# Introduction to AI and Azure Cognitive Services
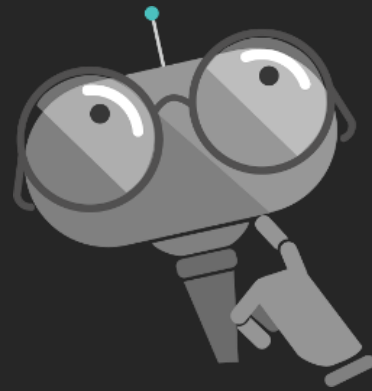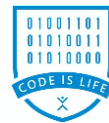
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# About me.

**Microsoft MVP in AI**

Microsoft Student Partner

Web Applications Developer @ ITT Inc.

Blogger

Traveler

Speaker

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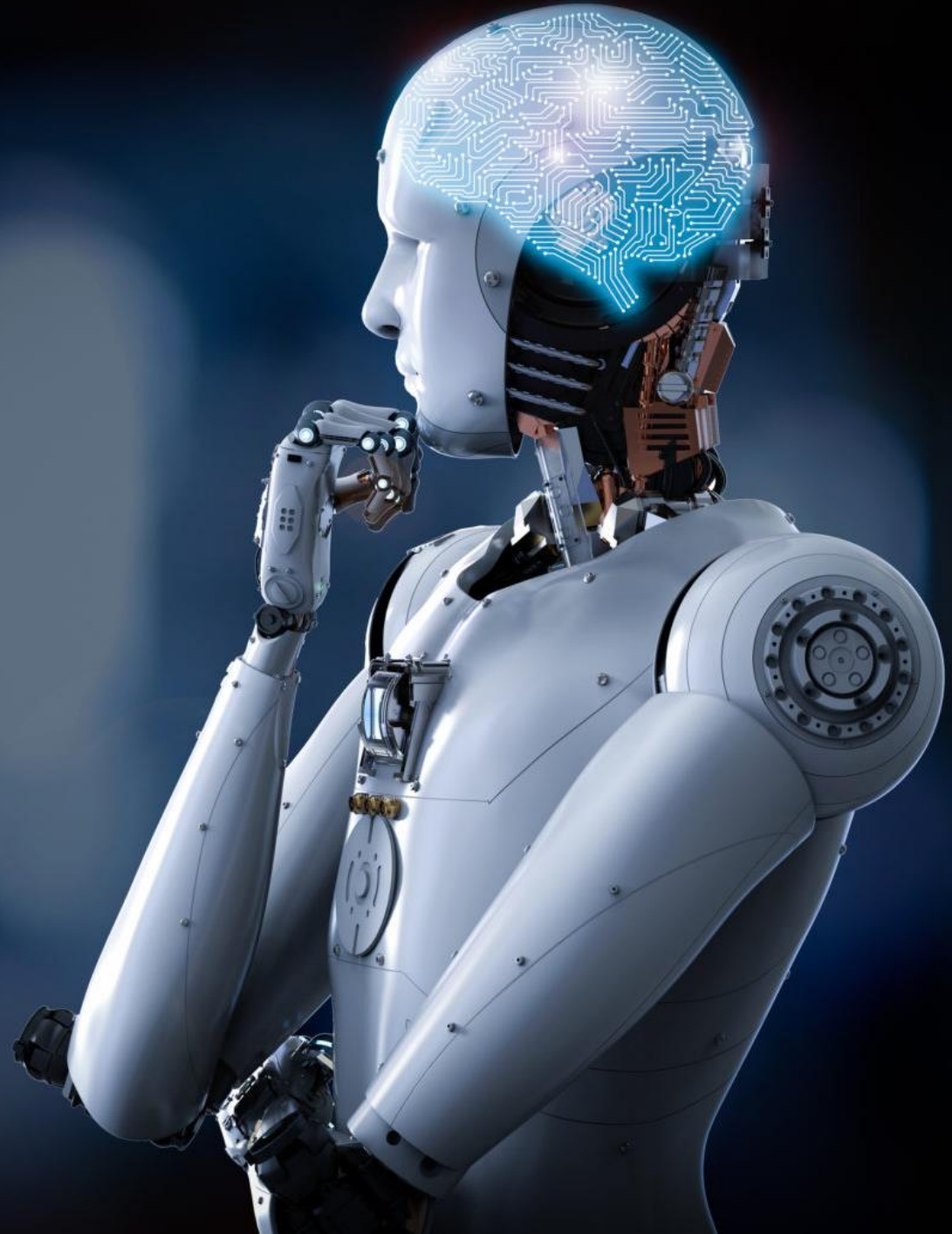
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# Definition

