Towards Augmented Intelligence

Tools and Skills for the Cognitive Era

William Carbone

Chairman of TEC.CZ|SK - IBM, Academy of Technology Member

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IBM Developer Advocate

Chairman of Technical Experts Council TEC.CZ|SK

Cognitive Solutions & Watson Expert

Strategic Business & Technology Advisor

Think Potential!

Program Manager for AI & Global Innovation

IBM Academy of Technology Member, AI & SpaceTech

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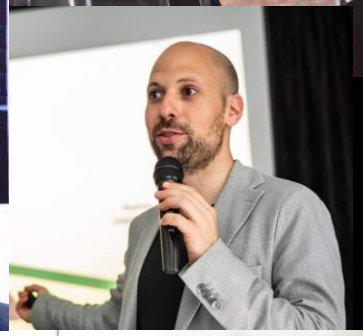

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LETTER TO MEMBERS

Leading digital reinvention through the eyes of an innovator

by **William Carbone**, Chairman of the Technical Experts Council for Czech Republic and Slovakia, IBM Academy of Technology Member

Ideas are powerful. Ideas are all we need to make the world around us a better place. Is this true at all times?

In a world in which everything has already been invented, re-invented and nothing seems to be new anymore, innovation is an old word which does not seem to find an easy way to flourish. However, humans have the great capability to innovate, and that has been the driving force of our progress since the early days.

From an early age, my vision has always been to imagine new scenarios and ways of doing things. I have always been driven by the possibility of transforming the world we live in. Since then, I have developed a fertile imagination. This is reflected in the various activities I have been involved in, spanning from being a self-taught concert pianist to a technology evangelist. I have always believed in the power of humans to change the world by the right usage of technology, to improve the way they live in the short and long term. My work and research reflect the continuous vision of thinking globally by acting locally.

Locally, I am serving as the chairman of the IBM Technical Experts Council, a community of 350+ eminent technical leaders who manage projects spanning from AI, Blockchain, Quantum and Cloud in Central and Eastern Europe, with main focus on Czech Republic and Slovakia. Leadership for me means inspiring others to achieve mutual and their own goals, motivating people to engage and leverage their potential, creating an environment where everyone can contribute. I am the intersection between the technology, research and business innovation worlds. Slovakia represents a fertile place in which all this could be realized, by maintaining a global perspective.

Nowadays, I drive global innovation by translating business needs into technical solutions – powered by AI. I bring cognitive computing abilities and make them accessible to the IBM population, by providing guidance, best practices and simplifying complexity to enable a continuous learning environment. Most of these elements would have been unthinkable ten years ago. Yet, it has proven to be the environment in which various things are possible in both the corporate and the entrepreneurship worlds. Figures support that vision, with over 90 quality startups founded in recent years. Moreover, Slovakia has the unprecedented advantage of the coexistence of unique job roles, companies, internationality and quality of life.

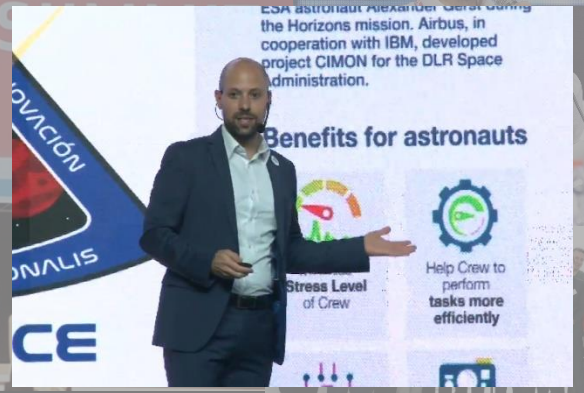
The American Chamber of Commerce is becoming a solid platform for innovation, business opportunities and a beacon of enlightenment for technology and business expertise sharing. It has been pivotal for the creation of slovak.ai (Slovak Research Center for Artificial Intelligence), now actively participating in the formation of the position of the Slovak Republic in the various fields of AI to become an accepted and recognized player and partner of major international structures in the field of AI in Europe. Such initiatives are among the foundations for boosting innovation and research for the country, driving the increasing need for knowledge creation, innovation and entrepreneurship. In the context of a knowledge economy, we shall focus at increasing investments into education, R&D and a broader application of IT.

