speech, and visual recognition technology should be used to empower people with hearing, visual, and other impairments.

#### Reference:

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

### QUESTION: 20

DRAG DROP (Drag and Drop is not supported)

Match the principles of responsible AI to appropriate requirements.

To answer, drag the appropriate principles from the column on the left to its requirement on the right. Each principle may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

Note: Each correct selection is worth one point.

Select and Place:

Principles	Answer Area
Fairness	The system must not discriminate based on gender, race
Privacy and security	Personal data must be visible only to approve
Reliability and safety	
Transparency	Automated decision-making processes must be recorded so that approved users can identify why a decision was made

#### Answer(s): A

#### Explanation:

Principles	Answer Area
Fairness	The system must not discriminate based on gender, race
Privacy and security	Personal data must be visible only to approve
Reliability and safety	
Transparency	Automated decision-making processes must be recorded so that approved users can identify why a decision was made

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles>

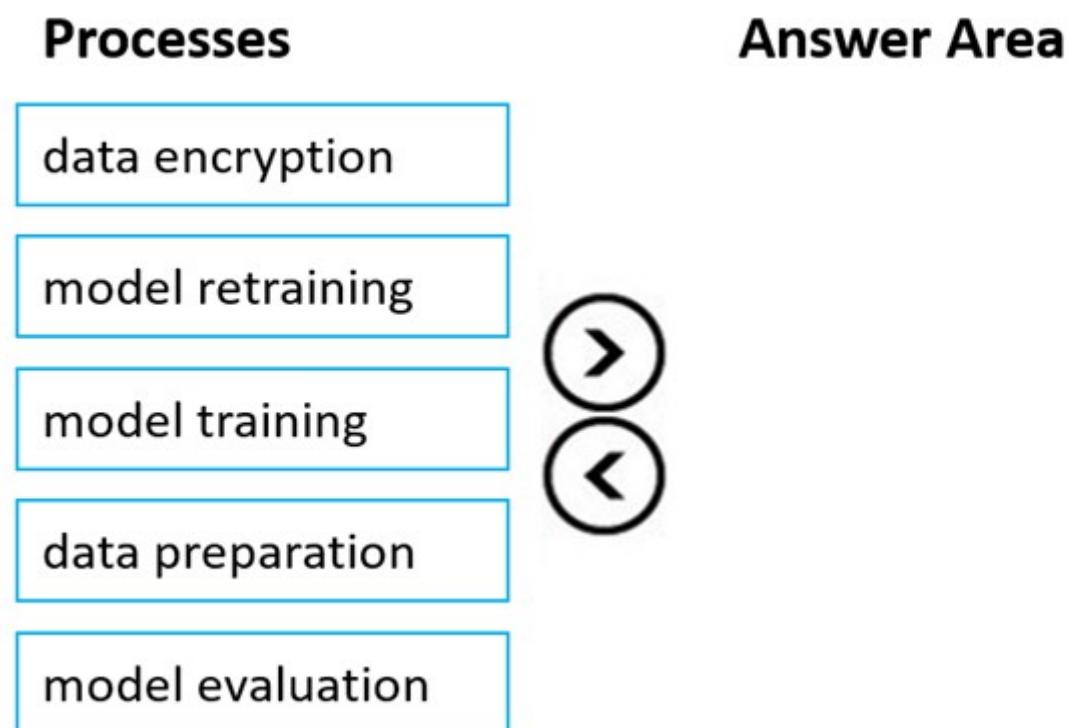
**QUESTION: 21**

DRAG DROP (Drag and Drop is not supported)

You plan to deploy an Azure Machine Learning model as a service that will be used by client applications.

Which three processes should you perform in sequence before you deploy the model? To answer, move the appropriate processes from the list of processes to the answer area and arrange them in the correct order.

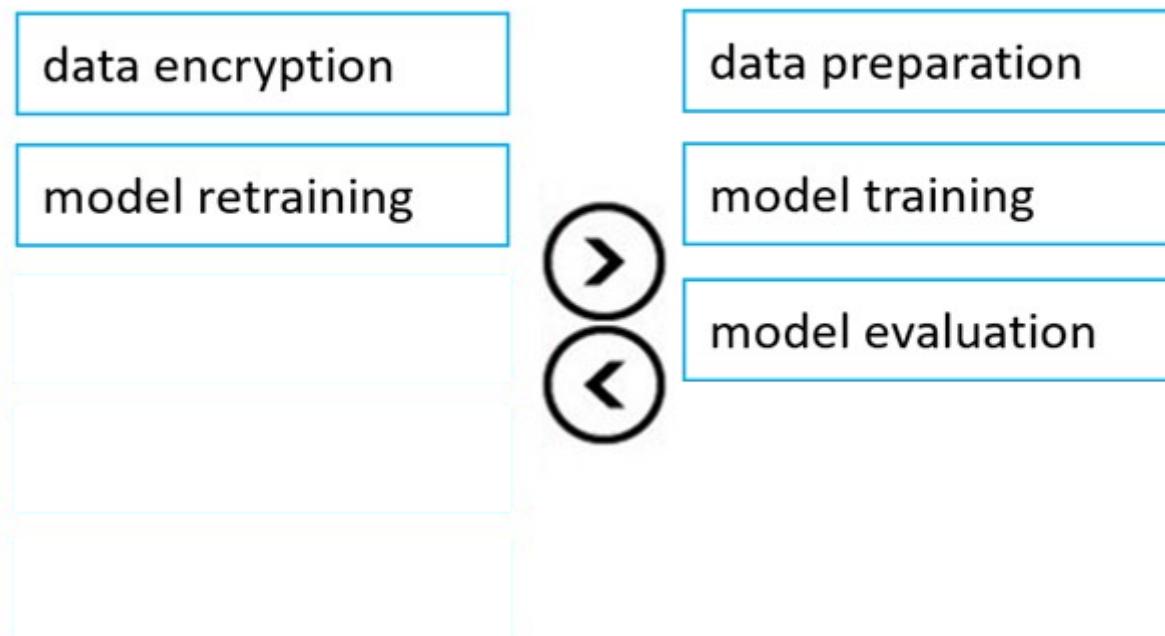
Select and Place:



**Answer(s): A**

**Explanation:**

## Processes                          Answer Area

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-ml-pipelines>

**QUESTION: 22**

You are building an AI-based app.

You need to ensure that the app uses the principles for responsible AI.

Which two principles should you follow? Each correct answer presents part of the solution.

Note: Each correct selection is worth one point.

1. Implement an Agile software development methodology
2. Implement a process of AI model validation as part of the software review process
3. Establish a risk governance committee that includes members of the legal team, members of the risk management team, and a privacy officer
4. Prevent the disclosure of the use of AI-based algorithms for automated decision making

**Answer(s):** B,C

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>  
<https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/3-implications-responsible-ai-practical>

**QUESTION: 23**

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

According to Microsoft's

	▼
accountability	
fairness	
inclusiveness	
transparency	

principle of responsible AI,

AI systems should **NOT** reflect biases from the data sets that are used to train the systems.

**Answer(s): A**

**Explanation:**

## Answer Area

According to Microsoft's

	▼
accountability	
fairness	
inclusiveness	
transparency	

principle of responsible AI,

AI systems should **NOT** reflect biases from the data sets that are used to train the systems.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

## QUESTION: 24

HOTSPOT (Drag and Drop is not supported)

Select the answer that correctly completes the sentence.

Hot Area:

## Answer Area

According to Microsoft's

accountability
fairness
inclusiveness
transparency

principle of responsible AI,

AI systems should **NOT** reflect biases from the data sets that are used to train the systems.

**Answer(s): A**

**Explanation:**

## Answer Area

According to Microsoft's

accountability
fairness
inclusiveness
transparency

principle of responsible AI,

AI systems should **NOT** reflect biases from the data sets that are used to train the systems.

Fairness is a core ethical principle that all humans aim to understand and apply. This principle is even more important when AI systems are being developed. Key checks and balances need to make sure that the system's decisions don't discriminate or run a gender, race, sexual orientation, or religion bias toward a group or individual.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

## QUESTION: 25

DRAG DROP (Drag and Drop is not supported)

Match the types of AI workloads to the appropriate scenarios.

To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Workload Types	Answer Area
Anomaly detection	Workload type
Computer vision	Workload type
Knowledge mining	Workload type
Natural language processing	Determining whether a review is positive or negative

**Answer(s): A**

**Explanation:**

Workload Types	Answer Area
Anomaly detection	Knowledge mining
Computer vision	Computer vision
Knowledge mining	Natural language processing
Natural language processing	An automated chatbot to answer questions about refunds and exchanges
	Determining whether a photo contains a person
	Determining whether a review is positive or negative

**Box 1: Knowledge mining**

You can use Azure Cognitive Search's knowledge mining results and populate your knowledge base of your chatbot.

**Box 2: Computer vision**

**Box 3: Natural language processing**

Natural language processing (NLP) is used for tasks such as sentiment analysis.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

## QUESTION: 26

DRAG DROP (Drag and Drop is not supported)

Match the machine learning tasks to the appropriate scenarios.

To answer, drag the appropriate task from the column on the left to its scenario on the right. Each task may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Learning Types	Answer Area
Feature engineering	Task Examining the values of a confusion matrix
Feature selection	Task Splitting a date into month, day, and year fields
Model deployment	Task Picking temperature and pressure to train a weather model
Model evaluation	
Model training	

**Answer(s): A**

**Explanation:**

Learning Types	Answer Area
Feature engineering	Model evaluation Examining the values of a confusion matrix
Feature selection	Feature engineering Splitting a date into month, day, and year fields
Model deployment	
Model evaluation	Feature selection Picking temperature and pressure to train a weather model
Model training	

#### Box 1: Model evaluation

The Model evaluation module outputs a confusion matrix showing the number of true positives, false negatives, false positives, and true negatives, as well as ROC, Precision/Recall, and Lift curves.

#### Box 2: Feature engineering

Feature engineering is the process of using domain knowledge of the data to create features that help ML algorithms learn better. In Azure Machine Learning, scaling and normalization techniques are applied to facilitate feature engineering. Collectively, these techniques and feature engineering are referred to as featurization.

Note: Often, features are created from raw data through a process of feature engineering. For example, a time stamp in itself might not be useful for modeling until the information is transformed into units of days, months, or categories that are relevant to the problem, such as holiday versus working day.

#### Box 3: Feature selection

In machine learning and statistics, feature selection is the process of selecting a subset of relevant, useful features to use in building an analytical model. Feature selection helps narrow the field of data to the most valuable inputs. Narrowing the field of data helps reduce noise and improve training performance.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio/evaluate-model-performance>

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-automated-ml>

**QUESTION: 27**

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

**Answer Area**

Data values that influence the prediction of a model are called

dependant variables.
features.
identifiers.
labels.

**Answer(s): A**

**Explanation:**

**Answer Area**

Data values that influence the prediction of a model are called

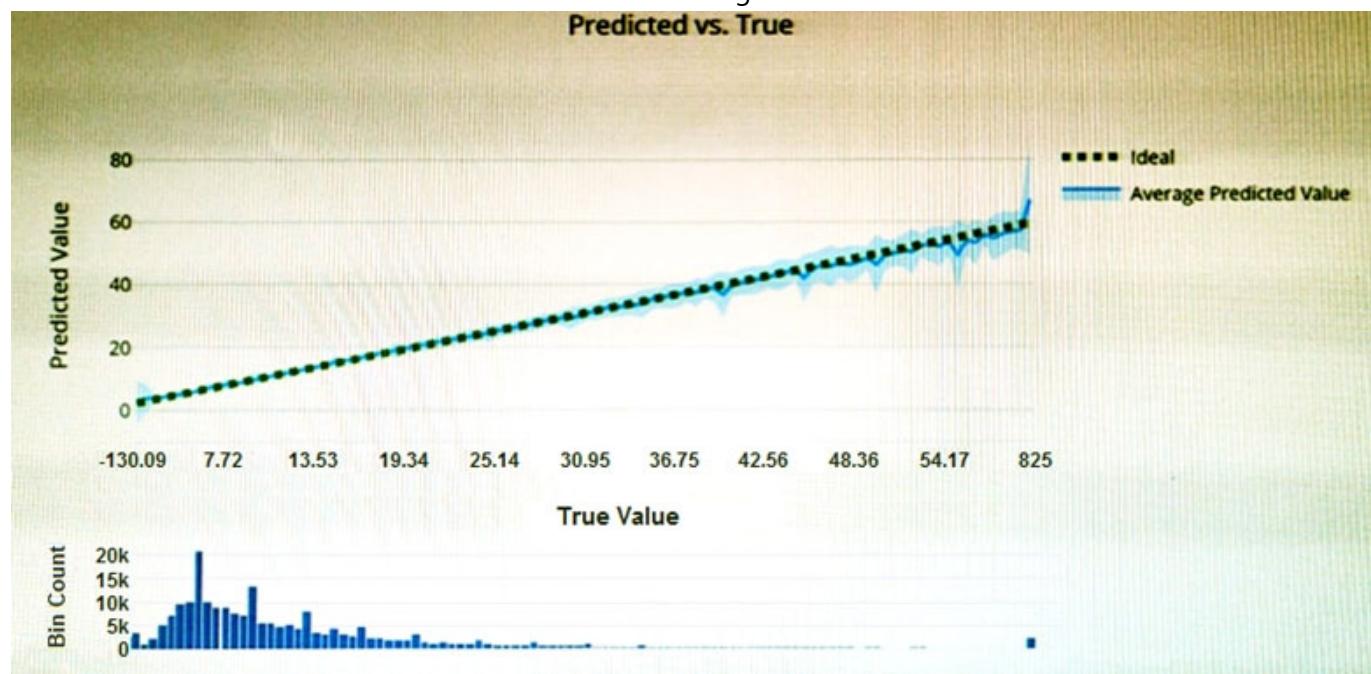
dependant variables.
features.
identifiers.
labels.