- Artificial Intelligence is technology that appears to emulate human performance typically by learning, coming to it's own conclusions, appearing to understand complex content, engaging in natural dialogs with people, enhancing human cognitive performance or replacing or supporting people on execution of tasks.
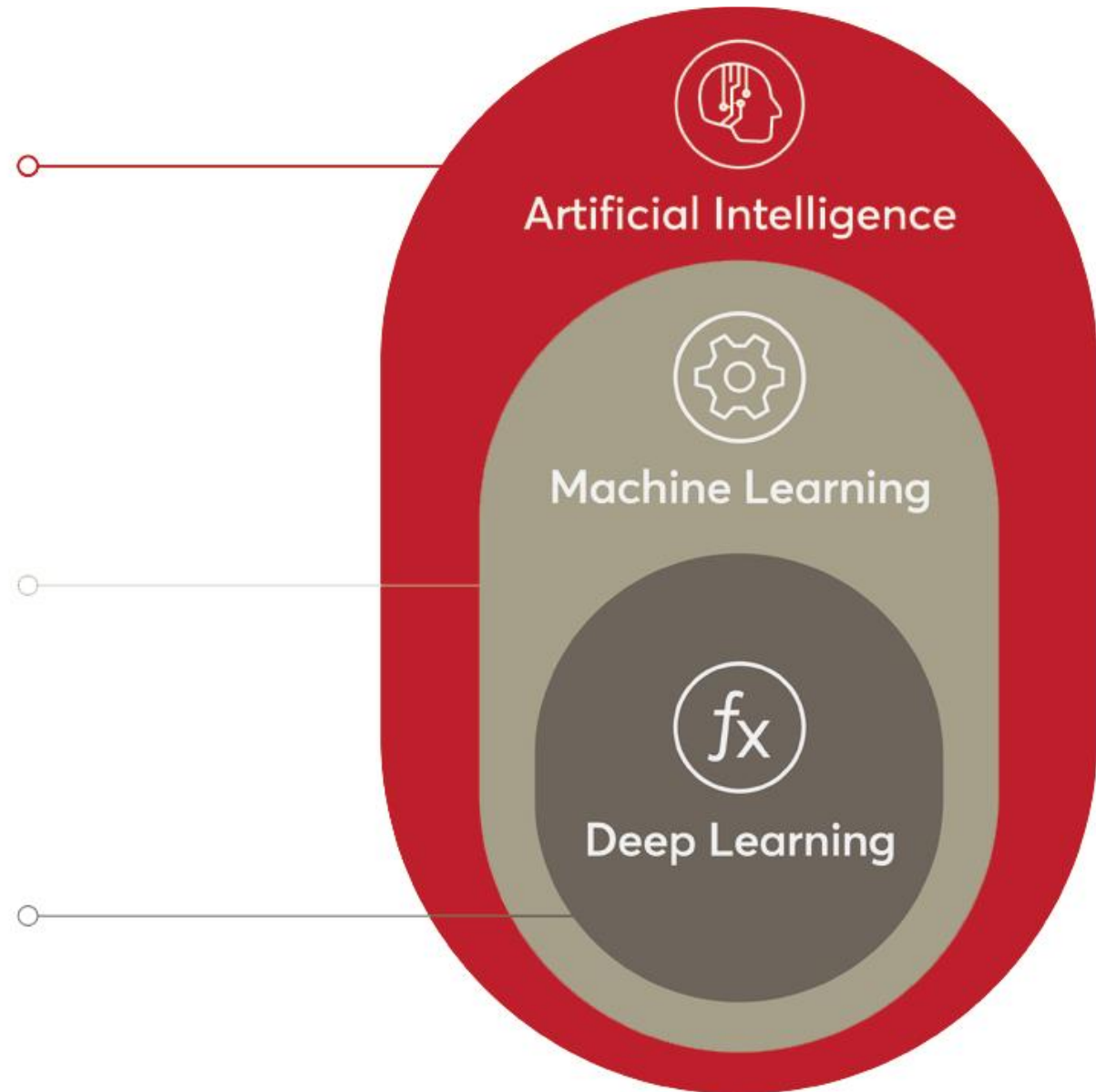
# Artificial Intelligence
Any technique which enables computers to mimic human behavior

# Machine Learning
Subset of AI techniques which use Statistical methods to enable machines to improve with experiences

# Deep Learning
Subset of ML which makes the computation of multi-layer neural networks feasible

| Artificial Intelligence | VS | Natural Intelligence |
|---|---|---|
| Non Creative | | Creative |
| Precise | | Error – prone |
| Consistent | | Inconsistent |
| Multitasking | | Universal |
| Fast | | Biased |

# Microsoft AI Principles

Fair | Accountable | Transparent | Ethical

1. AI must maximize efficiencies without destroying the dignity of people

2. AI must guard against bias

3. AI needs accountability so humans can undo unintended harm

4. AI must be transparent

5. AI must be designed for intelligent privacy

6. AI must be designed to assist humanity

Artificial Intelligence Today?