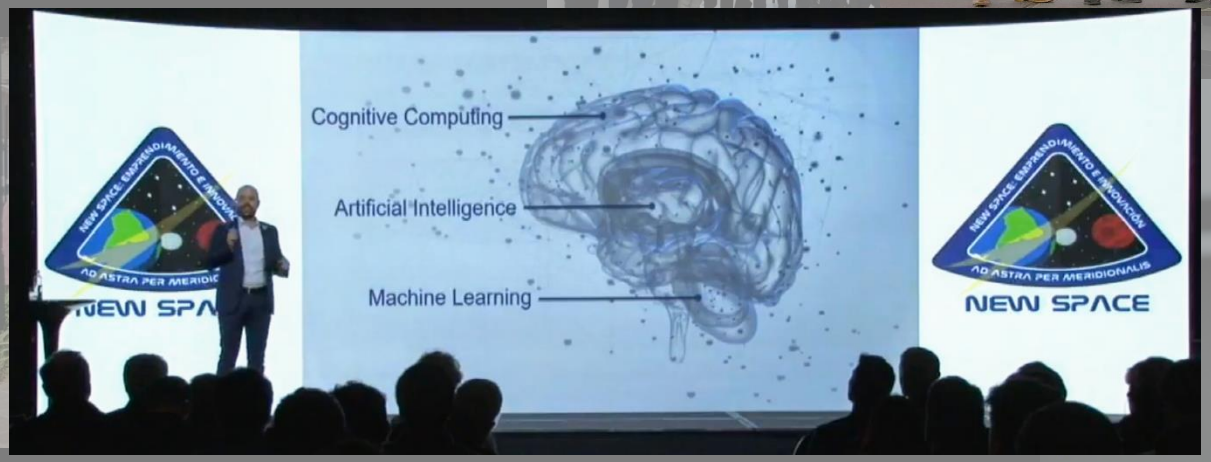
I believe in innovation and in its power to be the engine that helps every business blossom, every engagement to be authentic. Innovation is beneficial to the world and it is vital to the survival of mankind. Thanks to its power to drive radical societal changes, either by introducing new products, services or technologies, it gives the concrete possibility of a better future by transforming the way people perceive life, technology and society.

To me, innovation is the translation of societal and economical needs into tangible, adaptive and transformational products, processes and services to serve the development of mankind. I believe our greatest opportunity resides in the unprecedented access to information, technologies and availability of resources. Nevertheless, that comes with a price, and innovation is not a choice. The challenge is to connect and combine the information overflow to link all the potential dots which can enable ideas and innovation to happen. Technology is constantly creating change and we shall keep our eyes open and continuously look for opportunities. With that, I want to share all the wishful excitement into embarking on a new era of radical innovation, reinvention and digital disruption for Slovakia. Ideme na to!

BIOGRAPHY

William Carbone is a global innovator, popular keynote speaker, futurist, thinker and a strategic business & technology advisor to governments and companies. He helps organizations improve their business performance, use data more intelligently and understand the implications of new technologies such as Artificial Intelligence, Big Data, Analytics and the Internet of things. William is a catalyst for change and innovation in key business & research areas. Locally, he is serving as the chairman of the IBM Technical Experts Council. Hands-on practitioner and applied technologist driving sustainable organic innovation for business, William is an advisory board member of Data&Society Lab, Matej Bel University and Slovak.ai - Slovak Research Center for Artificial Intelligence.





STU
FEI

Thank You!

