Microsoft Cognitive Services: AI for everyone?

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Our sponsors

Structured Concepts

SQL Service

Microsoft

PASS

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Snabbfoting
SQLSaturday #865 - Rheinland
25.05.2019

SQLSaturday #880 - Munich
19.10.2019
Who am I?

Independent BI Consultant

> 15 years experience of SQL Server

Focus on MS Azure & AI & BI Stack

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**Next 60 Minutes**

- Cognitive Services
- Computer Vision
- Custom Vision
- Sketch 2 Code
- Text Analytics
- What’s next?
Deep learning, machine learning and AI
<table>
<thead>
<tr>
<th></th>
<th>Raising money</th>
<th>Hiriring developers</th>
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<tbody>
<tr>
<td><strong>AI</strong></td>
<td>✓</td>
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<td><strong>ML</strong></td>
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</table>
Use a comprehensive set of flexible AI services for any scenario, and enterprise-grade AI infrastructure that runs AI workloads anywhere at scale. Modern AI tools designed for developers and data scientists help you create AI solutions easily, and with maximum productivity.
AI Service

Accelerate the development of AI solutions with high-level services. Use your preferred approach adapted to your targeted scenario, and achieve maximum productivity and reliability.

Cognitive Services
Use AI to solve business problems. Infuse your apps, websites, and bots with intelligent algorithms to see, hear, speak, and understand natural methods of communication.

Machine Learning Services
Model AI algorithms and experiment with ease. Customize based on your requirements.

Azure Bot Service
Accelerate development for conversational AI. Integrate seamlessly with Cortana, Office 365, Slack, Facebook Messenger, and more.
AI Infrastructure

**AI compute**
Flexible compute services from virtually limitless scale to the edge.

- **Apache Spark for Azure HDInsight**
  Take advantage of Apache Spark in the cloud for mission critical deployments.

- **Batch AI training**
  Experience unlimited, elastic scale-out deep learning. Run large-scale, massively parallel GPU-enabled AI development.

- **Data Science Virtual Machines**
  Use a friction-free data science environment that contains popular tools for data exploration, modeling, and development activities.

- **Azure Container Service (AKS)**
  Scale and orchestrate containers using Kubernetes, DC/OS, or Docker Swarm.

**AI on data**
AI-enable your data platform

- **Data Lake Store**
  Run data transformations and AI on petabyte-scale.

- **SQL Database**
  Use R, Python, and native machine learning in an industry-leading SQL DB.

- **Azure Cosmos DB**
  Integrate AI with a globally distributed, multi-model database service.
AI Tools

Machine Learning Studio
Easily build, deploy, and manage predictive analytics solutions

Visual Studio Code Tools for AI
Build, debug, test, and deploy AI with Visual Studio Code on Windows and Mac.

Other popular open source tools
Support for Jupyter Notebooks, PyCharm, and more.

Azure Machine Learning Workbench
Visual AI-powered data wrangling, experimentation, and lifecycle management.

Azure Notebooks
Organize your datasets and Jupyter Notebooks in a centralized library for data science and analysis.

AI Toolkit for Azure IoT Edge
Deploy deep learning models and AI to run locally on IoT devices through pre-built models.
Microsoft Cognitive Services
Basic elements
Microsoft Cognitive Services

Basic elements
Microsoft Cognitive Services
Microsoft Cognitive Services

Single Layer

Multi-Layer
Microsoft Cognitive Services

- Klassifizierung
- Regression
- Assoziation & Matchbox
- Clustering
Microsoft Cognitive Services

ImageNet Large Scale Visual Recognition Challenge (ILSVRC)

ImageNet Classification top-5 error (%)

- ILSVRC 2010: 28.2
- ILSVRC 2011: 25.8
- ILSVRC 2012: 16.4
- ILSVRC 2013: 11.7
- ILSVRC 2014: 7.3
- ILSVRC 2014: 6.7
- Human Performance: 5.1
- ILSVRC 2015: 3.5

- NEC America, 8 layers
- Xerox, 8 layers
- AlexNet, 19 layers
- Clarifi, 22 layers
- VGG, 152 layers
- Microsoft

Fish or stone???
**CPU**
A central processing unit (CPU) is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions.

**GPU**
A graphics processing unit (GPU), occasionally called visual processing unit (VPU), is a specialized electronic circuit designed to rapidly manipulate and alter memory to accelerate the creation of images in a frame buffer intended for output to a display device.

**FPGA**
A field-programmable gate array (FPGA) is an integrated circuit designed to be configured by a customer or a designer after manufacturing – hence "field-programmable".
Microsoft Azure

Microsoft Translator V1.00.23400.11102
Data Source: War and Peace
Translate to: English

War and Peace
Author: Leo Tolstoy
Language: Russian
Pages: 1,440
Novel by Russian author Tolstoy, originally titled Война и мир, considered one of the finest literary achievements and a central work in world literature.