# Virtual Personal Assistants
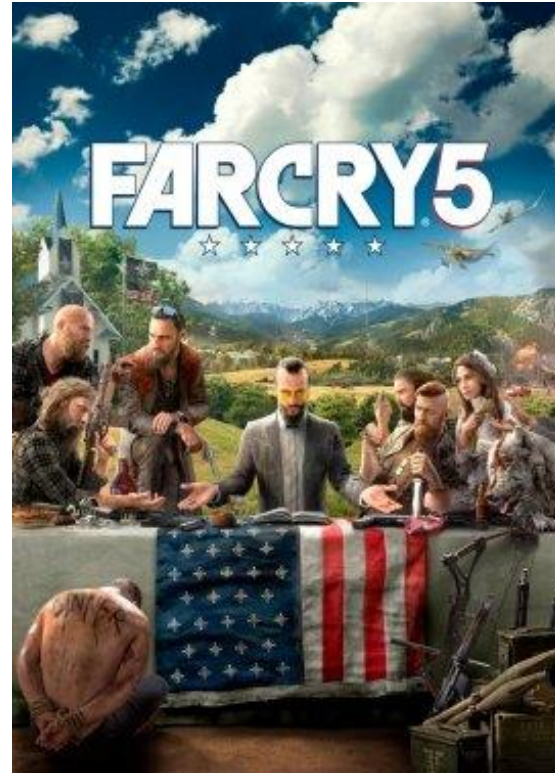
AI Examples we use daily

SIRI

Google Assistant

Hey Cortana

# Video Games

AI Examples we use daily

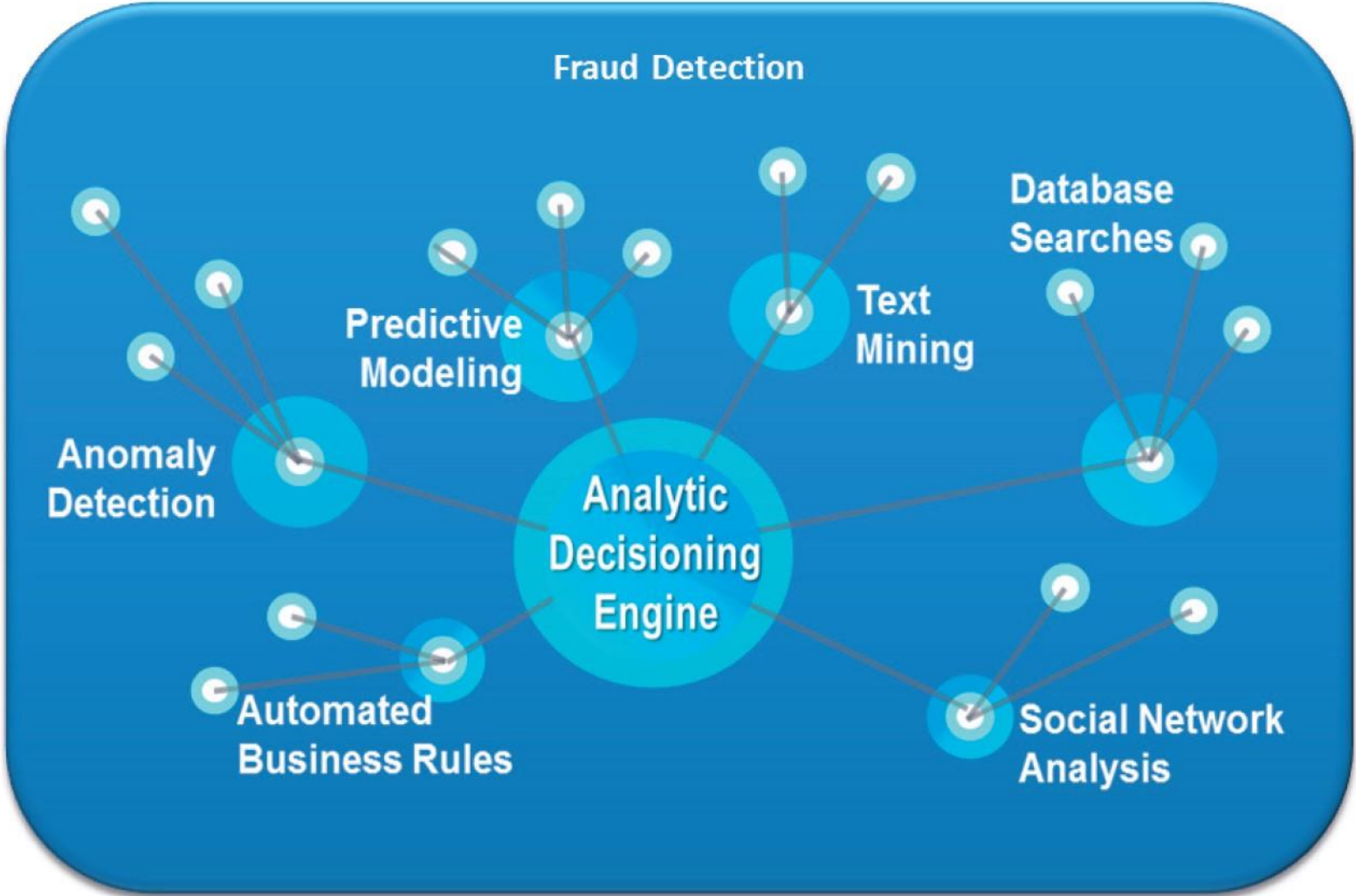Self-driving Cars

AI Examples we use daily

# Purchase Prediction

AI
Examples
we use
daily

# Fraud Detection

AI Examples we use daily

News Generation

AI Examples we use daily

Security Surveillance

AI Examples we use daily

Music and Movie
Recommendation Services

AI Examples we use daily

# Smart Home Devices

AI
Examples
we use
daily

Robot Home Devices

AI Examples we use daily

Online Customer Support

AI Examples we use daily

Chatbot, help me find an alternative flight.