THINK

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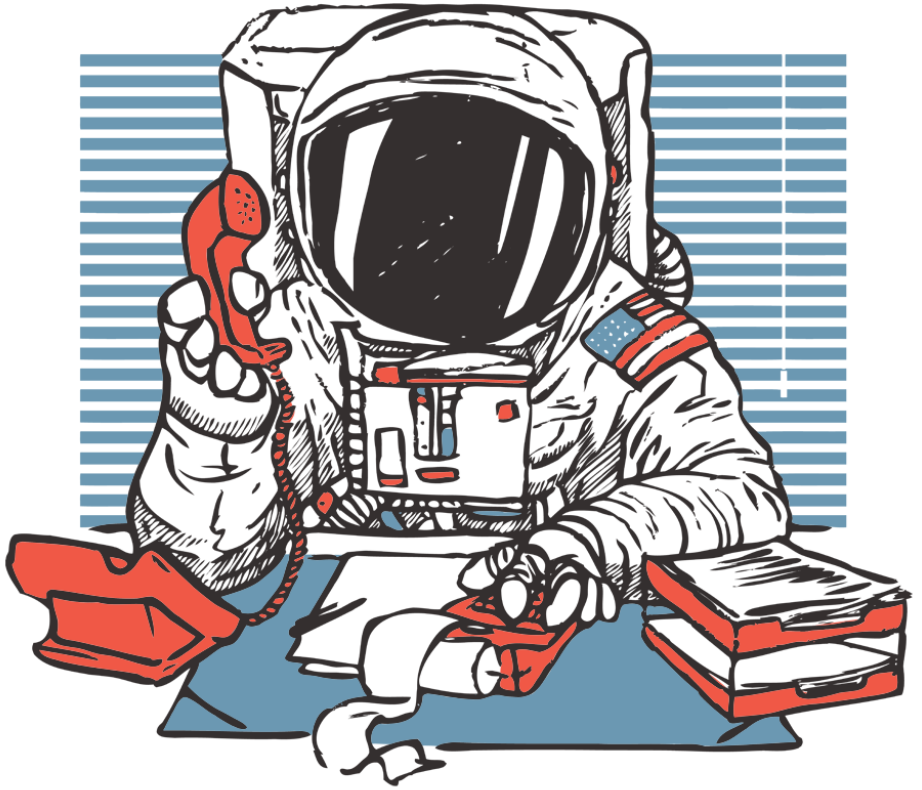
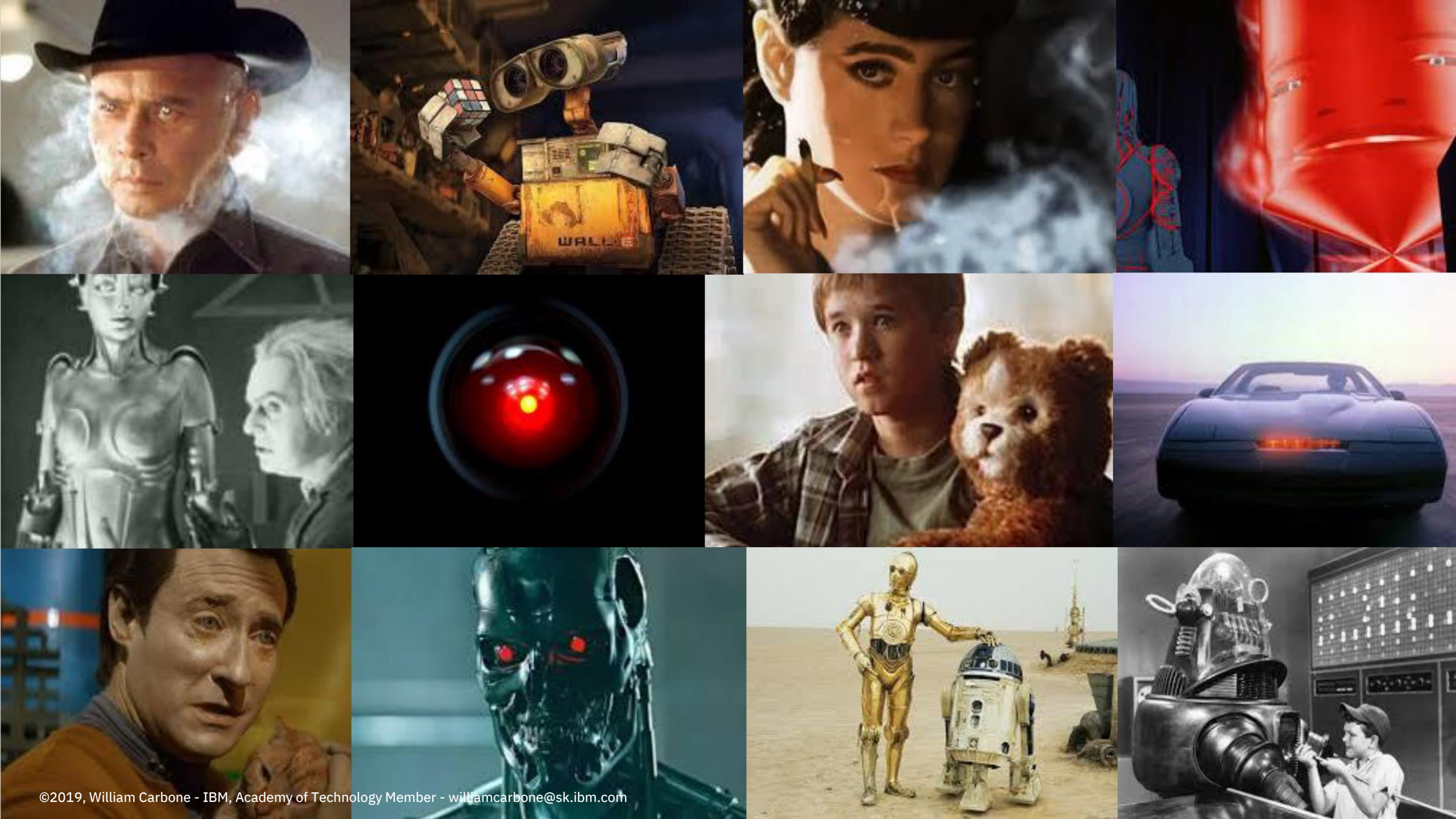
★ DRESS FOR ★
THE JOB YOU WANT



NOT THE JOB YOU HAVE



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IBM Research Definition of AI

Artificial Intelligence (AI) has a long history at IBM Research, dating back to the 1950s. By AI we mean **anything that makes machines act *more intelligently***.

Our work includes basic and applied research in machine learning, deep question answering, search and planning, knowledge representation, and cognitive architectures.

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Famous applications of AI at IBM

Deep Blue

In 1997, the IBM chess-playing computer named **Deep Blue** beat World Chess Champion Garry Kasparov in a six-game match.

Watson

In 2011, the IBM Jeopardy!-playing computer named Watson beat Ken Jennings and Brad Rutter in a grand champion challenge.