**Reference:**

<https://www.baeldung.com/cs/feature-vs-label> <https://machinelearningmastery.com/discover-feature-engineering-how-to-engineer-features-and-how-to-get-good-at-it/>

**QUESTION: 28**

You have the Predicted vs. True chart shown in the following exhibit.



Which type of model is the chart used to evaluate?

1. classification
2. regression
3. clustering

**Answer(s): B**

**Explanation:**

What is a Predicted vs. True chart?

Predicted vs. True shows the relationship between a predicted value and its correlating true value for a regression problem. This graph can be used to measure performance of a model as the closer to the  $y=x$  line the predicted values are, the better the accuracy of a predictive model.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/how-to-understand-automated-m>

### QUESTION: 29

Which type of machine learning should you use to predict the number of gift cards that will be sold next month?

1. classification
2. regression
3. clustering

**Answer(s): B**

**Explanation:**

In the most basic sense, regression refers to prediction of a numeric target.

Linear regression attempts to establish a linear relationship between one or more independent variables and a numeric outcome, or dependent variable.

You use this module to define a linear regression method, and then train a model using a labeled dataset. The trained model can then be used to make predictions.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/linear-regression>

**QUESTION: 30**

You have a dataset that contains information about taxi journeys that occurred during a given period.

You need to train a model to predict the fare of a taxi journey.

What should you use as a feature?

1. the number of taxi journeys in the dataset
2. the trip distance of individual taxi journeys
3. the fare of individual taxi journeys
4. the trip ID of individual taxi journeys

**Answer(s): B**

**Explanation:**

The label is the column you want to predict. The identified Features are the inputs you give the model to predict the Label.

Example:

The provided data set contains the following columns:

vendor\_id: The ID of the taxi vendor is a feature.

rate\_code: The rate type of the taxi trip is a feature.

passenger\_count: The number of passengers on the trip is a feature. trip\_time\_in\_secs: The amount of time the trip took. You want to predict the fare of the trip before the trip is completed. At that moment, you don't know how long the trip would take. Thus, the trip time is not a feature and you'll exclude this column from the model.

trip\_distance: The distance of the trip is a feature. payment\_type: The payment method (cash or credit card) is a feature.

fare\_amount: The total taxi fare paid is the label.

**Reference:**

<https://docs.microsoft.com/en-us/dotnet/machine-learning/tutorials/predict-prices>

**QUESTION: 31**

You need to predict the sea level in meters for the next 10 years.

Which type of machine learning should you use?

1. classification
2. regression
3. clustering

**Answer(s): B**

**Explanation:**

In the most basic sense, regression refers to prediction of a numeric target.

Linear regression attempts to establish a linear relationship between one or more independent variables and a numeric outcome, or dependent variable.

You use this module to define a linear regression method, and then train a model using a labeled dataset. The trained model can then be used to make predictions.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/linear-regression>

### QUESTION: 32

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

### Answer Area

Statements	Yes	No
Automated machine learning is the process of automating the time-consuming, iterative tasks of machine learning model development.	<input type="radio"/>	<input type="radio"/>
Automated machine learning can automatically infer the training data from the use case provided.	<input type="radio"/>	<input type="radio"/>
Automated machine learning works by running multiple training iterations that are scored and ranked by the metrics you specify.	<input type="radio"/>	<input type="radio"/>
Automated machine learning enables you to specify a dataset and will automatically understand which label to predict.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
Automated machine learning is the process of automating the time-consuming, iterative tasks of machine learning model development.	<input checked="" type="radio"/>	<input type="radio"/>
Automated machine learning can automatically infer the training data from the use case provided.	<input type="radio"/>	<input checked="" type="radio"/>
Automated machine learning works by running multiple training iterations that are scored and ranked by the metrics you specify.	<input checked="" type="radio"/>	<input type="radio"/>
Automated machine learning enables you to specify a dataset and will automatically understand which label to predict.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: Yes

Automated machine learning, also referred to as automated ML or AutoML, is the process of automating the time consuming, iterative tasks of machine learning model development. It allows data scientists, analysts, and developers to build ML models with high scale, efficiency, and productivity all while sustaining model quality.

Box 2: No

Box 3: Yes

During training, Azure Machine Learning creates a number of pipelines in parallel that try different algorithms and parameters for you. The service iterates through ML algorithms paired with feature selections, where each iteration produces a model with a training score. The higher the score, the better the model is considered to "fit" your data. It will stop once it hits the exit criteria defined in the experiment.

Box 4: No

Apply automated ML when you want Azure Machine Learning to train and tune a model for you using the target metric you specify.

The label is the column you want to predict.

### Reference:

<https://azure.microsoft.com/en-us/services/machine-learning/automatedml/#features>

### QUESTION: 33

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

A banking system that predicts whether a loan will be repaid is an example of the  type of machine learning.

classification
regression
clustering

**Answer(s): A**

**Explanation:**

## Answer Area

A banking system that predicts whether a loan will be repaid is an example of the  type of machine learning.

classification
regression
clustering

Two-class classification provides the answer to simple two-choice questions such as Yes/No or True/False.

## QUESTION: 34

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Statements	Yes	No
Labelling is the process of tagging training data with known values.	<input type="radio"/>	<input type="radio"/>
You should evaluate a model by using the same data used to train the model.	<input type="radio"/>	<input type="radio"/>
Accuracy is always the primary metric used to measure a model's performance.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:****Answer Area**

Statements	Yes	No
Labelling is the process of tagging training data with known values.	<input checked="" type="radio"/>	<input type="radio"/>
You should evaluate a model by using the same data used to train the model.	<input type="radio"/>	<input checked="" type="radio"/>
Accuracy is always the primary metric used to measure a model's performance.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: Yes

In machine learning, if you have labeled data, that means your data is marked up, or annotated, to show the target, which is the answer you want your machine learning model to predict.

In general, data labeling can refer to tasks that include data tagging, annotation, classification, moderation, transcription, or processing.

Box 2: No

Box 3: No

Accuracy is simply the proportion of correctly classified instances. It is usually the first metric you look at when evaluating a classifier. However, when the test data is unbalanced (where most of the instances belong to one of the classes), or you are more interested in the performance on either one of the classes, accuracy doesn't really capture the effectiveness of a classifier.

**Reference:**

<https://www.cloudfactory.com/data-labeling-guide> <https://docs.microsoft.com/en-us/azure/machine-learning/studio/evaluate-model-performance>

**QUESTION: 35**

Which service should you use to extract text, key/value pairs, and table data automatically from scanned documents?

1. Form Recognizer
2. Text Analytics
3. Language Understanding
4. Custom Vision

**Answer(s): A****Explanation:**

Accelerate your business processes by automating information extraction. Form Recognizer applies advanced machine learning to accurately extract text, key/ value pairs, and tables from documents. With just a few

samples, Form Recognizer tailors its understanding to your documents, both on-premises and in the cloud. Turn forms into usable data at a fraction of the time and cost, so you can focus more time acting on the information rather than compiling it.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/form-recognizer/>

**QUESTION: 36**

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

**Answer Area**

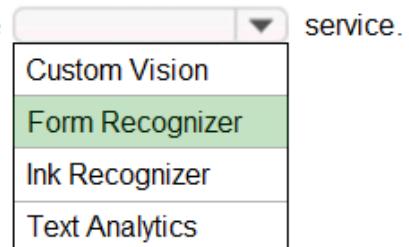
The ability to extract subtotals and totals from a receipt is a capability of the



**Answer(s): A**

**Explanation:****Answer Area**

The ability to extract subtotals and totals from a receipt is a capability of the



Accelerate your business processes by automating information extraction. Form Recognizer applies advanced machine learning to accurately extract text, key/ value pairs, and tables from documents. With just a few samples, Form Recognizer tailors its understanding to your documents, both on-premises and in the cloud. Turn forms into usable data at a fraction of the time and cost, so you can focus more time acting on the information rather than compiling it.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/form-recognizer/>

**QUESTION: 37**

You use Azure Machine Learning designer to publish an inference pipeline.

Which two parameters should you use to access the web service? Each correct answer presents part of the solution.

Note: Each correct selection is worth one point.

1. the model name
2. the training endpoint
3. the authentication key
4. the REST endpoint

**Answer(s):** C,D

**Explanation:**

You can consume a published pipeline in the Published pipelines page. Select a published pipeline and find the REST endpoint of it.

To consume the pipeline, you need:

- The REST endpoint for your service
- The Primary Key for your service

**Reference:**

<https://docs.microsoft.com/en-in/learn/modules/create-regression-model-azure-machine-learning-designer/deploy-service>

### QUESTION: 38

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

### Answer Area

From Azure Machine Learning designer, to deploy a real-time inference pipeline as a service for others to consume, you must deploy the model to

a local web service.
Azure Container Instances.
Azure Kubernetes Service (AKS).
Azure Machine Learning compute.

**Answer(s): A**

**Explanation:**

## Answer Area

From Azure Machine Learning designer, to deploy a real-time inference pipeline as a service for others to consume, you must deploy the model to

a local web service.
Azure Container Instances.
Azure Kubernetes Service (AKS). <span style="background-color: #c8e6c9;">(selected)</span>
Azure Machine Learning compute.

To perform real-time inferencing, you must deploy a pipeline as a real-time endpoint. Real-time endpoints must be deployed to an Azure Kubernetes Service cluster.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-designer#deploy>

## QUESTION: 39

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

Predicting how many hours of overtime a delivery person will work based on the number of order received is an example of

classification.
clustering.
regression. <span style="background-color: #c8e6c9;">(selected)</span>

**Answer(s): A**

**Explanation:**

## Answer Area

Predicting how many hours of overtime a delivery person will work based on the number of order received is an example of

classification.
clustering.
regression. <span style="background-color: #c8e6c9;">(selected)</span>

In the most basic sense, regression refers to prediction of a numeric target.

Linear regression attempts to establish a linear relationship between one or more independent variables and a numeric outcome, or dependent variable.

You use this module to define a linear regression method, and then train a model using a labeled dataset. The trained model can then be used to make predictions.

Incorrect Answers:

-Classification is a machine learning method that uses data to determine the category, type, or class of an item or row of data.

-Clustering, in machine learning, is a method of grouping data points into similar clusters. It is also called segmentation.

Over the years, many clustering algorithms have been developed. Almost all clustering algorithms use the features of individual items to find similar items. For example, you might apply clustering to find similar people by demographics. You might use clustering with text analysis to group sentences with similar topics or sentiment.

#### Reference:

<https://docs.microsoft.com/en-us/azure/machine-learning/algorithm-module-reference/linear-regression>

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/machine-learning-initialize-model-clustering>

#### QUESTION: 40

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

#### Answer Area

Statements	Yes	No
------------	-----	----

Azure Machine Learning designer provides a drag-and-drop visual canvas to build, test, and deploy machine learning models.

Azure Machine Learning designer enables you to save your progress as a pipeline draft.

Azure Machine Learning designer enables you to include custom JavaScript functions.

Answer(s): A

Explanation:

## Answer Area

Statements	Yes	No
Azure Machine Learning designer provides a drag-and-drop visual canvas to build, test, and deploy machine learning models.	<input checked="" type="radio"/>	<input type="radio"/>
Azure Machine Learning designer enables you to save your progress as a pipeline draft.	<input checked="" type="radio"/>	<input type="radio"/>
Azure Machine Learning designer enables you to include custom JavaScript functions.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: Yes

Azure Machine Learning designer lets you visually connect datasets and modules on an interactive canvas to create machine learning models.

Box 2: Yes

With the designer you can connect the modules to create a pipeline draft.

As you edit a pipeline in the designer, your progress is saved as a pipeline draft.

Box 3: No

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-designer>

**QUESTION: 41**

HOTSPOT (Drag and Drop is not supported)

You have the following dataset.

Household Income	Postal Code	House Price Category
20,000	55555	Low
23,000	20541	Middle
80,000	87960	High

You plan to use the dataset to train a model that will predict the house price categories of houses.

What are Household Income and House Price Category? To answer, select the appropriate option in the answer area.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Household Income:

A feature
A label

House Price Category:

A feature
A label

**Answer(s): A**

**Explanation:**

## Answer Area

Household Income:

A feature
A label

House Price Category:

A feature
A label

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio/interpret-model-results>

## QUESTION: 42

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

Azure Machine Learning designer lets you create machine learning models by

adding and connecting modules on a visual canvas.
automatically performing common data preparation tasks.
automatically selecting an algorithm to build the most accurate model.
using a code-first notebook experience.

**Answer(s): A**

**Explanation:**

### Answer Area

Azure Machine Learning designer lets you create machine learning models by

adding and connecting modules on a visual canvas.
automatically performing common data preparation tasks.
automatically selecting an algorithm to build the most accurate model.
using a code-first notebook experience.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-designer>

### QUESTION: 43

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

### Answer Area

Statements	Yes	No
Automated machine learning provides you with the ability to include custom Python scripts in a training pipeline.	<input type="radio"/>	<input type="radio"/>
Automated machine learning implements machine learning solutions without the need for programming experience.	<input type="radio"/>	<input type="radio"/>
Automated machine learning provides you with the ability to visually connect datasets and modules on an interactive canvas.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
Automated machine learning provides you with the ability to include custom Python scripts in a training pipeline.	<input checked="" type="radio"/>	<input type="radio"/>
Automated machine learning implements machine learning solutions without the need for programming experience.	<input checked="" type="radio"/>	<input type="radio"/>
Automated machine learning provides you with the ability to visually connect datasets and modules on an interactive canvas.	<input checked="" type="radio"/>	<input type="radio"/>

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/how-to-designer-python>  
<https://docs.microsoft.com/en-us/azure/machine-learning/concept-automated-ml>

### QUESTION: 44

A medical research project uses a large anonymized dataset of brain scan images that are categorized into predefined brain haemorrhage types.