Here are the best results based on your trip.

From Dallas (DFW) to New York (JFK) departing at 10:20 AM arriving at 2:52 PM

See All Results

# Conversations as a Platform
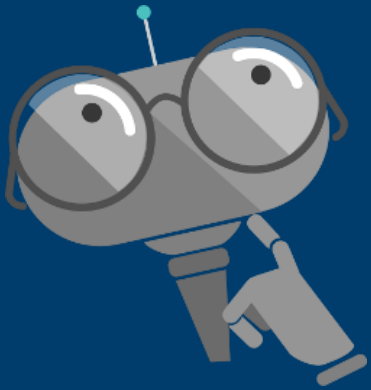
Human language is the new UI

Digital assistants

Bots are the new apps

# Bots.

# What is a bot?

An application that performs one or more automated tasks.

Bots uses conversation as the interface for both internally-facing (employees) and externally-facing (customers) scenarios.

Conversational Apps are an application category of AI-based solution.

# Examples of Conversational Apps

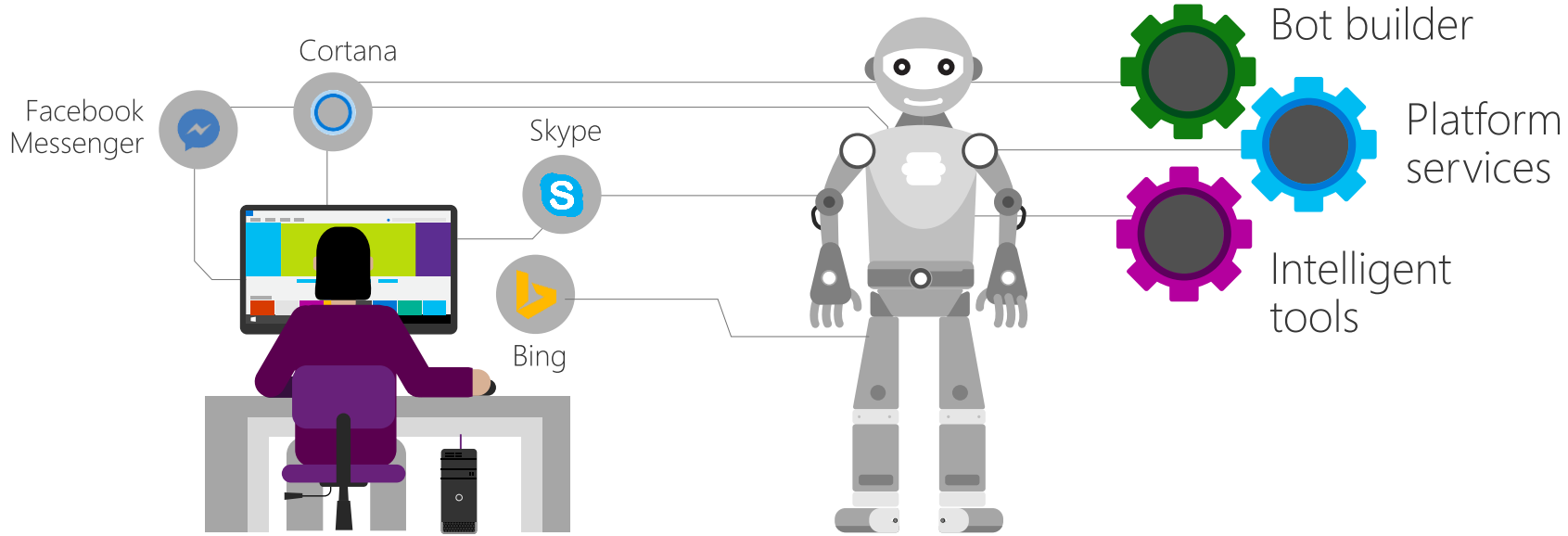| Internal Bots<br>Experiment and Learn | Simple Customer Bots<br>Unauthenticated Services | Advanced Bots<br>Authenticated Services |
|---|---|---|
| **Internal Knowledge**<br>Take existing FAQs and empower staff to provide self-serve knowledge via Bot. | **General Enquiries**<br>Handle basic customer enquiries traditionally hidden in FAQs. | **Account Enquiry**<br>Handle enquiries that require identification of the customer<br>(i.e., account balance enquiry) |
| **IT Helpdesk**<br>Report an IT problem and check the status. Bot can provide self-help and escalation to engineer if required. | **Appointment Booking**<br>Handle simple "anonymous" tasks via chat (i.e., booking an appointment) | **Make Payment**<br>Perform actions that require a user to be authenticated and authorized, e.g. make payment to predefined payee. |
| **Smart Document Agent**<br>Search of relevant documents based on the user's needs. | **Complex Enquiries**<br>For requests that a Bot cannot complete hand off to a human agent. | **Retail-bot**<br>Send a customer with a new device to a stall to help them set up their services. |