Azure Standard Server – 24-S3N-1U
Type: 24-core 2.4 GHz Haswell
Model: 24-53245-NKD 1U
Peak Power/Unit: 300 Watts
Compute Capacity: 1.8 Tera-ops

Time Elapsed: 00:19.9
Pages Translated: 1440
Pages Per Second: 73

Azure FPGA Server – SV4-D5-1U
Type: 10 CPU cores + 4 FPGAs
Model: Stratix V D5-accelerator
Peak Power/Unit: 240 Watts
Compute Capacity: 7.9 Tera-ops

Time Elapsed: 00:02.6
Pages Translated: 1440
Pages Per Second: 558
Microsoft Cognitive Services (formerly Project Oxford) are a set of APIs, SDKs and services available to developers to make their applications more intelligent, engaging and discoverable. Cognitive Services expands on Microsoft’s evolving portfolio of machine learning APIs and enables developers to easily add intelligent features ...

https://docs.microsoft.com/en-us/azure/cognitive-services/welcome
Microsoft Cognitive Services
Give your apps a human side

**Vision**
From faces to feelings, allow your apps to understand images and video

**Speech**
Hear and speak to your users by filtering noise, identifying speakers, & understanding intent

**Language**
Process text and learn how to recognize what users want

**Knowledge**
Tap into rich knowledge amassed from the web, academia, or your own data

**Search**
Access billions of web pages, images, videos, and news with the power of Bing APIs

**Labs**
An early look at emerging Cognitive Services technologies: discover, try & give feedback on new technologies before general availability
Microsoft Cognitive Services
Give your apps a human side
Microsoft Cognitive Services
Give your apps a human side

**Vision**
- Computer Vision
- Content Moderator
- Face
- Video
- Video Indexer

**Speech**
- Speech to Text
- Speaker Recognition
- Text to Speech
- Speech Translation

**Language**
- Bing Spell Check
- Content Moderator
- Language Understanding
- Text Analytics
- Translator Text

**Knowledge**
- QnA Maker
- Custom Decision

**Search**
- Bing Autosuggest
- Bing Custom Search
- Bing Entity Search
- Bing Image Search
- Bing Web Search
- Bing Video Search
- Bing Visual Search

**Labs**
- Project Academic Knowledge
- Project Anomaly Finder
- Project Answer Search
- Project Conversation Learner
- Project Entity Linking
- Project Event Tracking
- Project Ink Analysis
- Project Local Insights
- Project Gesture

**CUSTOMIZATION**
- Custom Vision Service
- Custom Speech Service
- Language Understanding
- Custom Decision Service
- Bing Custom Search
Vision

Computer Vision API
Distill actionable information from images

Face API
Detect, identify, analyze, organize, and tag faces in photos

Video Indexer
Process and extract smart insights from videos

Content Moderator
Machine-assisted moderation of text and images, augmented with human review tools

Custom Vision Service
Customizable web service that learns to recognize specific content in imagery
Computer Vision API

Analyze an image
Understand content within an image

OCR
Detect and recognize words within an image

Generate thumbnail
Scale and crop images, while retaining key content

Recognize celebrities
Thanks to domain specific models, ability to recognize 200K celebrities from business, politics, sports, and entertainment around the world
### Analyze image

#### Type of image
- Clip Art Type: Non-clipart
- Line Drawing Type: Non-Line Drawing
- Black & White Image: False

#### Content of image
- Categories: 
  - people_swimming
  - score: 0.099690375
- Adult Content: False
- Adult Score: 0.18533889949321747
- Faces: 
  - age: 27
  - gender: Male
  - faceRectangle: 
    - left: 472
    - top: 258
    - width: 199
    - height: 199

#### Image colors
- Dominant Color Background: White
- Dominant Color Foreground: Grey
- Dominant Colors: White
- Accent Color: White

### Metadata
- Age: 27
- Gender: Male
LIFE IS LIKE
RIDING A BICYCLE
TO KEEP YOUR BALANCE
YOU MUST KEEP MOVING
Face API

**Face detection**
Detect faces and their attributes within an image

**Face verification**
Check if two faces belong to the same person

**Similar face searching**
Find similar faces within a set of images

**Face grouping**
Organize many faces into groups

**Face identification**
Search which person a face belongs to
Computer Vision Demo
Custom Vision Service
A customizable web service that learns to recognize specific content in imagery

Upload Images
Upload your own labeled images, or use Custom Vision Service to quickly tag any unlabeled images.

Train
Use your labeled images to teach Custom Vision Service the concepts you want it to learn.

Evaluate
Use simple REST API calls to quickly tag images with your new custom computer vision model.