You need to use machine learning to support early detection of the different brain haemorrhage types in the images before the images are reviewed by a person.

This is an example of which type of machine learning?

1. clustering
2. regression
3. classification

**Answer(s): C**

**Reference:**

<https://docs.microsoft.com/en-us/learn/modules/create-classification-model-azure-machine-learning-designer/introduction>

### QUESTION: 45

When training a model, why should you randomly split the rows into separate subsets?

1. to train the model twice to attain better accuracy
2. to train multiple models simultaneously to attain better performance
3. to test the model by using data that was not used to train the model

**Answer(s): C**

### QUESTION: 46

You are evaluating whether to use a basic workspace or an enterprise workspace in Azure Machine Learning. What are two tasks that require an enterprise workspace? Each correct answer presents a complete solution. Note: Each correct selection is worth one point.

1. Use a graphical user interface (GUI) to run automated machine learning experiments.
2. Create a compute instance to use as a workstation.
3. Use a graphical user interface (GUI) to define and run machine learning experiments from Azure Machine Learning designer.
4. Create a dataset from a comma-separated value (CSV) file.

**Answer(s):** A,C

**Explanation:**

Note: Enterprise workspaces are no longer available as of September 2020. The basic workspace now has all the functionality of the enterprise workspace.

**Reference:**

<https://www.azure.cn/en-us/pricing/details/machine-learning/>  
<https://docs.microsoft.com/en-us/azure/machine-learning/concept-workspace>

## QUESTION: 47

You need to predict the income range of a given customer by using the following dataset.

First Name	Last Name	Age	Education Level	Income Range
Orlando	Gee	45	University	25,000-50,000
Keith	Harris	36	High school	25,000-50,000
Donna	Carreras	52	University	50,000-75,000
Janet	Gates	21	University	75,000-100,000
Lucy	Harrington	68	High school	50,000-75,000

Which two fields should you use as features? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Education Level
2. Last Name
3. Age
4. Income Range
5. First Name

**Answer(s):** A,C

**Explanation:**

First Name, Last Name, Age and Education Level are features. Income range is a label (what you want to predict). First Name and Last Name are irrelevant in that they have no bearing on income. Age and Education level are the features you should use.

**QUESTION: 48**

You are building a tool that will process images from retail stores and identify the products of competitors. The solution will use a custom model. Which Azure Cognitive Services service should you use?

1. Custom Vision
2. Form Recognizer
3. Face
4. Computer Vision

**Answer(s): A**

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/custom-vision-service/overview>

**QUESTION: 49**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
Organizing documents into groups based on similarities of the text contained in the documents is an example of clustering.	<input type="radio"/>	<input type="radio"/>
Grouping similar patients based on symptoms and diagnostic test results is an example of clustering.	<input type="radio"/>	<input type="radio"/>
Predicting whether a person will develop mild, moderate, or severe allergy symptoms based on pollen count is an example of clustering.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
Organizing documents into groups based on similarities of the text contained in the documents is an example of clustering.	<input checked="" type="radio"/>	<input type="radio"/>
Grouping similar patients based on symptoms and diagnostic test results is an example of clustering.	<input checked="" type="radio"/>	<input type="radio"/>
Predicting whether a person will develop mild, moderate, or severe allergy symptoms based on pollen count is an example of clustering.	<input type="radio"/>	<input checked="" type="radio"/>

Clustering is a machine learning task that is used to group instances of data into clusters that contain similar characteristics. Clustering can also be used to identify relationships in a dataset

Regression is a machine learning task that is used to predict the value of the label from a set of related features.

**Reference:**

<https://docs.microsoft.com/en-us/dotnet/machine-learning/resources/tasks>

## QUESTION: 50

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Statements	Yes	No
A validation set includes the set of input examples that will be used to train a model.	<input type="radio"/>	<input checked="" type="radio"/>
A validation set can be used to determine how well a model predicts labels.	<input checked="" type="radio"/>	<input type="radio"/>
A validation set can be used to verify that all the training data was used to train the model.	<input type="radio"/>	<input checked="" type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
A validation set includes the set of input examples that will be used to train a mode.	<input type="radio"/>	<input checked="" type="radio"/>
A validation set can be used to determine how well a model predicts labels.	<input checked="" type="radio"/>	<input type="radio"/>
A validation set can be used to verify that all the training data was used to train the model.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: No

The validation dataset is different from the test dataset that is held back from the training of the model.

Box 2: Yes

A validation dataset is a sample of data that is used to give an estimate of model skill while tuning model's hyperparameters.

Box 3: No

The Test Dataset, not the validation set, used for this. The Test Dataset is a sample of data used to provide an unbiased evaluation of a final model fit on the training dataset.

### Reference:

<https://machinelearningmastery.com/difference-test-validation-datasets/>

## QUESTION: 51

What are two metrics that you can use to evaluate a regression model? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. coefficient of determination (R<sup>2</sup>)
2. F1 score
3. root mean squared error (RMSE)
4. area under curve (AUC)
5. balanced accuracy

**Answer(s):** A,C

### Explanation:

A: R-squared (R<sup>2</sup>), or Coefficient of determination represents the predictive power of the model as a value between -inf and 1.00. 1.00 means there is a perfect fit, and the fit can be arbitrarily poor so the scores can be negative.

C: RMS-loss or Root Mean Squared Error (RMSE) (also called Root Mean Square Deviation, RMSD), measures

the difference between values predicted by a model and the values observed from the environment that is being modeled.

Incorrect Answers:

B: F1 score also known as balanced F-score or F-measure is used to evaluate a classification model.

D: aucROC or area under the curve (AUC) is used to evaluate a classification model.

**Reference:**

<https://docs.microsoft.com/en-us/dotnet/machine-learning/resources/metrics>

## QUESTION: 52

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

### Answer Area

Predicting how many vehicles will travel across a bridge on a given day is an example of

A dropdown menu with three items listed vertically: "classification.", "clustering.", and "regression.". The "classification." item is in a dark grey box, while "clustering." and "regression." are in white boxes.

classification.
clustering.
regression.

**Answer(s): A**

**Explanation:**

### Answer Area

Predicting how many vehicles will travel across a bridge on a given day is an example of

A dropdown menu with three items listed vertically: "classification.", "clustering.", and "regression.". The "regression." item is highlighted with a green background, while "classification." and "clustering." are in white boxes.

classification.
clustering.
regression.

Regression is a machine learning task that is used to predict the value of the label from a set of related features.

**Reference:**

<https://docs.microsoft.com/en-us/dotnet/machine-learning/resources/tasks>

**QUESTION: 53**

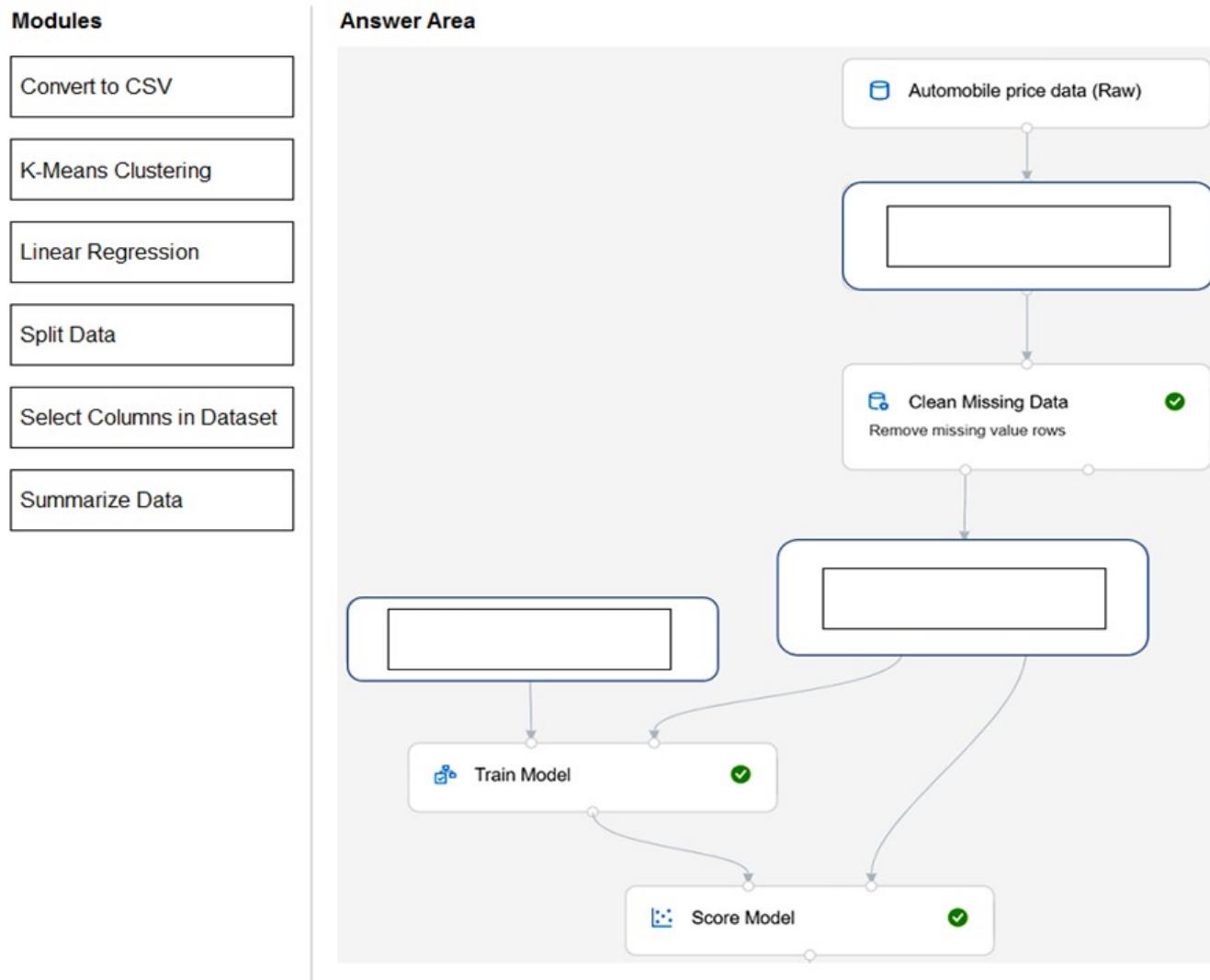
DRAG DROP (Drag and Drop is not supported)

You need to use Azure Machine Learning designer to build a model that will predict automobile prices.

Which type of modules should you use to complete the model? To answer, drag the appropriate modules to the correct locations. Each module may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

Note: Each correct selection is worth one point.

Select and Place:



**Answer(s): A**

**Explanation:**

**Modules**

Convert to CSV

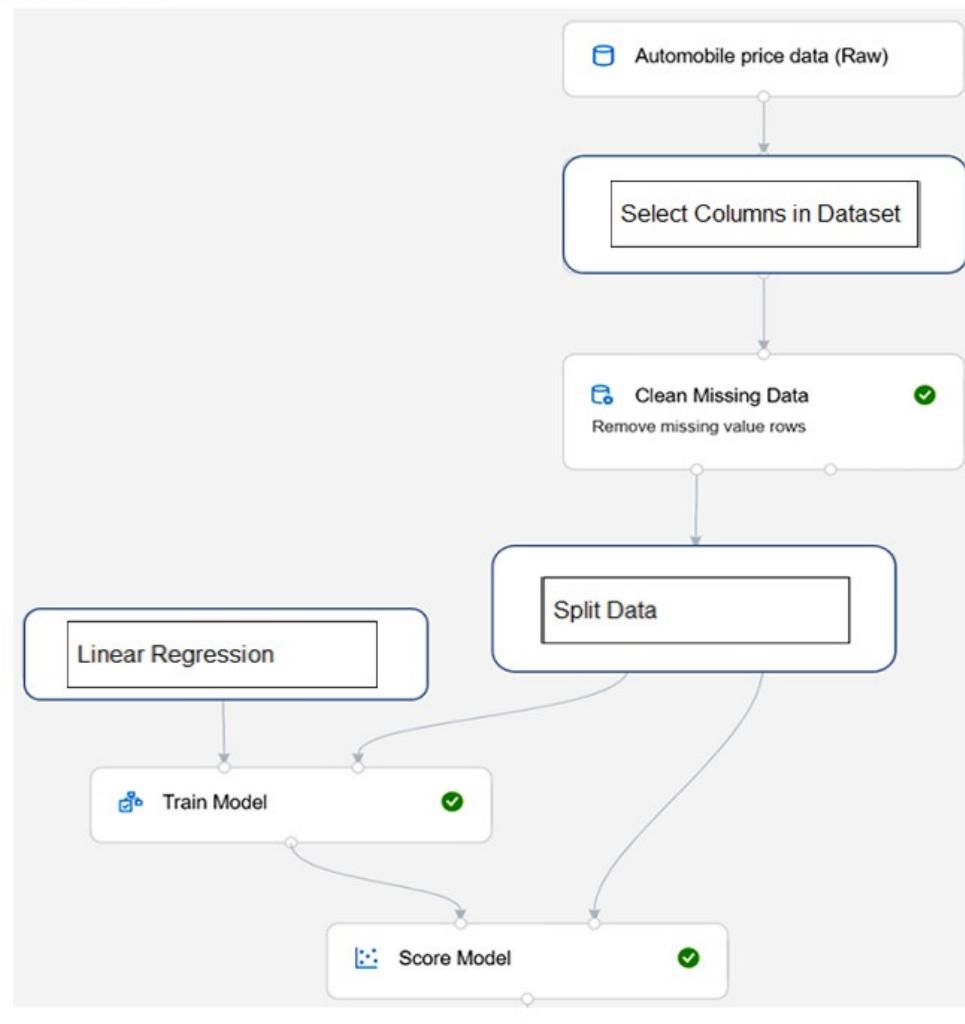
K-Means Clustering

Linear Regression

Split Data

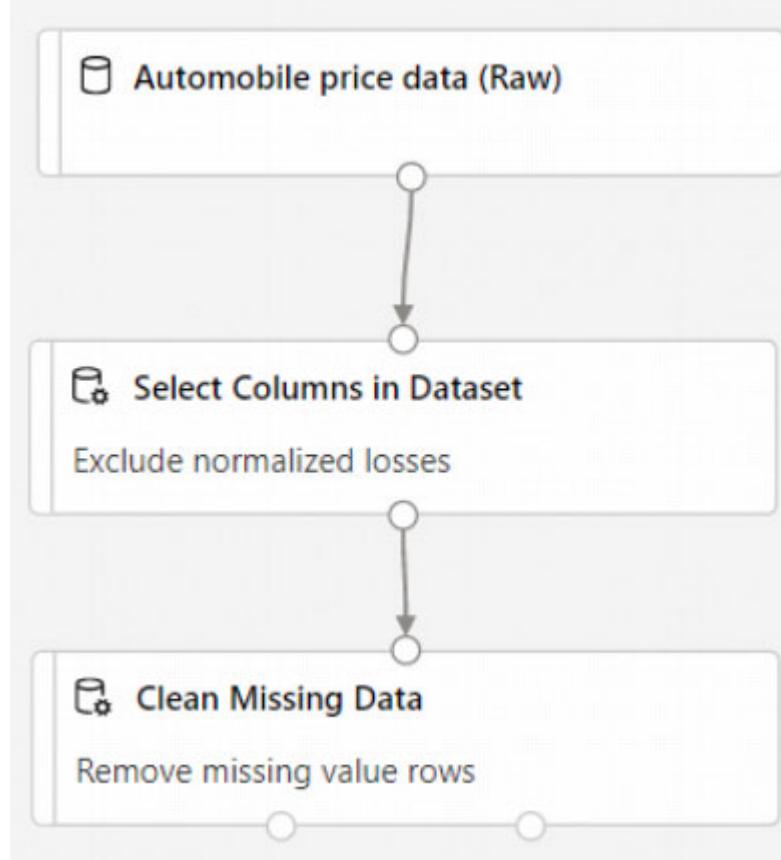
Select Columns in Dataset

Summarize Data

**Answer Area****Box 1: Select Columns in Dataset**

For Columns to be cleaned, choose the columns that contain the missing values you want to change. You can choose multiple columns, but you must use the same replacement method in all selected columns.

Example:



#### Box 2: Split data

Splitting data is a common task in machine learning. You will split your data into two separate datasets. One dataset will train the model and the other will test how well the model performed.

#### Box 3: Linear regression

Because you want to predict price, which is a number, you can use a regression algorithm. For this example, you use a linear regression model.

#### Reference:

<https://docs.microsoft.com/en-us/azure/machine-learning/tutorial-designer-automobile-price-train-score>

#### QUESTION: 54

Which type of machine learning should you use to identify groups of people who have similar purchasing habits?

1. classification
2. regression
3. clustering

#### Answer(s): C

#### Explanation:

Clustering is a machine learning task that is used to group instances of data into clusters that contain similar characteristics. Clustering can also be used to identify relationships in a dataset

**Reference:**

<https://docs.microsoft.com/en-us/dotnet/machine-learning/resources/tasks>

**QUESTION: 55**

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

**Answer Area**

Classification
Clustering
Regression

models can be used to predict the sale price of auctioned items.

**Answer(s): A**

**Explanation:****Answer Area**

Classification
Clustering
Regression

models can be used to predict the sale price of auctioned items.

Regression is a machine learning task that is used to predict the value of the label from a set of related features.

**Reference:**

<https://docs.microsoft.com/en-us/dotnet/machine-learning/resources/tasks>

**QUESTION: 56**

Which metric can you use to evaluate a classification model?

1. true positive rate
2. mean absolute error (MAE)
3. coefficient of determination (R<sup>2</sup>)
4. root mean squared error (RMSE)

**Answer(s): A**

**Explanation:**

What does a good model look like?

An ROC curve that approaches the top left corner with 100% true positive rate and 0% false positive rate will be the best model. A random model would display as a flat line from the bottom left to the top right corner. Worse than random would dip below the  $y=x$  line.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/how-to-understand-automated-ml#classification>

**QUESTION: 57**

Which two components can you drag onto a canvas in Azure Machine Learning designer? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. dataset
2. compute
3. pipeline
4. module

**Answer(s):** A,D

**Explanation:**

You can drag-and-drop datasets and modules onto the canvas.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-designer>

**QUESTION: 58**

You need to create a training dataset and validation dataset from an existing dataset.

Which module in the Azure Machine Learning designer should you use?

1. Select Columns in Dataset
2. Add Rows
3. Split Data
4. Join Data

**Answer(s):** C

**Explanation:**

A common way of evaluating a model is to divide the data into a training and test set by using Split Data, and then validate the model on the training data.

Use the Split Data module to divide a dataset into two distinct sets.

The studio currently supports training/validation data splits

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/how-to-configure-cross-validation-data-splits>

**QUESTION: 59**

DRAG DROP (Drag and Drop is not supported)

Match the types of machine learning to the appropriate scenarios.

To answer, drag the appropriate machine learning type from the column on the left to its scenario on the right. Each machine learning type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Learning Types	Answer Area
Classification	Learning Type
Clustering	Learning Type
Regression	Learning Type

Predict how many minutes late a flight will arrive based on the amount of snowfall at an airport.  
Segment customers into different groups to support a marketing department.  
Predict whether a student will complete a university course.

**Answer(s): A**

**Explanation:**

Learning Types	Answer Area
Classification	Regression
Clustering	Clustering
Regression	Classification

Predict how many minutes late a flight will arrive based on the amount of snowfall at an airport.  
Segment customers into different groups to support a marketing department.  
Predict whether a student will complete a university course.

Box 1: Regression

In the most basic sense, regression refers to prediction of a numeric target.

Linear regression attempts to establish a linear relationship between one or more independent variables and a numeric outcome, or dependent variable.

You use this module to define a linear regression method, and then train a model using a labeled dataset. The trained model can then be used to make predictions.

Box 2: Clustering

Clustering, in machine learning, is a method of grouping data points into similar clusters. It is also called segmentation.

Over the years, many clustering algorithms have been developed. Almost all clustering algorithms use the features of individual items to find similar items. For example, you might apply clustering to find similar

people by demographics. You might use clustering with text analysis to group sentences with similar topics or sentiment.

### Box 3: Classification

Two-class classification provides the answer to simple two-choice questions such as Yes/No or True/False.

#### Reference:

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/linear-regression>

### QUESTION: 60

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

#### Answer Area

	▼
Accuracy	
Confidence	
Root Mean Square Error	
Sentiment	

is the calculated probability of a correct image classification.

Answer(s): A

#### Explanation:

#### Answer Area

	▼
Accuracy	
Confidence	
Root Mean Square Error	
Sentiment	

is the calculated probability of a correct image classification.

#### Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/custom-vision-service/getting-started-build-a-classifier>

### QUESTION: 61

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

Ensuring an AI system does not provide a prediction when important fields contain unusual or missing values is ▼ principle for responsible AI.

- an inclusiveness
- a privacy and security
- a reliability and safety
- a transparency

**Answer(s): A**

**Explanation:**

## Answer Area

Ensuring an AI system does not provide a prediction when important fields contain unusual or missing values is ▼ principle for responsible AI.

- an inclusiveness
- a privacy and security
- a reliability and safety
- a transparency

**Reference:**

<https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/innovate/best-practices/trusted-ai>

## QUESTION: 62

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

Ensuring that the numeric variables in training data are on a similar scale is an example of ▼

- data ingestion.
- feature engineering.
- feature selection.
- model training.

**Answer(s): A**

**Explanation:**

## Answer Area

Ensuring that the numeric variables in training data are on a similar scale is an example of

	▼
data ingestion.	
feature engineering.	
feature selection.	
model training.	

### Reference:

<https://docs.microsoft.com/en-us/azure/architecture/data-science-process/create-features>

## QUESTION: 63

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

Assigning classes to images before training a classification model is an example of

	▼
evaluation.	
feature engineering	
hyperparameter tuning.	
labeling.	

### Answer(s): A

### Explanation:

## Answer Area

Assigning classes to images before training a classification model is an example of

	▼
evaluation.	
feature engineering	
hyperparameter tuning.	
labeling.	

### Reference:

<https://docs.microsoft.com/en-us/azure/machine-learning/how-to-label-data>

## QUESTION: 64

HOTSPOT (Drag and Drop is not supported)

You have an Azure Machine Learning model that predicts product quality. The model has a training dataset that contains 50,000 records. A sample of the data is shown in the following table.

Date	Time	Mass (kg)	Temperature (C)	Quality Test
26/02/2021	15:31:07	2.108	62.5	Pass
26/02/2021	15:31:39	2.099	62.4	Pass
26/02/2021	02:32:21	2.098	66.4	Fail

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Statements	Yes	No
Mass (kg) is a feature.	<input type="radio"/>	<input type="radio"/>
Quality Test is a label.	<input type="radio"/>	<input type="radio"/>
Temperature (C) is a label.	<input type="radio"/>	<input type="radio"/>

Answer(s): A

Explanation:

## Answer Area

Statements	Yes	No
Mass (kg) is a feature.	<input checked="" type="radio"/>	<input type="radio"/>
Quality Test is a label.	<input checked="" type="radio"/>	<input type="radio"/>
Temperature (C) is a label.	<input type="radio"/>	<input checked="" type="radio"/>

Reference:

<https://docs.microsoft.com/en-us/azure/machine-learning/component-reference/filter-based-feature-selection>

**QUESTION: 65**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Statements	Yes	No
You train a regression model by using unlabeled data.	<input type="radio"/>	<input type="radio"/>
The classification technique is used to predict sequential numerical data over time.	<input type="radio"/>	<input type="radio"/>
Grouping items by their common characteristics is an example of clustering.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
You train a regression model by using unlabeled data.	<input type="radio"/>	<input checked="" type="radio"/>
The classification technique is used to predict sequential numerical data over time.	<input type="radio"/>	<input checked="" type="radio"/>
Grouping items by their common characteristics is an example of clustering.	<input checked="" type="radio"/>	<input type="radio"/>

**Reference:**

<https://docs.microsoft.com/en-us/learn/modules/create-regression-model-azure-machine-learning-designer/5-create-training-pipeline> <https://docs.microsoft.com/en-us/learn/modules/create-classification-model-azure-machine-learning-designer/introduction> <https://docs.microsoft.com/en-us/learn/modules/create-clustering-model-azure-machine-learning-designer/1-introduction>

## QUESTION: 66

Which two actions are performed during the data ingestion and data preparation stage of an Azure Machine Learning process? Each correct answer presents part of the solution.

Note: Each correct selection is worth one point.

1. Calculate the accuracy of the model.
2. Score test data by using the model.
3. Combine multiple datasets.
4. Use the model for real-time predictions.
5. Remove records that have missing values.

**Answer(s):** C,E

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/concept-data-ingestion>

<https://docs.microsoft.com/en-us/azure/architecture/data-science-process/prepare-data>

## **QUESTION: 67**

You need to predict the animal population of an area.

Which Azure Machine Learning type should you use?

1. regression
2. clustering
3. classification

**Answer(s):** A

**Explanation:**

Regression is a supervised machine learning technique used to predict numeric values.

**Reference:**

<https://docs.microsoft.com/en-us/learn/modules/create-regression-model-azure-machine-learning-designer/1-introduction>

## **QUESTION: 68**

Which two languages can you use to write custom code for Azure Machine Learning designer? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Python
2. R
3. C#
4. Scala

**Answer(s):** A,B

**Explanation:**

Use Azure Machine Learning designer for customizing using Python and R code.

**Reference:**

<https://azure.microsoft.com/en-us/services/machine-learning/designer/#features>

**QUESTION: 69**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
For a regression model, labels must be numeric.	<input type="radio"/>	<input type="radio"/>
For a clustering model, labels must be used.	<input type="radio"/>	<input type="radio"/>
For a classification model, labels must be numeric.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

**Answer Area**

Statements	Yes	No
For a regression model, labels must be numeric.	<input checked="" type="radio"/>	<input type="radio"/>
For a clustering model, labels must be used.	<input type="radio"/>	<input checked="" type="radio"/>
For a classification model, labels must be numeric.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: Yes

For regression problems, the label column must contain numeric data that represents the response variable. Ideally the numeric data represents a continuous scale.

Box 2: No

K-Means Clustering

Because the K-means algorithm is an unsupervised learning method, a label column is optional.

If your data includes a label, you can use the label values to guide selection of the clusters and optimize the model.

If your data has no label, the algorithm creates clusters representing possible categories, based solely on the data.

**Box 3: No**

For classification problems, the label column must contain either categorical values or discrete values. Some examples might be a yes/no rating, a disease classification code or name, or an income group. If you pick a noncategorical column, the component will return an error during training.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/component-reference/train-model>

<https://docs.microsoft.com/en-us/azure/machine-learning/component-reference/k-means-clustering>

**QUESTION: 70**

Your company wants to build a recycling machine for bottles. The recycling machine must automatically identify bottles of the correct shape and reject all other items.