# Why a bot?

| TYPE | TALK | TAP |
|------|------|-----|

Facebook Messenger

Cortana

Skype

Bing
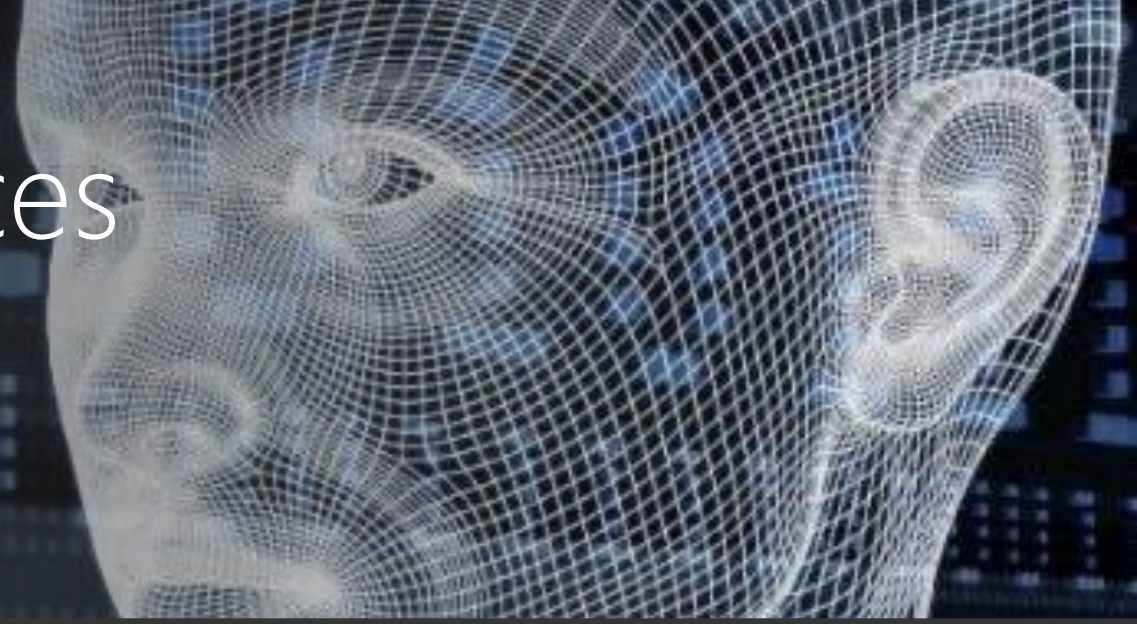
Bot builder

Platform services

Intelligent tools

App Intelligence.

# Microsoft Cognitive Services

Give your apps a human side

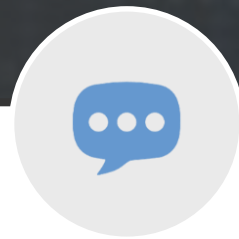A set of ready to use APIs for every developer to use without requiring machine-learning expertise

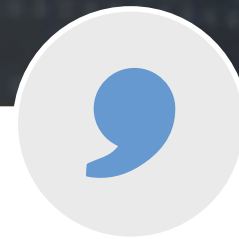# Microsoft Cognitive Services

## Give your apps a human side

### Vision
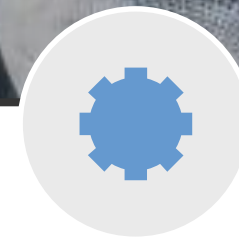Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

### Speech
Speech to Text
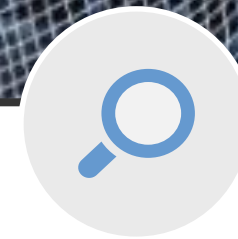Text to Speech
Speech Translation
Speech Recognition

### Language
Immersive Reader
Language Understanding
QnA Maker
Translator Text & Speech
Text Analytics

### Decision
Anomaly Detector
Content Moderator
Personalizer

### Search
Bing Autosuggest
Bing Image Search
Bing News Search
Bing Video Search
Bing Web Search
Bing Custom Search
Bing Spell Check

# Computer vision



**Vision**
Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

Type of Image:

Clip Art Type 0 Non-clipart
Line Drawing Type          0 Non-Line Drawing
Black & White Image        False

Content of Image:

Categories                 [{ "name": "people_swimming", "score": 0.099609375 }]
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

# Content Moderator

**Vision**
Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

- Detection of **potential offensive** and **unwanted images**

- Filtering of possible **profanity** and **undesirable text**

- Moderation of **adult and racy content** in videos

- Built-in review tool for best results

# Emotion API

**Vision**
Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

# Face API



**Vision**
Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

# Video Indexer



**Vision**
Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

# Form Recognizer



## Vision
Computer Vision
Emotion
Face
Video Indexer
Custom Vision
Form Recognizer

- Key-value pairs
- Table Data

## Speech

### Speech to Text
### Text to Speech
### Speech Translation
### Speech Recognition

# Speaker Verification

Use your voice for verification. The API can be used to power applications with an intelligent verification tool. If the speaker claims to be of a certain identity use voice to verify this claim.