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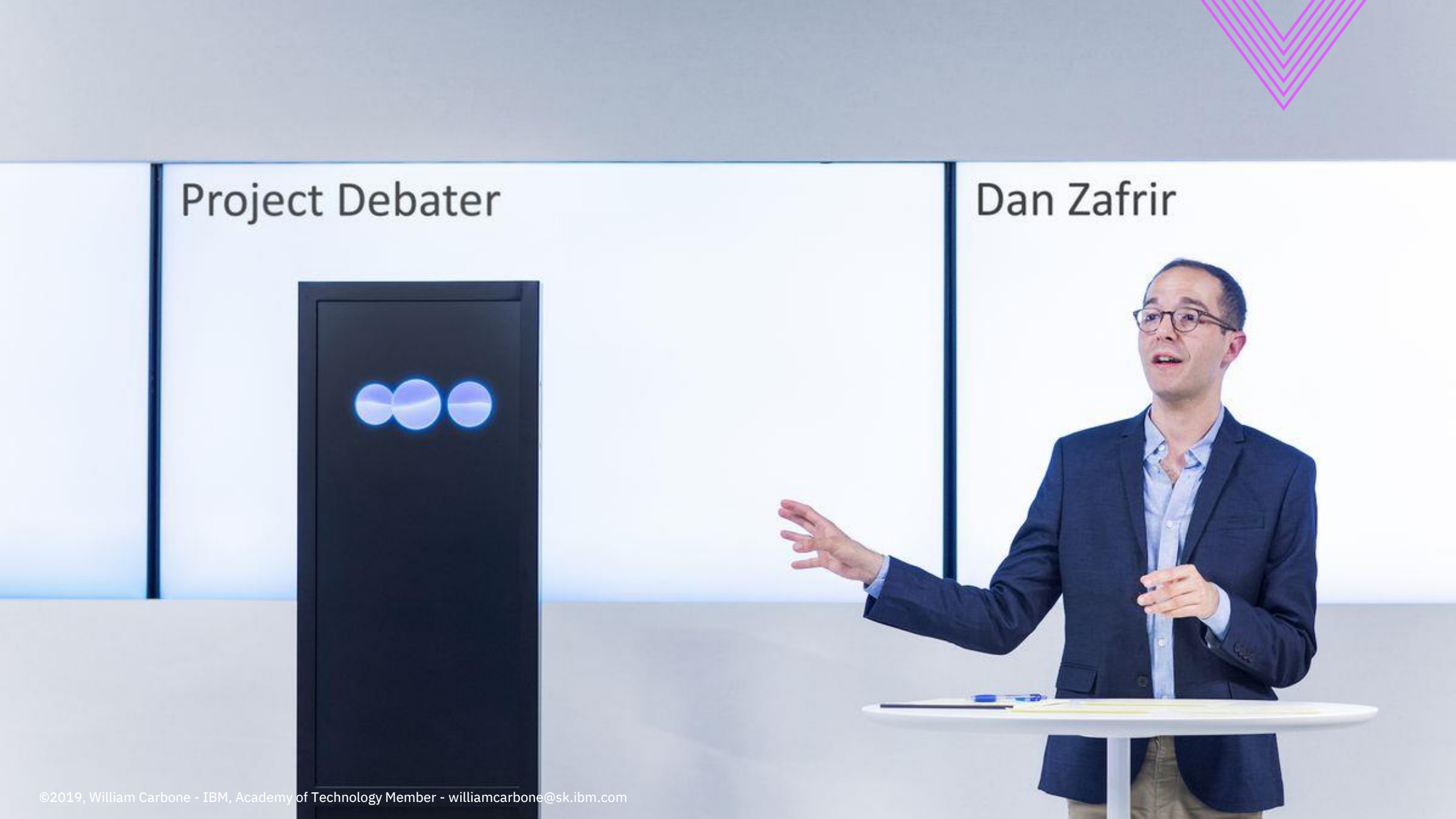

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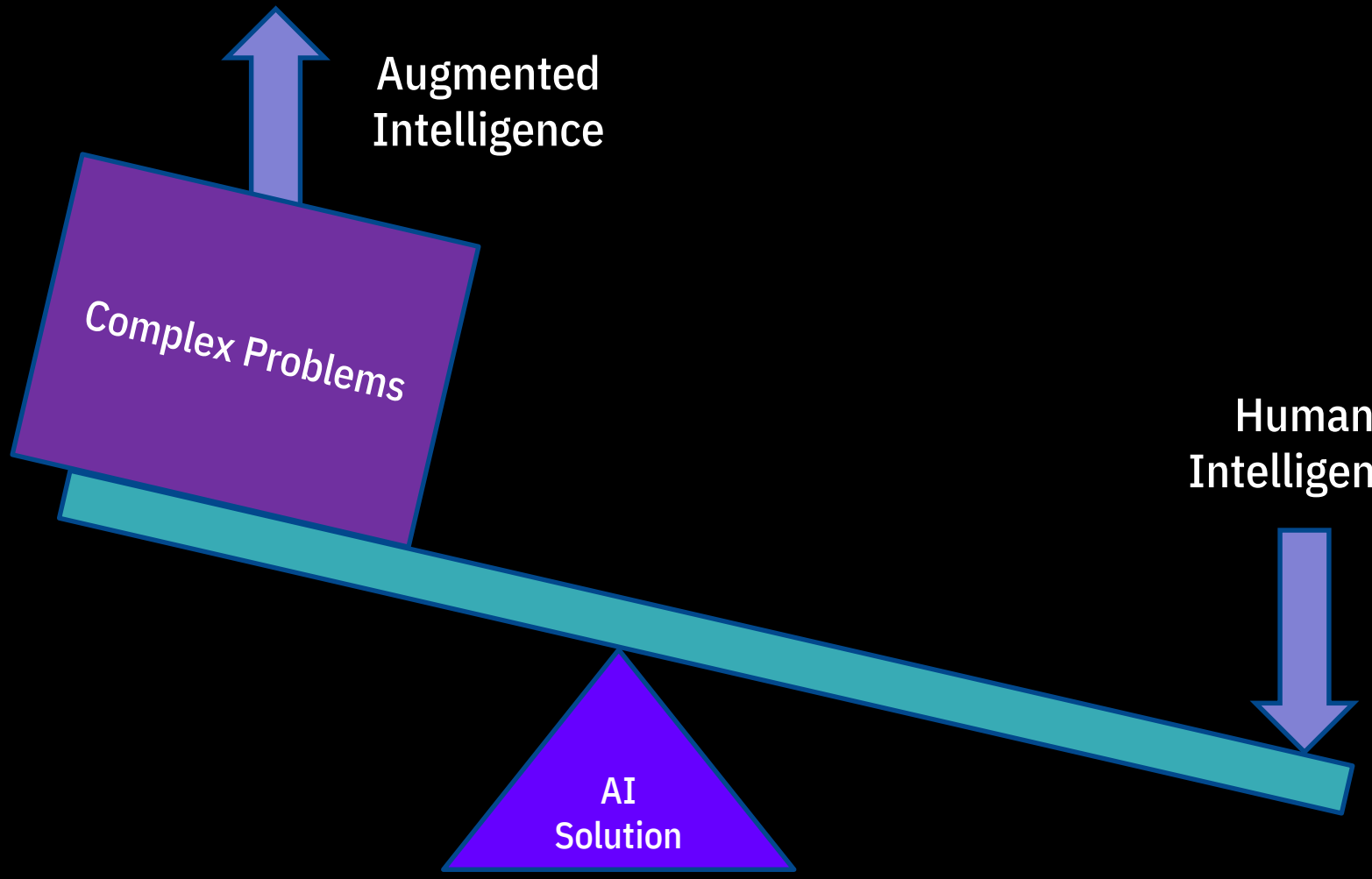
Watson Music

