
Microsoft
CERTIFIED
AZURE AI
FUNDAMENTALS

Notes: Quick Revision

What is AI (Artificial Intelligence)?

AI (Artificial Intelligence) is the creation of software that takes human behaviors and capabilities as Patterns.

Key elements of AI:

- **Machine learning** - This is often the foundation for an AI system, and is the way we "teach" a computer model to make prediction and draw conclusions from data.
- **Anomaly detection** - The capability to automatically detect errors or unusual activity in a system.
- **Computer Vision** - The capability of software to interpret the world visually through cameras, video, and images.
- **Natural language processing** - The capability for a computer to interpret written or spoken language, and respond in kind.
- **Conversational AI** - The capability of a software "agent" to participate in a conversation.

How does Machine Learning work?

- We create huge volumes of data in our everyday lives.
- We generate massive amounts of information from the text messages, emails, and social media posts.
- More data still is created by millions of sensors in our homes, cars, cities, public transport infrastructure, and factories.
- Data scientists can use all of that data to train machine learning models that can make predictions and inferences based on the relationships they find in the data.

Machine Learning in Microsoft Azure?

Microsoft Azure provides the Azure Machine learning service - a cloud-based platform for creating, managing and publishing machine learning models.

Features:

- **Automated machine learning -** enables non-experts to quickly create an effective machine learning model from data.
- **Azure Machine Learning designer -** A graphical interface enabling no-code development of machine learning solutions.
- **Data and compute management -** Cloud-based data storage and compute resources that professional data scientists can use to run data experiment code at scale
- **Pipelines -** Data scientists, software engineers, and IT operations professionals can define pipelines to orchestrate model training, deployment, and management tasks.

Use Cases

Use Cases for Anomaly Detection

- Monitor credit card transactions and detect unusual usage patterns that might indicate fraud
- An application that tracks activity in an automated production line and identifies failures
- A racing car telemetry system that uses sensors to proactively warn engineers about potential mechanical failures before they happen

Service used for Anomaly Detection in Microsoft Azure

- The **Anomaly Detector** service provides an application programming interface (API) that developers can use to create anomaly detection solutions
- An AI service that helps you foresee problems before they occur
- Boost your business systems' reliability with early problem detection

Use Cases for Computer Vision

Computer Visions an area of AI that deals with visual processing.

- Image classification
- Object detection
- Semantic segmentation
- Image analysis
- Face detection, analysis, and recognition
- Optical character recognition (OCR)

Service used for Computer Vision in Microsoft Azure

- **Computer Vision** - to analyze images and video, and extract descriptions, tags, objects, and text.
- **Custom Vision** – to train custom image classification and object detection models using your own images.
- **Face** - enables you to build face detection and facial recognition solutions.

- **Form Recognizer** - to extract information from scanned forms and invoices.

Use Cases for NLP (Natural Language Processing)

Natural language processing (NLP) is the area of AI that deals with creating software that understands written and spoken language.

- Analyze and interpret text in documents, email messages, and other sources.
- Interpret spoken language, and synthesize speech responses.
- Automatically translate spoken or written phrases between languages.
- Interpret commands and determine appropriate actions.

Service used for NLP (Natural Language Processing) in Microsoft Azure

- **Text Analytics** - to analyze text documents and extract key phrases, detect entities (such as places, dates, and people), and evaluate sentiment (how positive or negative a document is)
- **Translator Text** - to translate text between more than 60 languages
- **Speech** - to recognize and synthesize speech, and to translate spoken languages
- **Language Understanding Intelligent Service (LUIS)** - to train a language model that can understand spoken or text-based commands

Use Cases for conversational AI

- Conversational AI is the term used to describe solutions where AI agents participate in conversations with humans. Most commonly, conversational AI solutions use *bots* to manage dialogs with users
- These dialogs can take place through web site interfaces, email, social media platforms, messaging systems, phone calls, and other channels.

Use Case

- Customer support for products or services.
- Reservation systems for restaurants, airlines, cinemas, and other appointment based businesses.
- Health care consultations and self-diagnosis.
- Home automation and personal digital assistants.

Service used for Conversational AI in Microsoft Azure

- QnA Maker - to quickly build a *knowledge base* of questions and answers that can form the basis of a dialog between a human and an AI agent
- Azure Bot Service - provides a platform for creating, publishing, and managing bots