# Speaker Identification

Identify who is speaking. The API can be used to determine the identity of an unknown speaker.

# Speech Translation

**Speech**
Speech to Text
Text to Speech
Speech Translation
Speech Recognition

- A cloud-based automatic translation service
- Real-time transcription and translation

# Immersive Reader



**Language**

Immersive Reader

Language Understanding

QnA Maker

Translator Text & Speech

Text Analytics

# Language Understanding

A machine learning-based service to build natural language into apps by creating custom models

## Language

Immersive Reader

Language Understanding

QnA Maker

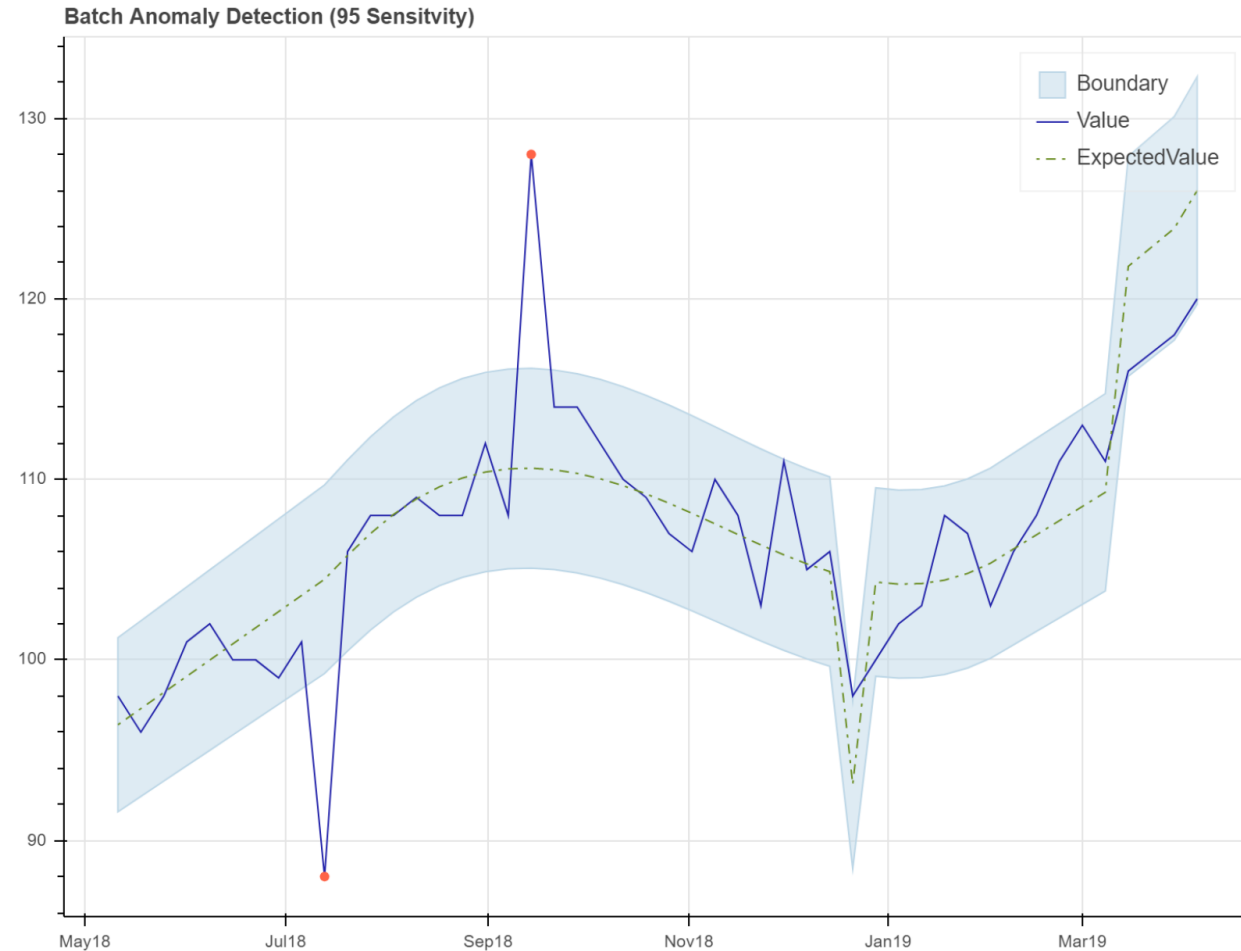Translator Text & Speech

Text Analytics

# QnA Maker

## Language

Immersive Reader

Language Understanding

QnA Maker

Translator Text & Speech

Text Analytics