Which type of AI workload should the company use?

1. anomaly detection
2. conversational AI
3. computer vision
4. natural language processing

**Answer(s): C**

**Explanation:**

Azure's Computer Vision service gives you access to advanced algorithms that process images and return information based on the visual features you're interested in. For example, Computer Vision can determine whether an image contains adult content, find specific brands or objects, or find human faces.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/overview>

**QUESTION: 71**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

## Answer Area

Statements	Yes	No
When creating an object detection model in the Custom Vision service, you must choose a classification type of either <b>Multilabel</b> or <b>Multiclass</b> .	<input type="radio"/>	<input type="radio"/>
You can create an object detection model in the Custom Vision service to find the location of content within an image.	<input type="radio"/>	<input type="radio"/>
When creating an object detection model in the Custom Vision service, you can select from a set of predefined domains.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
When creating an object detection model in the Custom Vision service, you must choose a classification type of either <b>Multilabel</b> or <b>Multiclass</b> .	<input type="radio"/>	<input checked="" type="radio"/>
You can create an object detection model in the Custom Vision service to find the location of content within an image.	<input checked="" type="radio"/>	<input type="radio"/>
When creating an object detection model in the Custom Vision service, you can select from a set of predefined domains.	<input checked="" type="radio"/>	<input type="radio"/>

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/custom-vision-service/get-started-build-detector>

## QUESTION: 72

In which two scenarios can you use the Form Recognizer service? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Extract the invoice number from an invoice.
2. Translate a form from French to English.
3. Find image of product in a catalog.
4. Identify the retailer from a receipt.

**Answer(s): A,D**

**Reference:**

<https://azure.microsoft.com/en-gb/services/cognitive-services/form-recognizer/#features>

### **QUESTION: 73**

HOTSPOT (Drag and Drop is not supported)

Select the answer that correctly completes the sentence.

Hot Area:

### **Answer Area**

Counting the number of animals in an area based on a video feed is an example of

forecasting.
computer vision.
conversational AI.
anomaly detection.

**Answer(s): A**

**Explanation:**

### **Answer Area**

Counting the number of animals in an area based on a video feed is an example of

forecasting.
computer vision.
conversational AI.
anomaly detection.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/overview>

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/intro-to-spatial-analysis-public-preview>

### QUESTION: 74

HOTSPOT (Drag and Drop is not supported)

You have a database that contains a list of employees and their photos.

You are tagging new photos of the employees.

For each of the following statements select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

### Answer Area

Statements	Yes	No
The Face service can be used to perform facial recognition for employees	<input type="radio"/>	<input type="radio"/>
The Face service will be more accurate if you provide more sample photos of each employee from different angles.	<input type="radio"/>	<input type="radio"/>
If an employee is wearing sunglasses, the Face service will always fail to recognize the employee.	<input type="radio"/>	<input type="radio"/>

Answer(s): A

Explanation:

### Answer Area

Statements	Yes	No
The Face service can be used to perform facial recognition for employees	<input checked="" type="radio"/>	<input type="radio"/>
The Face service will be more accurate if you provide more sample photos of each employee from different angles.	<input checked="" type="radio"/>	<input type="radio"/>
If an employee is wearing sunglasses, the Face service will always fail to recognize the employee.	<input type="radio"/>	<input checked="" type="radio"/>

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/face/overview> <https://docs.microsoft.com/en-us/azure/cognitive-services/face/concepts/face-detection>

**QUESTION: 75**

You need to develop a mobile app for employees to scan and store their expenses while travelling.  
Which type of computer vision should you use?

1. semantic segmentation
2. image classification
3. object detection
4. optical character recognition (OCR)

**Answer(s): D**

**Explanation:**

Azure's Computer Vision API includes Optical Character Recognition (OCR) capabilities that extract printed or handwritten text from images. You can extract text from images, such as photos of license plates or containers with serial numbers, as well as from documents - invoices, bills, financial reports, articles, and more.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-recognizing-text>

**QUESTION: 76**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
The Custom Vision service can be used to detect objects in an image.	<input type="radio"/>	<input type="radio"/>
The Custom Vision service requires that you provide your own data to train the model.	<input type="radio"/>	<input type="radio"/>
The Custom Vision service can be used to analyze video files.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:****Answer Area**

Statements	Yes	No
The Custom Vision service can be used to detect objects in an image.	<input checked="" type="radio"/>	<input type="radio"/>
The Custom Vision service requires that you provide your own data to train the model.	<input checked="" type="radio"/>	<input type="radio"/>
The Custom Vision service can be used to analyze video files.	<input type="radio"/>	<input checked="" type="radio"/>

Box 1: Yes

Custom Vision functionality can be divided into two features. Image classification applies one or more labels to an image. Object detection is similar, but it also returns the coordinates in the image where the applied label(s) can be found.

Box 2: Yes

The Custom Vision service uses a machine learning algorithm to analyze images. You, the developer, submit groups of images that feature and lack the characteristics in question. You label the images yourself at the time of submission. Then, the algorithm trains to this data and calculates its own accuracy by testing itself on those same images.

Box 3: No

Custom Vision service can be used only on graphic files.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/Custom-Vision-Service/overview>

**QUESTION: 77**

You are processing photos of runners in a race.

You need to read the numbers on the runners' shirts to identify the runners in the photos.

Which type of computer vision should you use?

1. facial recognition
2. optical character recognition (OCR)
3. image classification
4. object detection

**Answer(s): B**

**Explanation:**

Optical character recognition (OCR) allows you to extract printed or handwritten text from images and documents.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/overview-ocr>

**QUESTION: 78**

DRAG DROP (Drag and Drop is not supported)

Match the types of machine learning to the appropriate scenarios.

To answer, drag the appropriate machine learning type from the column on the left to its scenario on the right. Each machine learning type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Machine Learning Types	Answer Area
Facial detection	Machine Learning Type
Facial recognition	Machine Learning Type
Image classification	Machine Learning Type
Object detection	Machine Learning Type
Optical character recognition (OCR)	
Semantic segmentation	

**Answer(s): A**

**Explanation:**

Machine Learning Types	Answer Area
Facial detection	Image classification
Facial recognition	Object detection
Image classification	Semantic segmentation
Object detection	
Optical character recognition (OCR)	
Semantic segmentation	

**Box 1: Image classification**

Image classification is a supervised learning problem: define a set of target classes (objects to identify in images), and train a model to recognize them using labeled example photos.

**Box 2: Object detection**

Object detection is a computer vision problem.

While closely related to image classification, object detection performs image classification at a more granular scale. Object detection both locates and categorizes entities within images.

### Box 3: Semantic Segmentation

Semantic segmentation achieves fine-grained inference by making dense predictions inferring labels for every pixel, so that each pixel is labeled with the class of its enclosing object or region.

#### Reference:

<https://developers.google.com/machine-learning/practices/image-classification> <https://docs.microsoft.com/en-us/dotnet/machine-learning/tutorials/object-detection-model-builder> <https://nanonets.com/blog/how-to-do-semantic-segmentation-using-deep-learning/>

### QUESTION: 79

You use drones to identify where weeds grow between rows of crops to send an instruction for the removal of the weeds.

This is an example of which type of computer vision?

1. object detection
2. optical character recognition (OCR)
3. scene segmentation

#### Answer(s): A

#### Explanation:

Object detection is similar to tagging, but the API returns the bounding box coordinates for each tag applied.

For example, if an image contains a dog, cat and person, the Detect operation will list those objects together with their coordinates in the image.

Incorrect Answers:

B: Optical character recognition (OCR) allows you to extract printed or handwritten text from images and documents.

C: Scene segmentation determines when a scene changes in video based on visual cues. A scene depicts a single event and it's composed by a series of consecutive shots, which are semantically related.

#### Reference:

<https://docs.microsoft.com/en-us/ai-builder/object-detection-overview> <https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/overview-ocr> <https://docs.microsoft.com/en-us/azure/azure-video-analyzer/video-analyzer-for-media-docs/video-indexer-overview>

### QUESTION: 80

DRAG DROP (Drag and Drop is not supported)

Match the facial recognition tasks to the appropriate questions.

To answer, drag the appropriate task from the column on the left to its question on the right. Each task may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Tasks	Answer Area
grouping	Task
identification	Task
similarity	Task
verification	Task
	Do two images of a face belong to the same person?
	Does this person look like other people?
	Do all the faces belong together?
	Who is this person in this group of people?

**Answer(s): A**

**Explanation:**

Tasks	Answer Area
grouping	verification
identification	similarity
similarity	grouping
verification	identification
	Do two images of a face belong to the same person?
	Does this person look like other people?
	Do all the faces belong together?
	Who is this person in this group of people?

Box 1: verification

Face verification: Check the likelihood that two faces belong to the same person and receive a confidence score.

Box 2: similarity

Box 3: Grouping

Box 4: identification

Face detection: Detect one or more human faces along with attributes such as: age, emotion, pose, smile, and facial hair, including 27 landmarks for each face in the image.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/face/#features>

## QUESTION: 81

DRAG DROP (Drag and Drop is not supported)

Match the types of computer vision workloads to the appropriate scenarios.

To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Workloads Types	Answer Area	
Facial recognition	Workload Type	Identify celebrities in images.
Image classification	Workload Type	Extract movie title names from movie poster images.
Object detection	Workload Type	Locate vehicles in images.
Optical character recognition (OCR)		

**Answer(s): A**

**Explanation:**

Workloads Types	Answer Area	
Facial recognition	Facial recognition	Identify celebrities in images.
Image classification	Optical character recognition (OCR)	Extract movie title names from movie poster images.
Object detection	Object detection	Locate vehicles in images.
Optical character recognition (OCR)		

Box 1: Facial recognition

Face detection that perceives faces and attributes in an image; person identification that matches an individual in your private repository of up to 1 million people; perceived emotion recognition that detects a range of facial expressions like happiness, contempt, neutrality, and fear; and recognition and grouping of similar faces in images.

Box 2: OCR

Box 3: Object detection

Object detection is similar to tagging, but the API returns the bounding box coordinates (in pixels) for each object found. For example, if an image contains a dog, cat and person, the Detect operation will list those objects together with their coordinates in the image. You can use this functionality to process the relationships between the objects in an image. It also lets you determine whether there are multiple instances of the same tag in an image.

The Detect API applies tags based on the objects or living things identified in the image. There is currently no formal relationship between the tagging taxonomy and the object detection taxonomy. At a conceptual level, the Detect API only finds objects and living things, while the Tag API can also include contextual terms like "indoor", which can't be localized with bounding boxes.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/face/> <https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-object-detection>

## QUESTION: 82

You need to determine the location of cars in an image so that you can estimate the distance between the cars.

Which type of computer vision should you use?

1. optical character recognition (OCR)
2. object detection
3. image classification
4. face detection

**Answer(s): B**

### Explanation:

Object detection is similar to tagging, but the API returns the bounding box coordinates (in pixels) for each object found. For example, if an image contains a dog, cat and person, the Detect operation will list those objects together with their coordinates in the image. You can use this functionality to process the relationships between the objects in an image. It also lets you determine whether there are multiple instances of the same tag in an image.

The Detect API applies tags based on the objects or living things identified in the image. There is currently no formal relationship between the tagging taxonomy and the object detection taxonomy. At a conceptual level, the Detect API only finds objects and living things, while the Tag API can also include contextual terms like "indoor", which can't be localized with bounding boxes.

### Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-object-detection>

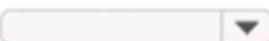
## QUESTION: 83

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

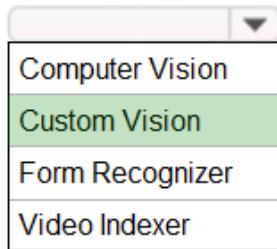
### Answer Area

You can use the  service to train an object detection model by using your own images.

Computer Vision
Custom Vision
Form Recognizer
Video Indexer

**Answer(s): A**

**Explanation:****Answer Area**

You can use the  service to train an object detection model by using your own images.

- Computer Vision
- Custom Vision
- Form Recognizer
- Video Indexer

Azure Custom Vision is a cognitive service that lets you build, deploy, and improve your own image classifiers. An image classifier is an AI service that applies labels (which represent classes) to images, according to their visual characteristics. Unlike the Computer Vision service, Custom Vision allows you to specify the labels to apply.

Note: The Custom Vision service uses a machine learning algorithm to apply labels to images. You, the developer, must submit groups of images that feature and lack the characteristics in question. You label the images yourself at the time of submission. Then the algorithm trains to this data and calculates its own accuracy by testing itself on those same images. Once the algorithm is trained, you can test, retrain, and eventually use it to classify new images according to the needs of your app. You can also export the model itself for offline use.