Source: https://www.evaaugustyn.com/ibm-watson-x-mus

Augmented Intelligence



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Ethical Challenges

"AI, like most other technology tools, is most effective when it is used to **extend** the natural capabilities of humans instead of replacing them. That means that AI and humans are best when they **work together** and can **trust** each other."

Among the many ethical issues are:

- Trust
- Privacy

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Cognitive /ˈkɒg.nə.tɪv/

Connected with thinking or conscious mental processes

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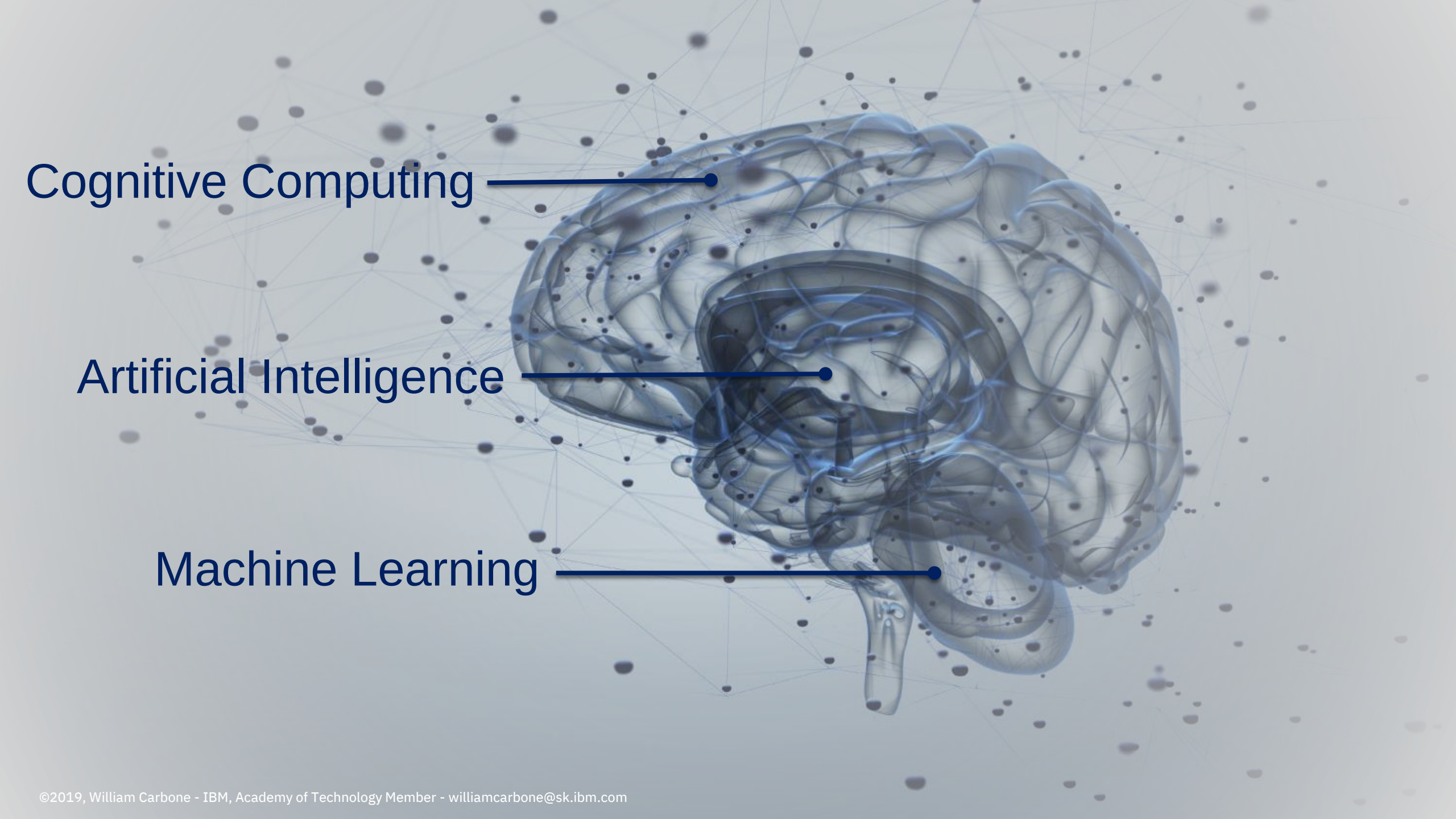