Azure Bot Service     Azure QnA Maker Service     Knowledge Base

# Anomaly Detector

**Decision**

Anomaly Detector
Content Moderator
Personalizer



**Batch Anomaly Detection (95 Sensitvity)**

# Content Moderator

**Decision**

Anomaly Detector

Content Moderator

Personalizer

- Detection of **potential offensive** and **unwanted images**

- Filtering of possible **profanity** and **undesirable text**

- Moderation of **adult and racy content** in videos

- Built-in review tool for best results

# Personalizer

**Decision**
Anomaly Detector
Content Moderator
Personalizer

# Bringing it all together

Imagine being able to search your environment in the same way you search the web to find things and people in real-time?
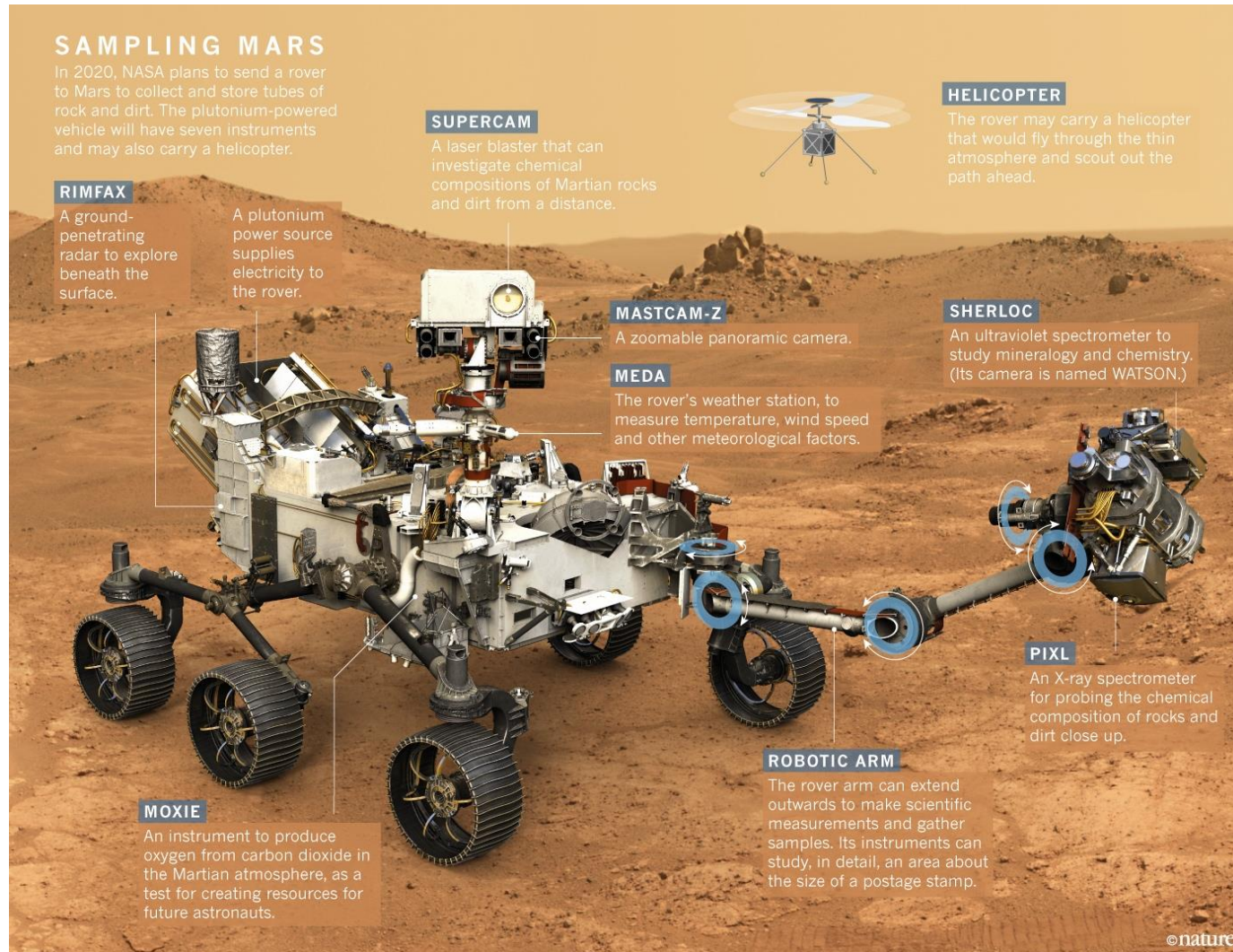
Artificial Intelligence is real

Will it assist us?