Incorrect Answers:

Computer Vision:

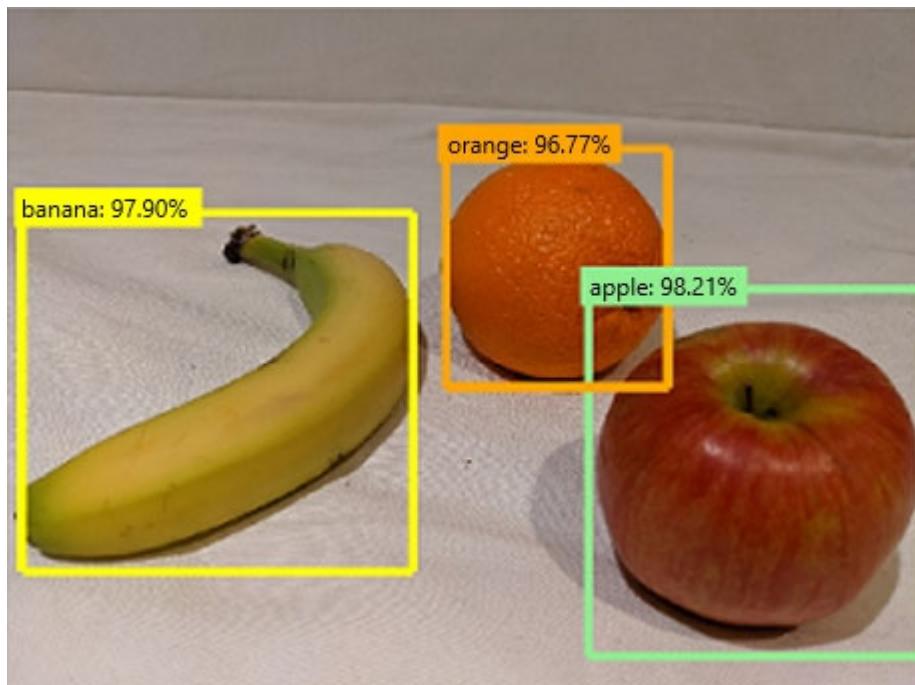
Azure's Computer Vision service provides developers with access to advanced algorithms that process images and return information based on the visual features you're interested in. For example, Computer Vision can determine whether an image contains adult content, find specific brands or objects, or find human faces.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/custom-vision-service/home>

**QUESTION: 84**

You send an image to a Computer Vision API and receive back the annotated image shown in the exhibit.



Which type of computer vision was used?

1. object detection
2. face detection
3. optical character recognition (OCR)
4. image classification

**Answer(s): A**

**Explanation:**

Object detection is similar to tagging, but the API returns the bounding box coordinates (in pixels) for each object found. For example, if an image contains a dog, cat and person, the Detect operation will list those objects together with their coordinates in the image. You can use this functionality to process the relationships between the objects in an image. It also lets you determine whether there are multiple instances of the same tag in an image.

The Detect API applies tags based on the objects or living things identified in the image. There is currently no formal relationship between the tagging taxonomy and the object detection taxonomy. At a conceptual level, the Detect API only finds objects and living things, while the Tag API can also include contextual terms like "indoor", which can't be localized with bounding boxes.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-object-detection>

**QUESTION: 85**

What are two tasks that can be performed by using the Computer Vision service? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Train a custom image classification model.

2. Detect faces in an image.
3. Recognize handwritten text.
4. Translate the text in an image between languages.

**Answer(s):** B,C

**Explanation:**

B: Azure's Computer Vision service provides developers with access to advanced algorithms that process images and return information based on the visual features you're interested in. For example, Computer Vision can determine whether an image contains adult content, find specific brands or objects, or find human faces.

C: Computer Vision includes Optical Character Recognition (OCR) capabilities. You can use the new Read API to extract printed and handwritten text from images and documents.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/home>

**QUESTION: 86**

What is a use case for classification?

1. predicting how many cups of coffee a person will drink based on how many hours the person slept the previous night.
2. analyzing the contents of images and grouping images that have similar colors
3. predicting whether someone uses a bicycle to travel to work based on the distance from home to work
4. predicting how many minutes it will take someone to run a race based on past race times

**Answer(s):** C

**Explanation:**

Two-class classification provides the answer to simple two-choice questions such as Yes/No or True/False.

Incorrect Answers:

A: This is Regression.

B: This is Clustering.

D: This is Regression.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/algorithm-module-reference/linear-regression>  
<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/machine-learning-initialize-model-clustering>

**QUESTION: 87**

What are two tasks that can be performed by using computer vision? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Predict stock prices.
2. Detect brands in an image.
3. Detect the color scheme in an image
4. Translate text between languages.
5. Extract key phrases.

**Answer(s):** B,C

**Explanation:**

B: Identify commercial brands in images or videos from a database of thousands of global logos. You can use this feature, for example, to discover which brands are most popular on social media or most prevalent in media product placement.

C: Analyze color usage within an image. Computer Vision can determine whether an image is black & white or color and, for color images, identify the dominant and accent colors.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/overview>

**QUESTION: 88**

You need to build an image tagging solution for social media that tags images of your friends automatically. Which Azure Cognitive Services service should you use?

1. Face
2. Form Recognizer
3. Text Analytics
4. Computer Vision

**Answer(s):** A

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/face/overview> <https://docs.microsoft.com/en-us/azure/cognitive-services/face/face-api-how-to-topics/howtodetectfacesinimage>

**QUESTION: 89**

In which two scenarios can you use the Form Recognizer service? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Identify the retailer from a receipt
2. Translate from French to English
3. Extract the invoice number from an invoice
4. Find images of products in a catalog

**Answer(s): A,C**

**Reference:**

<https://docs.microsoft.com/en-us/azure/applied-ai-services/form-recognizer/overview?tabs=v2-1>

## QUESTION: 90

DRAG DROP (Drag and Drop is not supported)

Match the facial recognition tasks to the appropriate questions.

To answer, drag the appropriate task from the column on the left to its question on the right.

Each task may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Tasks	Answer Area
grouping	Task Do two images of a face belong to the same person?
identification	Task Does this person look like other people?
similarity	Task Who is this person in this group of people?
verification	

**Answer(s): A**

**Explanation:**

Tasks	Answer Area
grouping	verification Do two images of a face belong to the same person?
identification	similarity Does this person look like other people?
similarity	identification Who is this person in this group of people?
verification	

Box 1: verification

Identity verification

Modern enterprises and apps can use the Face identification and Face verification operations to verify that a user is who they claim to be.

Box 2: similarity

The Find Similar operation does face matching between a target face and a set of candidate faces, finding a

smaller set of faces that look similar to the target face.

This is useful for doing a face search by image.

The service supports two working modes, matchPerson and matchFace. The matchPerson mode returns similar faces after filtering for the same person by using the Verify API. The matchFace mode ignores the same-person filter. It returns a list of similar candidate faces that may or may not belong to the same person.

### Box 3: identification

Face identification can address "one-to-many" matching of one face in an image to a set of faces in a secure repository. Match candidates are returned based on how closely their face data matches the query face. This scenario is used in granting building or airport access to a certain group of people or verifying the user of a device.

#### **Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/face/overview>

### **QUESTION: 91**

Which Computer Vision feature can you use to generate automatic captions for digital photographs?

1. Recognize text.
2. Identify the areas of interest.
3. Detect objects.
4. Describe the images.

#### **Answer(s): D**

#### **Explanation:**

Describe images with human-readable language

Computer Vision can analyze an image and generate a human-readable phrase that describes its contents.

The algorithm returns several descriptions based on different visual features, and each description is given a confidence score. The final output is a list of descriptions ordered from highest to lowest confidence.

The image description feature is part of the Analyze Image API.

#### **Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-describing-images>

### **QUESTION: 92**

Which service should you use to extract text, key/value pairs, and table data automatically from scanned documents?

1. Custom Vision
2. Face
3. Form Recognizer
4. Language

**Answer(s): C**

**Explanation:**

Form Recognizer applies advanced machine learning to accurately extract text, key-value pairs, tables, and structures from documents.

**Reference:**

<https://azure.microsoft.com/en-us/services/form-recognizer/>

### QUESTION: 93

HOTSPOT (Drag and Drop is not supported)

Select the answer that correctly completes the sentence.

Hot Area:

#### Answer Area

Object detection
Facial recognition
Image classification
Optical character recognition (OCR)

extracts text from handwritten documents.

**Answer(s): A**

**Explanation:**

#### Answer Area

Object detection
Facial recognition
Image classification
Optical character recognition (OCR)

extracts text from handwritten documents.

Handwriting OCR (optical character recognition) is the process of automatically extracting handwritten information from paper, scans and other low-quality digital documents.

**Reference:**

<https://vidado.ai/handwriting-ocr>

### QUESTION: 94

You are developing a solution that uses the Text Analytics service.  
You need to identify the main talking points in a collection of documents.  
Which type of natural language processing should you use?

1. entity recognition
2. key phrase extraction
3. sentiment analysis
4. language detection

**Answer(s): B**

**Explanation:**

Broad entity extraction: Identify important concepts in text, including key

Key phrase extraction/ Broad entity extraction: Identify important concepts in text, including key phrases and named entities such as people, places, and organizations.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

### **QUESTION: 95**

In which two scenarios can you use speech recognition? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. an in-car system that reads text messages aloud
2. providing closed captions for recorded or live videos
3. creating an automated public address system for a train station
4. creating a transcript of a telephone call or meeting

**Answer(s): B,D**

**Reference:**

<https://azure.microsoft.com/en-gb/services/cognitive-services/speech-to-text/#features>

### **QUESTION: 96**

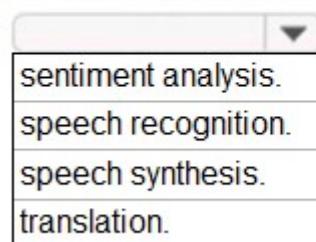
HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

While presenting at a conference, your session is transcribed into subtitles for the audience. This is an example of



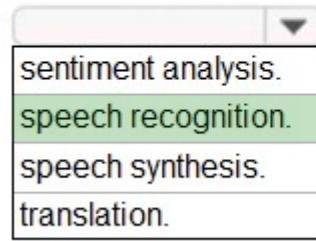
- sentiment analysis.
- speech recognition.
- speech synthesis.
- translation.

**Answer(s): A**

**Explanation:**

## Answer Area

While presenting at a conference, your session is transcribed into subtitles for the audience. This is an example of



- sentiment analysis.
- speech recognition.
- speech synthesis.
- translation.

**Reference:**

<https://azure.microsoft.com/en-gb/services/cognitive-services/speech-to-text/#features>

## QUESTION: 97

You need to build an app that will read recipe instructions aloud to support users who have reduced vision. Which version service should you use?

1. Text Analytics
2. Translator
3. Speech
4. Language Understanding (LUIS)

**Answer(s): C**

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/text-to-speech/#features>

## QUESTION: 98

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

### Answer Area

Statements	Yes	No
You can use the Speech service to transcribe a call to text.	<input type="radio"/>	<input type="radio"/>
You can use the Text Analytics service to extract key entities from a call transcript.	<input type="radio"/>	<input type="radio"/>
You can use the Speech service to translate the audio of a call to a different language.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

### Answer Area

Statements	Yes	No
You can use the Speech service to transcribe a call to text.	<input checked="" type="radio"/>	<input type="radio"/>
You can use the Text Analytics service to extract key entities from a call transcript.	<input checked="" type="radio"/>	<input type="radio"/>
You can use the Speech service to translate the audio of a call to a different language.	<input checked="" type="radio"/>	<input type="radio"/>

**Reference:**

<https://docs.microsoft.com/en-gb/azure/cognitive-services/text-analytics/overview>

<https://azure.microsoft.com/en-gb/services/cognitive-services/speech-services/>

**QUESTION: 99**

Your website has a chatbot to assist customers.

You need to detect when a customer is upset based on what the customer types in the chatbot.

Which type of AI workload should you use?

1. anomaly detection
2. computer vision
3. regression
4. natural language processing

**Answer(s): D**

**Explanation:**

Natural language processing (NLP) is used for tasks such as sentiment analysis, topic detection, language detection, key phrase extraction, and document categorization.

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative or neutral.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

## QUESTION: 100

You plan to develop a bot that will enable users to query a knowledge base by using natural language processing.

Which two services should you include in the solution? Each correct answer presents part of the solution.

Note: Each correct selection is worth one point.

1. QnA Maker
2. Azure Bot Service
3. Form Recognizer
4. Anomaly Detector

**Answer(s): A,B**

**Reference:**

<https://docs.microsoft.com/en-us/azure/bot-service/bot-service-overview-introduction?view=azure-bot-service-4.0>

<https://docs.microsoft.com/en-us/azure/cognitive-services/luis/choose-natural-language-processing-service>

## QUESTION: 101

In which two scenarios can you use a speech synthesis solution? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. an automated voice that reads back a credit card number entered into a telephone by using a numeric keypad
2. generating live captions for a news broadcast
3. extracting key phrases from the audio recording of a meeting
4. an AI character in a computer game that speaks audibly to a player

**Answer(s):** A,D

**Explanation:**

Azure Text to Speech is a Speech service feature that converts text to lifelike speech.

Incorrect Answers:

C: Extracting key phrases is not speech synthesis.

**Reference:**

<https://azure.microsoft.com/en-in/services/cognitive-services/text-to-speech/>

**QUESTION: 102**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
You can use the Translator service to translate text between languages.	<input type="radio"/>	<input type="radio"/>
You can use the Translator service to detect the language of a given text.	<input type="radio"/>	<input type="radio"/>
You can use the Translator service to transcribe audible speech into text.	<input type="radio"/>	<input type="radio"/>

**Answer(s):** A

**Explanation:**

## Answer Area

Statements	Yes	No
You can use the Translator service to translate text between languages.	<input checked="" type="radio"/>	<input type="radio"/>
You can use the Translator service to detect the language of a given text.	<input checked="" type="radio"/>	<input type="radio"/>
You can use the Translator service to transcribe audible speech into text.	<input type="radio"/>	<input checked="" type="radio"/>

The translator service provides multi-language support for text translation, transliteration, language detection, and dictionaries.

Speech-to-Text, also known as automatic speech recognition (ASR), is a feature of Speech Services that provides transcription.