Active learning
Images evaluated through your custom vision model become part of a feedback loop you can use to keep improving your classifier.
Custom Vision Service is an easy-to-use tool for prototyping, improving, and deploying a custom image classifier to a cloud service, without any background in computer vision or deep learning required.
Custom Vision Demo
Text Analytics

Sentiment analysis
Understand if a record has positive or negative sentiment

Key phrase extraction
Extract key phrases from a piece of text, and retrieve topics

Language detection
Identify the language, 120 supported languages
Sentient

The API returns a numeric score between 0 and 1. Scores close to 1 indicate positive sentiment and scores close to 0 indicate negative sentiment. Sentiment score is generated using classification techniques. The input features of the classifier include n-grams, features generated from part-of-speech tags, and word embeddings. English, French, Spanish and Portuguese text are supported.
Text Analytics Demo
Sketch 2 Code
The Need

User Interface Design process involves a lot of creativity that starts on a whiteboard where designers share ideas. Once a design is drawn, it is usually captured within a photograph and manually translated into some working HTML wireframe to play with in a web browser. This takes effort and delays the design process.
**Sketch 2 Code**

The Idea

Computer Vision is a discipline inside artificial intelligence that gives an application the capability to see and understand what it is seeing. We can use this technology to build a system that understands what a designer has drawn on a whiteboard and can translate that understanding to HTML code. This way we can generate HTML wireframes directly from a hand-drawn image giving an instant working design implementation thus streamlining the design process.
**Sketch 2 Code**

**Workflow**

1. **Wireframes**
   - User draws on a whiteboard a UI screen sketch

2. **Pictures**
   - A Windows app takes pictures and submit them to AI Service

3. **App**
   - AI service runs the image against a prebuilt model

4. **Cloud**
   - AI model
   - AI service
   - Markup generator
   - AI service generates HTML or any other markup language

5. **Results are displayed in the App**
Sketch 2 Code Demo
Cognitive Services

Demo Microsoft
Cognitive Services

Demo Microsoft
Bringing AI to the edge

Posted on November 14, 2018

Eric Boyd, Corporate Vice President, Azure AI

We are seeing a clear trend towards a future powered by the intelligent cloud and intelligent edge. The intelligent cloud is ubiquitous computing at massive scale, enabled by the public cloud and powered by AI, for every type of application one can envision. The intelligent edge is a continually expanding set of connected systems and devices that gather and analyze data—close to end users and the data that is generated. Together, they give customers the ability to create a new class of distributed, connected applications that enable breakthrough business outcomes.

To accelerate this trend, today we are announcing the preview of Azure Cognitive Services containers, making it possible to build intelligent applications that span the cloud and the edge. Azure Cognitive Services allow developers to easily add cognitive features—such as object detection, vision recognition, and language understanding—into their applications without having direct AI or data science skills or knowledge. Over 1.2 million developers have discovered and tried Azure Cognitive Services to build and run intelligent applications. Containerization is an approach to software distribution in which an application or service is packaged so that it can be deployed in a container host with little or no modification.

With container support, customers can use Azure’s intelligent Cognitive Services capabilities, wherever the data resides. This means customers can perform facial recognition, OCR, or text analytics operations without sending their content to the cloud. Their intelligent apps are portable and scale with greater consistency whether they run on the edge or in Azure.
Containers in Azure Cognitive Services

Features and benefits

• Control over your data
• Control over model updates
• Portable architecture
• High throughput / low latency
What’s next?

- Video Indexer
- Speaker Recognition
- LUIS
- Combination of 2 or more API’s
- Bots
- ...

...
Questions?

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Tack för din uppmärksamhet

Alexander Klein
Twitter: @SQL_Alex
Appendix

Cognitive Services
https://azure.microsoft.com/de-de/services/cognitive-services/

Cognitive Services Docker Support
https://docs.microsoft.com/en-us/azure/cognitive-services/cognitive-services-container-support

AI Demos
https://aidemos.microsoft.com

Seeing AI Prototype
https://www.youtube.com/watch?v=R2mC-NUAmMk&index=6&list=PLD7HFcN7LXRdHkBFl4stPPeWJcQ0VF1x

Seeing AI
http://SeeingAI.com

Keynote Cognitive Services Build 2017
https://www.youtube.com/watch?v=TU5KIYa4mBQ

Cognitive Services with cameras
https://www.youtube.com/watch?v=O1pDOkzsFOU
Appendix

Cognitive Services Docker Samples
https://github.com/Azure-Samples/cognitive-services-containers-samples

Cognitive Services in Power BI
https://docs.microsoft.com/en-us/power-bi/service-cognitive-services

Cognitive Services SDK Vision
https://github.com/Microsoft/Cognitive-Vision-Windows

Sketch2Code Custom Vision
https://azure.microsoft.com/de-de/blog/turn-your-whiteboard-sketches-to-working-code-in-seconds-with-sketch2code/

Computer Vision API detail information

What’s new in LUIS

What’s new in Vision
https://channel9.msdn.com/Shows/Al-Show/Vision-Cognitive-Services-Updates