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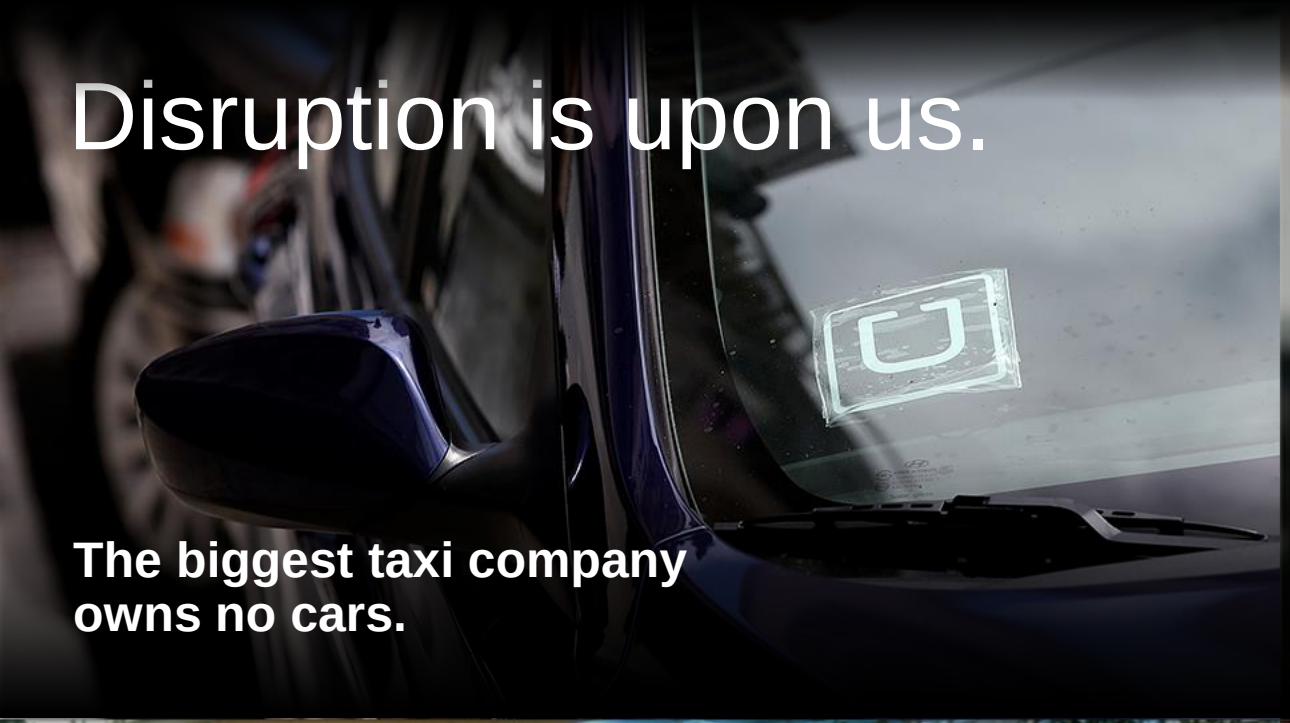
Disruption is upon us.



The biggest taxi company owns no cars.

The largest accommodation company owns no real estate.

The largest retailer carries no inventory.

The biggest media company owns no content.

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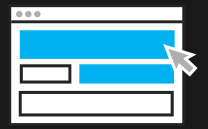
This disruption is fueled by three forces.

The proliferation of different types of data.



The ability to build business in code with the API economy.

The powerful capabilities and outcomes brought on by cognitive computing.

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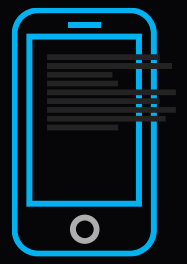
More devices are creating more information.