# Military Applications

Aiming, defending and moving simultaneously
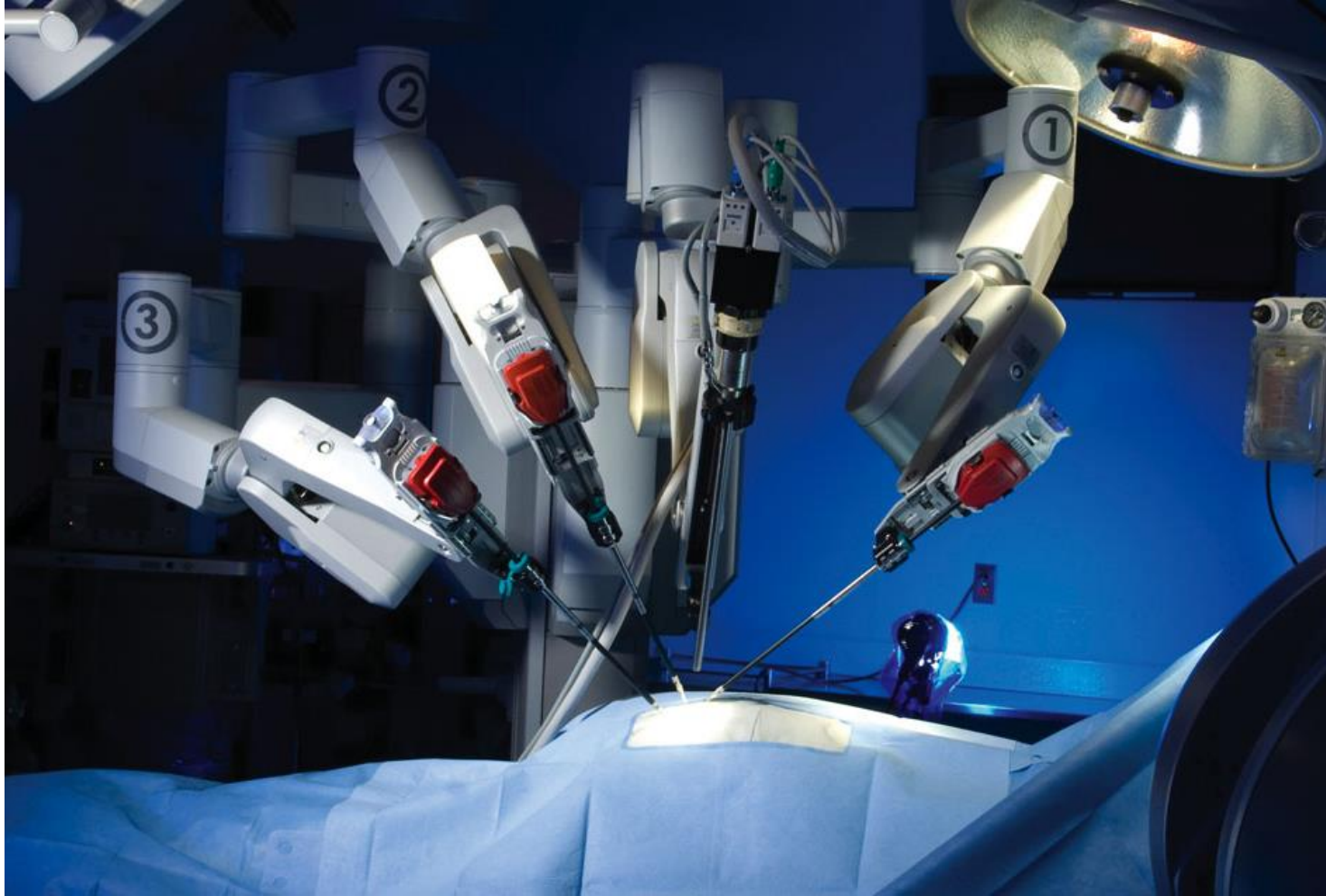
# Space Exploration



Water, Recycling, Food, Space Radiation and Psychological Issues of confinement do not concern a robot.

# Underwater Mining

It is not possible to have Mining Staff on site at certain depths.

# Medical Research



AI Technology can perform delicate operations more precisely and efficiently.

… or replace us?

| Myths | | Facts |
|---|---|---|
| AI Turning evil/conscious | > | AI turning competent with goals misaligned with ours |
| Robots are the main concern | > | AI needs no body just an internet connection |
| AI cannot control humans | > | Intelligence enables control |
| Machines cannot have goals | > | A heat seeking missile has a goal |
| Superintelligence is just years away | > | It's at least decades away but it may take longer to make it safe |

"I've talked to Mark about this. His understanding of the subject is limited."
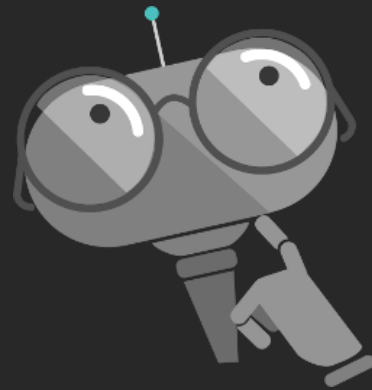
Elon Musk

"...people who drum up doomsday scenarios... I actually think it is pretty irresponsible."

Mark Zuckerberg

# Questions?



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