### Reference:

<https://docs.microsoft.com/en-us/azure/cognitive-services/Translator/translator-info-overview>

<https://docs.microsoft.com/en-us/legal/cognitive-services/speech-service/speech-to-text/transparency-note>

## QUESTION: 103

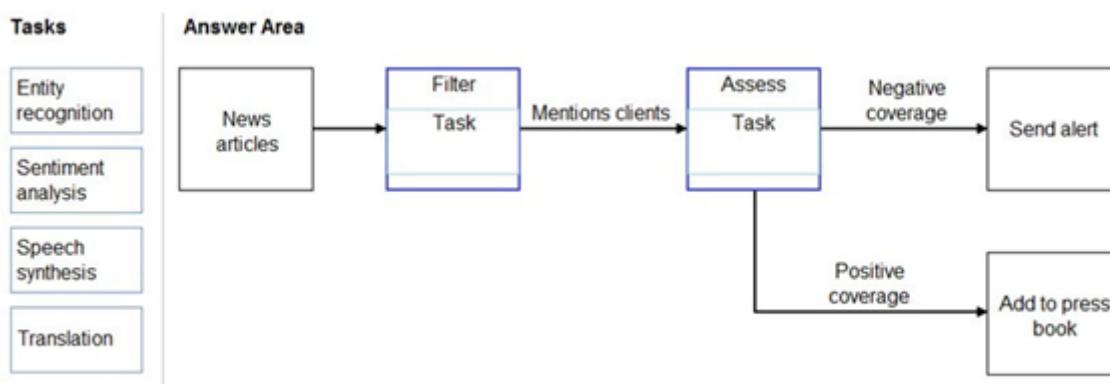
DRAG DROP (Drag and Drop is not supported)

You need to scan the news for articles about your customers and alert employees when there is a negative article. Positive articles must be added to a press book.

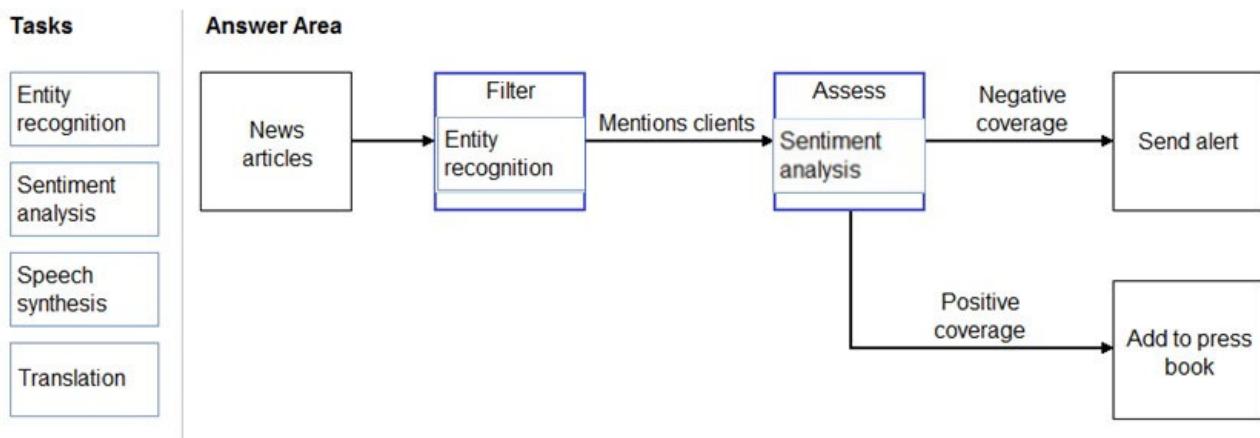
Which natural language processing tasks should you use to complete the process? To answer, drag the appropriate tasks to the correct locations. Each task may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

Note: Each correct selection is worth one point.

Select and Place:



Answer(s): A

**Explanation:**

Box 1: Entity recognition the Named Entity Recognition module in Machine Learning Studio (classic), to identify the names of things, such as people, companies, or locations in a column of text.

Named entity recognition is an important area of research in machine learning and natural language processing (NLP), because it can be used to answer many real-world questions, such as:

- Which companies were mentioned in a news article?
- Does a tweet contain the name of a person? Does the tweet also provide his current location?
- Were specified products mentioned in complaints or reviews?

**Box 2: Sentiment Analysis**

The Text Analytics API's Sentiment Analysis feature provides two ways for detecting positive and negative sentiment. If you send a Sentiment Analysis request, the API will return sentiment labels (such as "negative", "neutral" and "positive") and confidence scores at the sentence and document-level.

**Reference:**

<https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/named-entity-recognition> <https://docs.microsoft.com/en-us/azure/cognitive-services/text-analytics/how-tos/text-analytics-how-to-sentiment-analysis>

**QUESTION: 104**

You are building a knowledge base by using QnA Maker.

Which file format can you use to populate the knowledge base?

1. PPTX
2. XML
3. ZIP
4. PDF

**Answer(s): D****Explanation:**

D: Content types of documents you can add to a knowledge base:

Content types include many standard structured documents such as PDF, DOC, and TXT.

Note: The tool supports the following file formats for ingestion:

.tsv: QnA contained in the format Question(tab)Answer.

.txt, .docx, .pdf: QnA contained as regular FAQ content--that is, a sequence of questions and answers.

Incorrect Answers:

A: PPTX is the default presentation file format for new PowerPoint presentations.

B: It is not possible to ingest xml file directly.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/concepts/data-sources-and-content>

**QUESTION: 105**

In which scenario should you use key phrase extraction?

1. identifying whether reviews of a restaurant are positive or negative
2. generating captions for a video based on the audio track
3. identifying which documents provide information about the same topics
4. translating a set of documents from English to German

**Answer(s): C**

**QUESTION: 106**

You have insurance claim reports that are stored as text.

You need to extract key terms from the reports to generate summaries.

Which type of AI workload should you use?

1. natural language processing
2. conversational AI
3. anomaly detection
4. computer vision

**Answer(s): A**

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

**QUESTION: 107**

HOTSPOT (Drag and Drop is not supported)

To complete the sentence, select the appropriate option in the answer area.

Hot Area:

## Answer Area

Natural language processing can be used to

- classify email messages as work-related or personal.
- predict the number of future car rentals.
- predict which website visitors will make a transaction.
- stop a process in a factory when extremely high temperatures are registered.

**Answer(s): A**

**Explanation:**

## Answer Area

Natural language processing can be used to

- classify email messages as work-related or personal.
- predict the number of future car rentals.
- predict which website visitors will make a transaction.
- stop a process in a factory when extremely high temperatures are registered.

Natural language processing (NLP) is used for tasks such as sentiment analysis, topic detection, language detection, key phrase extraction, and document categorization.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

## QUESTION: 108

Which AI service can you use to interpret the meaning of a user input such as 'Call me back later?'

1. Translator
2. Text Analytics
3. Speech
4. Language Understanding (LUIS)

**Answer(s): D**

**Explanation:**

Language Understanding (LUIS) is a cloud-based AI service, that applies custom machine-learning intelligence to a user's conversational, natural language text to predict overall meaning, and pull out relevant, detailed information.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/luis/what-is-luis>

**QUESTION: 109**

You are developing a chatbot solution in Azure.

Which service should you use to determine a user's intent?

1. Translator
2. QnA Maker
3. Speech
4. Language Understanding (LUIS)

**Answer(s): D**

**Explanation:**

Language Understanding (LUIS) is a cloud-based API service that applies custom machine-learning intelligence to a user's conversational, natural language text to predict overall meaning, and pull out relevant, detailed information.

Design your LUIS model with categories of user intentions called intents. Each intent needs examples of user utterances. Each utterance can provide data that needs to be extracted with machine-learning entities.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/luis/what-is-luis>

**QUESTION: 110**

You need to make the written press releases of your company available in a range of languages.

Which service should you use?

1. Translator
2. Text Analytics
3. Speech
4. Language Understanding (LUIS)

**Answer(s): A**

**Explanation:**

Translator is a cloud-based machine translation service you can use to translate text in near real-time through a simple REST API call. The service uses modern neural machine translation technology and offers statistical

machine translation technology. Custom Translator is an extension of Translator, which allows you to build neural translation systems.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/translator/>

**QUESTION: 111**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
The Text Analytics service can identify in which language text is written.	<input type="radio"/>	<input type="radio"/>
The Text Analytics service can detect handwritten signatures in a document.	<input type="radio"/>	<input type="radio"/>
The Text Analytics service can identify companies and organizations mentioned in a document.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:****Answer Area**

Statements	Yes	No
The Text Analytics service can identify in which language text is written.	<input checked="" type="radio"/>	<input type="radio"/>
The Text Analytics service can detect handwritten signatures in a document.	<input type="radio"/>	<input checked="" type="radio"/>
The Text Analytics service can identify companies and organizations mentioned in a document.	<input checked="" type="radio"/>	<input type="radio"/>

The Text Analytics API is a cloud-based service that provides advanced natural language processing over raw text, and includes four main functions: sentiment analysis, key phrase extraction, named entity recognition, and language detection.

Box 1: Yes

You can detect which language the input text is written in and report a single language code for every

document submitted on the request in a wide range of languages, variants, dialects, and some regional/cultural languages. The language code is paired with a score indicating the strength of the score.

Box 2: No

Box 3: Yes

Named Entity Recognition: Identify and categorize entities in your text as people, places, organizations, date/time, quantities, percentages, currencies, and more.

Well-known entities are also recognized and linked to more information on the web.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/text-analytics/overview>

## QUESTION: 112

DRAG DROP (Drag and Drop is not supported)

Match the types of natural language processing workloads to the appropriate scenarios.

To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Workloads Types	Answer Area
Entity recognition	Workload Type
Key phrase extraction	Workload Type
Language modeling	Workload Type
Sentiment analysis	
Translation	
Speech recognition and speech synthesis	

**Answer(s): A**

**Explanation:**

Workloads Types	Answer Area
Entity recognition	Entity recognition
Key phrase extraction	Sentiment analysis
Language modeling	Translation
Sentiment analysis	
Translation	
Speech recognition and speech synthesis	

**Box 1: Entity recognition**

Named Entity Recognition (NER) is the ability to identify different entities in text and categorize them into pre-defined classes or types such as: person, location, event, product, and organization.

**Box 2: Sentiment analysis**

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative or neutral.

**Box 3: Translation**

Using Microsoft's Translator text API

This versatile API from Microsoft can be used for the following:

Translate text from one language to another.

Transliterate text from one script to another.

Detecting language of the input text.

Find alternate translations to specific text.

Determine the sentence length.

**Reference:**

<https://docs.microsoft.com/en-in/azure/cognitive-services/text-analytics/how-tos/text-analytics-how-to-entity-linking?tabs=version-3-preview> <https://azure.microsoft.com/en-us/services/cognitive-services/text-analytics>

**QUESTION: 113**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
Monitoring online service reviews for profanities is an example of natural language processing.	<input type="radio"/>	<input type="radio"/>
Identifying brand logos in an image is an example of natural languages processing.	<input type="radio"/>	<input type="radio"/>
Monitoring public news sites for negative mentions of a product is an example of natural language processing.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
Monitoring online service reviews for profanities is an example of natural language processing.	<input checked="" type="radio"/>	<input type="radio"/>
Identifying brand logos in an image is an example of natural languages processing.	<input type="radio"/>	<input checked="" type="radio"/>
Monitoring public news sites for negative mentions of a product is an example of natural language processing.	<input checked="" type="radio"/>	<input type="radio"/>

Box 1: Yes

Content Moderator is part of Microsoft Cognitive Services allowing businesses to use machine assisted moderation of text, images, and videos that augment human review.

The text moderation capability now includes a new machine-learning based text classification feature which uses a trained model to identify possible abusive, derogatory or discriminatory language such as slang, abbreviated words, offensive, and intentionally misspelled words for review.

Box 2: No

Azure's Computer Vision service gives you access to advanced algorithms that process images and return information based on the visual features you're interested in. For example, Computer Vision can determine whether an image contains adult content, find specific brands or objects, or find human faces.

Box 3: Yes

Natural language processing (NLP) is used for tasks such as sentiment analysis, topic detection, language detection, key phrase extraction, and document categorization.

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative or neutral.

### Reference:

<https://azure.microsoft.com/es-es/blog/machine-assisted-text-classification-on-content-moderator-public-preview/>

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

### QUESTION: 114

You are developing a natural language processing solution in Azure. The solution will analyze customer reviews and determine how positive or negative each review is.

This is an example of which type of natural language processing workload?

1. language detection
2. sentiment analysis
3. key phrase extraction
4. entity recognition

**Answer(s): B**

**Explanation:**

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative or neutral.

**Reference:**

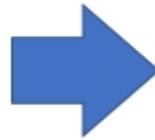
<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

**QUESTION: 115**

You use natural language processing to process text from a Microsoft news story.

You receive the output shown in the following exhibit.

For weeks now, students and teachers have been settling into the uncharted routine of distance learning. Today I want to thank all of the educators who are connecting classrooms and classmates together in the sudden shift to remote learning. This change requires everyone working together and is unlike anything we've seen in the modern history of education. We've seen countries, school districts and universities move rapidly into remote learning environments with Microsoft Teams being used in 175 countries by 183,000 institutions.



now [DateTime]  
students [PersonType]  
teachers [PersonType]  
distance learning [Skill]  
Today [DateTime-Date]  
educators [PersonType]  
classrooms [Location]  
classmates [PersonType]  
remote learning [Skill]  
history [Skill]  
education [Skill]  
remote learning [Skill]  
Microsoft [Organization]  
175 [Quantity-Number]  
183,000 [Quantity-Number]

Which type of natural languages processing was performed?

1. entity recognition
2. key phrase extraction
3. sentiment analysis
4. translation

**Answer(s): A****Explanation:**

Named Entity Recognition (NER) is the ability to identify different entities in text and categorize them into pre-defined classes or types such as: person, location, event, product, and organization.

In this question, the square brackets indicate the entities such as DateTime, PersonType, Skill.