1,200,000

lines of code in a smartphone

80,000

lines of code in a pacemaker

100,000,000

lines of code in a new car

5,000,000

lines of code in smart appliance

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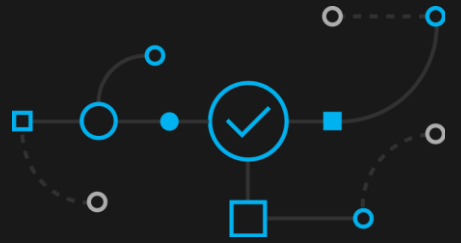
Three capabilities differentiate cognitive systems from traditional programmed computing systems…

Understanding

Cognitive systems understand like humans do.



Reasoning

They reason. They understand underlying ideas and concepts. They form hypothesis. They infer and extract concepts.

Learning

They never stop learning getting more valuable with time. Advancing with each new piece of information, interaction, and outcome. They develop “expertise”.

…. allowing them to interact with humans.

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Compassion

Intuition

Design

Value Judgments

Common Sense

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Design

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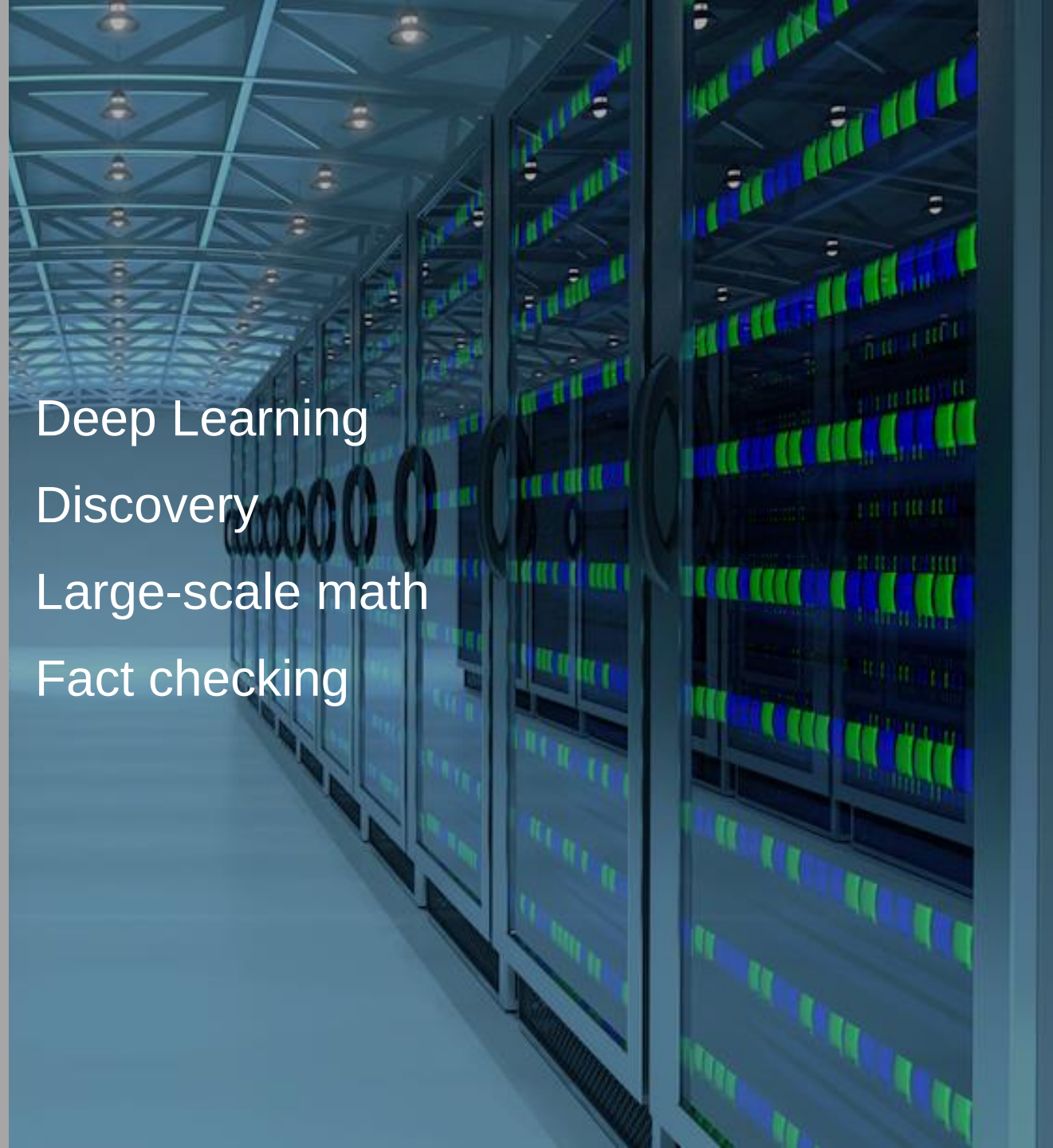
Common Sense



