Microsoft Azure Essentials

Azure Essentials Track Summary

Enabling Artificial Intelligence

Explore artificial intelligence solutions in Azure that can help make profit-maximizing decisions based on your business and customer data.

Artificial Intelligence (AI) is the process of empowering machines to decipher an event. Azure offers infrastructure, services, and tools to help streamline the process of creating AI solutions and run them at scale. There are three key ways to harness AI on Azure: Azure Cognitive Services, Azure Machine Learning, and the Azure Bot Service.

AZURE COGNITIVE SERVICES

Azure Cognitive Services comprises a suite of machine learning models hosted as a service. Developed by data scientists at Microsoft Research, this is a great way to add valuable AI capabilities to applications and websites without having to develop Machine Learning models yourself.

With well-documented APIs, Azure Cognitive Services allow you to apply natural methods of communication to your apps and services. 29 such services are currently available or in preview, and more are on the way. Each Cognitive Service provides valuable AI functionality for Vision, Speech, Language, Knowledge, and Search:

- Text Analytics API, within our Language Services, can be applied to process natural language, evaluate sentiment, and recognize what the user wants during an interaction with the application. This can be used to assess customer reviews and feedback. The service parses each comment, detects the language used, extracts key words, and scores sentiment within Vision services.
• The Computer Vision API can extract rich information from images to categorize and process visual data – for machine-assisted moderation and curation.

• The Emotion API is capable of scanning images for faces and assessing each image for emotion.

In addition to Vision and Language Services, other notable services include:

• Speech Services to identify and authenticate individual speakers, conduct real-time speech translation, and bidirectional speech-to-text/text-to-speech operations.

• Knowledge Services to organize, distill information and content, recommend information the user may be interested in, and allowing simple accessibility.

• Search Services to view billions of images, videos, news, and web pages.

**MACHINE LEARNING**

Azure provides an open platform with the tools and services to help you orchestrate the building and operationalization of your models in production. To support you in the task of creating AI models, the Azure Machine Learning (ML) Service helps you to prepare data, experiment with different algorithms, generate and compare models, encapsulate the chosen model, and deploy it at scale whether on Azure, on-premises, or on edge devices.

Structured and unstructured data can be leveraged in the building of machine learning models. Additionally, the data might be your organization’s internal data, third-party data purchased on data exchanges, or publicly available datasets. The accuracy of a machine learning model is dependent on the quality of data that the model is trained on. To reduce the time spent in data prep, Azure ML Workbench provides a range of tools. Azure ML Workbench uses Machine Learning to quicken the process of data preparation, intuitively transforming the data without coding. For example, Azure ML Workbench can parse long strings of text to extract what you want. The extraction is not just along delimiters like spaces or hyphens. The application recognizes the underlying logical formats of timestamp, date, IP Address, and extracts them.

You can also extract meaningful text through examples. You can teach Workbench by giving it a few samples of what you want and it will attempt to do the same on all the data in the dataset. Workbench also reports its confidence level on accuracy, and can be easily retrained by correcting mistakes.

With the data prepped, the Azure ML Workbench application works with your IDE of choice or the built-in Jupyter notebook to enable rapid experimentation. You can iterate along different lines generating hundreds of runs. The application’s Run History capability allows you to compare metrics across runs and determine which ones are best. The application tracks your project dependencies like Scikit Learn, TensorFlow, Cognitive Toolkit etc., which enables you to scale up on virtual machines, or scale out on Spark clusters without any code changes. By using GIT for version control in the background, the application enables your runs to be reproducible.

The Azure ML Model Management service orchestrates the creation, testing, and deployment of your AI models using a Docker container. It tracks model usage in production and captures model telemetry for actionable insights. The key advantage of encapsulating the model in a Docker container is that it ensures portability and consistency of the model across Docker host devices.

**BOT FRAMEWORK**

Azure Cognitive Services and Machine Learning enable bots that can interact naturally with users. In the past, Bots have relied on preprogrammed flows. Typically, these Bots could only respond to a limited set of expected responses. With the Azure Bot Service, you can use Cognitive Services to create bots that intelligently interact with users to deliver a highly customized service based on their responses. Your bots can interact with other apps and platforms, perhaps a CRM system, to have the responses based on users’ profiles and past interactions. Bots can monitor the trend in sentiment of users’ responses, the time it takes to respond, and alter their course to achieve the best possible outcome. You can develop Bots to be predictive – capitalizing on Machine Learning insights within big data. For example, in a customer support
interaction, a support bot could be used to introduce a customer to other products or services the customer may have an interest in.

The Azure Bot Service includes the Azure Bot Framework; a platform for building, connecting, testing, and deploying your bots. You do not have to start from scratch. The Framework includes a range of bot templates to help get things started. You can also integrate other Azure Cognitive Services. In addition to the provided templates, you can create your own bots using the Bot Builder SDK in either C# or Node JS. You can then host bots built with the SDK in the Azure Bot Service or using your own hosting provider.

When you provision a bot on Azure, you can choose a plan that allows you to allocate a predefined capacity with predictable costs, and with the option to scale as required. You can also use Azure Functions to provide a Serverless bot that is triggered during certain events or if you want to augment current capacity when you experience traffic spikes.

This allows you to take advantage of activity-based billing, so you only pay for the compute resources that you use.

MACHINE LEARNING WORKBENCH

The Machine Learning Workbench is a downloadable desktop application and command-line interface for Windows and MacOS. This tool uses built-in data preparation that learns your data preparation steps as you perform them. The Machine Learning Workbench helps with project management, run history, and notebook integration to bolster your productivity.

BOT SERVICES

Think of a bot as an app that users interact with in a conversational way. Bots can communicate conversationally with text, cards, or speech. A bot may be as simple as basic pattern matching with a response, or it may be a sophisticated weaving of artificial intelligence techniques with complex conversational state tracking and integration to existing business services. Azure Bot Service can be integrated across multiple channels to increase interactions and reach more customers using your website or app to email, GroupMe, Facebook Messenger, Kik, Skype, Slack, Microsoft Teams, Telegram, text/SMS, Twilio, Cortana, and Skype for Business.

Enabling Artificial Intelligence

Demo Topics

COGNITIVE SERVICES

Microsoft Cognitive Services expand on Microsoft's evolving portfolio of machine learning APIs and enables developers to easily add intelligent features - such as emotion and video detection, facial, speech and vision recognition, and speech or language understanding - into their applications. Each category contains several products a developer can use to make their applications more intelligent, engaging and discoverable.

MACHINE LEARNING

Machine learning enables computers to learn from data and experiences and to act without being explicitly programmed. We can build Artificial Intelligence (AI) applications that intelligently sense, process, and act on information - augmenting human capabilities, increasing speed and efficiency, and helping organizations achieve more.
CONTINUE LEARNING

Artificial Intelligence solutions from Azure can help you make critical decisions based on your data. You can learn more with these useful resources.

AZURE LEARNING PATHS

AI Developer on Azure

HANDS-ON LABS

Building Intelligent Bot using Azure Bot Service and Cosmos DB

MICROSOFT MECHANICS

Azure Machine Learning

Build your own bots with Azure Bot Service