**Reference:**

<https://docs.microsoft.com/en-in/azure/cognitive-services/text-analytics/how-tos/text-analytics-how-to-entity-linking?tabs=version-3-preview>

## QUESTION: 116

DRAG DROP (Drag and Drop is not supported)

You plan to apply Text Analytics API features to a technical support ticketing system.

Match the Text Analytics API features to the appropriate natural language processing scenarios.

To answer, drag the appropriate feature from the column on the left to its scenario on the right. Each feature may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

API Features	Answer Area
Entity recognition	API Feature
Key phrase extraction	API Feature
Language detection	API Feature
Sentiment analysis	API Feature
	Understand how upset a customer is based on the text contained in the support ticket.
	Summarize important information from the support ticket.
	Extract key dates from the support ticket.

**Answer(s): A**

**Explanation:**

API Features	Answer Area
Entity recognition	Sentiment analysis
Key phrase extraction	Key phrase extraction
Language detection	
Sentiment analysis	Entity recognition
	Understand how upset a customer is based on the text contained in the support ticket.
	Summarize important information from the support ticket.
	Extract key dates from the support ticket.

Box1: Sentiment analysis

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative or neutral.

Box 2: Broad entity extraction

Broad entity extraction: Identify important concepts in text, including key

Key phrase extraction/ Broad entity extraction: Identify important concepts in text, including key phrases and named entities such as people, places, and organizations.

Box 3: Entity Recognition

Named Entity Recognition: Identify and categorize entities in your text as people, places, organizations, date/time, quantities, percentages, currencies, and more.

Well-known entities are also recognized and linked to more information on the web.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing> <https://azure.microsoft.com/en-us/services/cognitive-services/text-analytics>

**QUESTION: 117**

You are authoring a Language Understanding (LUIS) application to support a music festival.

You want users to be able to ask questions about scheduled shows, such as: 'Which act is playing on the main stage?'

The question 'Which act is playing on the main stage?' is an example of which type of element?

1. an intent
2. an utterance
3. a domain
4. an entity

**Answer(s): B**

**Explanation:**

Utterances are input from the user that your app needs to interpret.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/LUIS/luis-concept-utterance>

**QUESTION: 118**

You build a QnA Maker bot by using a frequently asked questions (FAQ) page.

You need to add professional greetings and other responses to make the bot more user friendly.

What should you do?

1. Increase the confidence threshold of responses
2. Enable active learning
3. Create multi-turn questions
4. Add chit-chat

**Answer(s): D**

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/how-to/chit-chat-knowledge-base?tabs=v1>

**QUESTION: 119**

You need to develop a chatbot for a website. The chatbot must answer users' questions based on the information in the following documents:

- A product troubleshooting guide in a Microsoft Word document
- A frequently asked questions (FAQ) list on a webpage

Which service should you use to process the documents?

1. Azure Bot Service
2. Language Understanding
3. Text Analytics
4. QnA Maker

**Answer(s): D**

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/QnAMaker/Overview/overview>

### **QUESTION: 120**

You are building a Language Understanding model for an e-commerce business.

You need to ensure that the model detects when utterances are outside the intended scope of the model.

What should you do?

1. Test the model by using new utterances
2. Add utterances to the None intent
3. Create a prebuilt task entity
4. Create a new model

**Answer(s): B**

**Explanation:**

The None intent is filled with utterances that are outside of your domain.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/LUIS/luis-concept-intent>

### **QUESTION: 121**

Which two scenarios are examples of a natural language processing workload? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. monitoring the temperature of machinery to turn on a fan when the temperature reaches a specific threshold
2. a smart device in the home that responds to questions such as, "What will the weather be like today?"
3. a website that uses a knowledge base to interactively respond to users' questions
4. assembly line machinery that autonomously inserts headlamps into cars

**Answer(s): B,C**

**Explanation:**

Natural language processing (NLP) is used for tasks such as sentiment analysis, topic detection, language detection, key phrase extraction, and document categorization.

**Reference:**

<https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing>

**QUESTION: 122**

You have an AI solution that provides users with the ability to control smart devices by using verbal commands.

Which two types of natural language processing (NLP) workloads does the solution use? Each correct answer presents part of the solution.

Note: Each correct selection is worth one point.

1. text-to-speech
2. key phrase extraction
3. speech-to-text
4. language modeling
5. translation

**Answer(s):** B,C

**Explanation:**

Key phrase extraction is one of the features offered by Azure Cognitive Service for Language, a collection of machine learning and AI algorithms in the cloud for developing intelligent applications that involve written language. Use key phrase extraction to quickly identify the main concepts in text. For example, in the text "The food was delicious and the staff were wonderful.", key phrase extraction will return the main topics: "food" and "wonderful staff".

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/language-service/key-phrase-extraction/overview>

**QUESTION: 123**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

**Answer Area**

Statements	Yes	No
The Language service can identify in which language text is written.	<input type="radio"/>	<input type="radio"/>
The Language service can detect handwritten signatures in a document.	<input type="radio"/>	<input type="radio"/>
The Language service can identify companies and organizations mentioned in a document.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A****Explanation:****Answer Area**

Statements	Yes	No
The Language service can identify in which language text is written.	<input checked="" type="radio"/>	<input type="radio"/>
The Language service can detect handwritten signatures in a document.	<input type="radio"/>	<input checked="" type="radio"/>
The Language service can identify companies and organizations mentioned in a document.	<input checked="" type="radio"/>	<input type="radio"/>

Box 1: Yes

Azure Cognitive Service for Language provides features including:

- \* Language detection: This pre-configured feature evaluates text, and determines the language it was written in. It returns a language identifier and a score that indicates the strength of the analysis.

Box 2: No

Handwritten detection is part of OCR (Optical Character Recognition).

Box 3: Yes

Azure Cognitive Service for Language provides features including:

- \* Named Entity Recognition (NER): This pre-configured feature identifies entities in text across several pre-defined categories.

Note: Named entity recognition is a natural language processing technique that can automatically scan entire articles and pull out some fundamental entities in a text and classify them into predefined categories. Entities may be,

Organizations,

Quantities,

Monetary values,

Percentages, and more.

People's names

Company names

Geographic locations (Both physical and political)

Product names

Dates and times

Amounts of money

Names of events

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/language-service/overview>

**QUESTION: 124**

DRAG DROP (Drag and Drop is not supported)

You plan to use Azure Cognitive Services to develop a voice controlled personal assistant app.

Match the Azure Cognitive Services to the appropriate tasks.

To answer, drag the appropriate service from the column on the left to its description on the right. Each service may be used once, more than once, or not at all.

Note: Each correct selection is worth one point.

Select and Place:

Services	Answer Area
Speech	Convert a user's speech to text
Language service	Identify a user's intent
Translator Text	Provide a spoken response to the user

**Answer(s): A**

**Explanation:**

Services	Answer Area
Speech	Convert a user's speech to text
Language service	Identify a user's intent
Translator Text	Provide a spoken response to the user

Box 1: Speech

The Speech service provides speech-to-text and text-to-speech capabilities with an Azure Speech resource.

You can transcribe speech to text with high accuracy, produce natural-sounding text-to-speech voices, translate spoken audio, and use speaker recognition during conversations.

Box 2: Language service

Build applications with conversational language understanding, a Cognitive Service for Language feature that understands natural language to interpret user goals and extracts key information from conversational phrases. Create multilingual, customizable intent classification and entity extraction models for your domain-specific keywords or phrases across 96 languages.

**Box 3: Speech**

Incorrect:

Not Translator text: Text translation is a cloud-based REST API feature of the Translator service that uses neural machine translation technology to enable quick and accurate source-to-target text translation in real time across all supported languages.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/speech-service/overview>

<https://azure.microsoft.com/en-us/services/cognitive-services/conversational-language-understanding/>

<https://docs.microsoft.com/en-us/azure/cognitive-services/translator/text-translation-overview>

**QUESTION: 125**

You need to make the written press releases of your company available in a range of languages.

Which service should you use?

1. Speech
2. Language
3. Translator
4. Personalizer

**Answer(s): C**

**Explanation:**

Translator, an AI service for real-time document and text translation.

Translate text instantly or in batches across more than 100 languages, powered by the latest innovations in machine translation. Support a wide range of use cases, such as translation for call centers, multilingual conversational agents, or in-app communication.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/translator/4>

**QUESTION: 126**

You have insurance claim reports that are stored as text.

You need to extract key terms from the reports to generate summaries.

Which type of AI workload should you use?

1. anomaly detection
2. natural language processing
3. computer vision
4. knowledge mining

**Answer(s): B**

**Explanation:**

Key phrase extraction is one of the features offered by Azure Cognitive Service for Language, a collection of machine learning and AI algorithms in the cloud for developing intelligent applications that involve written language. Use key phrase extraction to quickly identify the main concepts in text. For example, in the text "The food was delicious and the staff were wonderful.", key phrase extraction will return the main topics: "food" and "wonderful staff".

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/language-service/key-phrase-extraction/overview>

**QUESTION: 127**

You need to build an app that will read recipe instructions aloud to support users who have reduced vision. Which version service should you use?

1. Language service
2. Translator
3. Speech
4. Personalizer

**Answer(s): C****Explanation:**

Speech, a managed service offering industry-leading speech capabilities such as speech-to-text, text-to-speech, speech translation, and speaker recognition.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/speech-services/>

**QUESTION: 128**

You have a webchat bot that provides responses from a QnA Maker knowledge base.

You need to ensure that the bot uses user feedback to improve the relevance of the responses over time. What should you use?

1. key phrase extraction
2. sentiment analysis
3. business logic
4. active learning

**Answer(s): D****Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/how-to/improve-knowledge-base>

**QUESTION: 129**

You are developing a conversational AI solution that will communicate with users through multiple channels including email, Microsoft Teams, and webchat.

Which service should you use?

1. Text Analytics
2. Azure Bot Service
3. Translator
4. Form Recognizer

**Answer(s): B**

**Reference:**

<https://docs.microsoft.com/en-us/azure/bot-service/bot-service-overview-introduction?view=azure-bot-service-4.0>

### **QUESTION: 130**

HOTSPOT (Drag and Drop is not supported)

For each of the following statements, select Yes if the statement is true. Otherwise, select No.

Note: Each correct selection is worth one point.

Hot Area:

### **Answer Area**

<b>Statements</b>	<b>Yes</b>	<b>No</b>
A bot that responds to queries by internal users is an example of a conversational AI workload.	<input type="radio"/>	<input type="radio"/>
An application that displays images relating to an entered search term is an example of a conversational AI workload.	<input type="radio"/>	<input type="radio"/>
A web form used to submit a request to reset a password is an example of a conversational AI workload.	<input type="radio"/>	<input type="radio"/>

**Answer(s): A**

**Explanation:**

## Answer Area

Statements	Yes	No
A bot that responds to queries by internal users is an example of a conversational AI workload.	<input checked="" type="radio"/>	<input type="radio"/>
An application that displays images relating to an entered search term is an example of a conversational AI workload.	<input type="radio"/>	<input checked="" type="radio"/>
A web form used to submit a request to reset a password is an example of a conversational AI workload.	<input checked="" type="radio"/>	<input type="radio"/>

**Reference:**

<https://docs.microsoft.com/en-us/azure/bot-service/bot-service-overview-introduction?view=azure-bot-service-4.0>

**QUESTION: 131**

You need to provide content for a business chatbot that will help answer simple user queries.

What are three ways to create question and answer text by using QnA Maker? Each correct answer presents a complete solution.

Note: Each correct selection is worth one point.

1. Generate the questions and answers from an existing webpage.
2. Use automated machine learning to train a model based on a file that contains the questions.
3. Manually enter the questions and answers.
4. Connect the bot to the Cortana channel and ask questions by using Cortana.
5. Import chit-chat content from a predefined data source.

**Answer(s): A,C,E**

**Explanation:**

Automatic extraction

Extract question-answer pairs from semi-structured content, including FAQ pages, support websites, excel files, SharePoint documents, product manuals and policies.

**Reference:**

<https://docs.microsoft.com/en-us/azure/cognitive-services/qnamaker/concepts/content-types>

**QUESTION: 132**

You have a frequently asked questions (FAQ) PDF file.

You need to create a conversational support system based on the FAQ.

Which service should you use?

1. QnA Maker
2. Text Analytics
3. Computer Vision
4. Language Understanding (LUIS)

**Answer(s): A**

**Explanation:**

QnA Maker is a cloud-based API service that lets you create a conversational question-and-answer layer over your existing data. Use it to build a knowledge base by extracting questions and answers from your semi-structured content, including FAQs, manuals, and documents.

**Reference:**

<https://azure.microsoft.com/en-us/services/cognitive-services/qna-maker/>

### **Gentle Reminder**

Please prepare for the recently added Gen AI under the AI-900 certification which is missing in this list. You can find the necessary resources at [Introduction to Generative AI](#).

## My Outcome

I took CS50 AI, AI and DS as part of my academic degree and learned a lot from online resources as a self-learner. Therefore, it was easy for me to cram and score 871/100, surpassing the passing score of 700. Although I didn't go through the official learning path, I did review the official practice tests and the questions from my notes.

## Certificate



## Anas Khan

has successfully passed all requirements for

### Microsoft Certified: Azure AI Fundamentals

Credential ID: 60E4A16A343378DA

Certification number: A298BA-F2D445

Earned on: June 22, 2024

✓ Online Verifiable



A handwritten signature of "Satya N." above a horizontal line.

Satya Narayana Nadella

[Verify my certification](#)

---

V1.0 (2024) PDF Version

If you found this repository helpful, please leave a star. Feel free to reach out to me on [LinkedIn](#) or [Twitter](#) if you need any assistance.