Deep Learning

Discovery

Large-scale math

Fact checking

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Human + Machine

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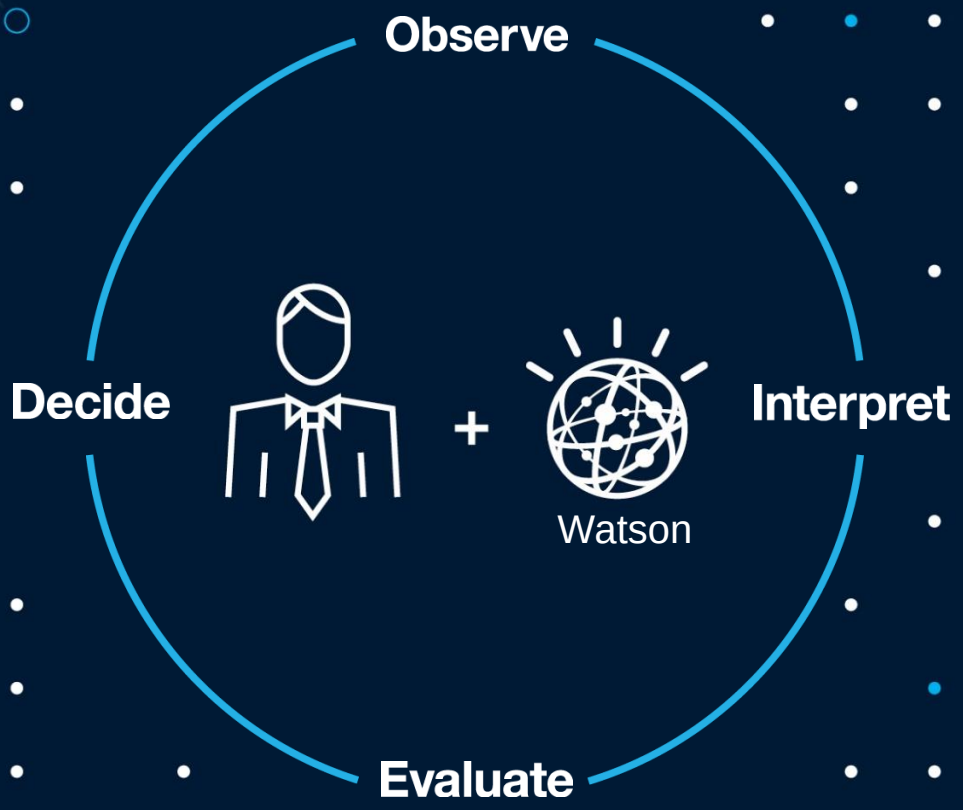
New Information Technology challenge is now about the possibility to expand our **WISDOM** options



Toward a **Precise Decision Making** to reduce the wasteful spend as well as the risk in every industry

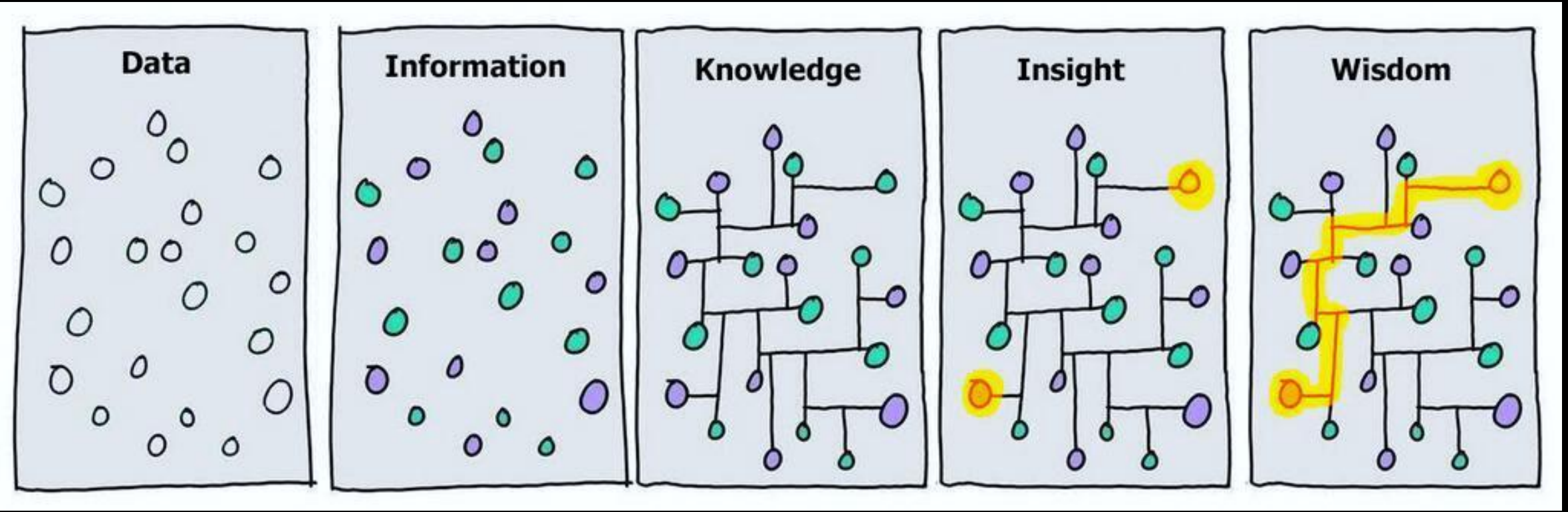
The Journey to Wisdom

Data

Information

Knowledge

Wisdom



Source: https://www.kaushik.net/avinash/great-analyst-skills-skepticism-wisdom/

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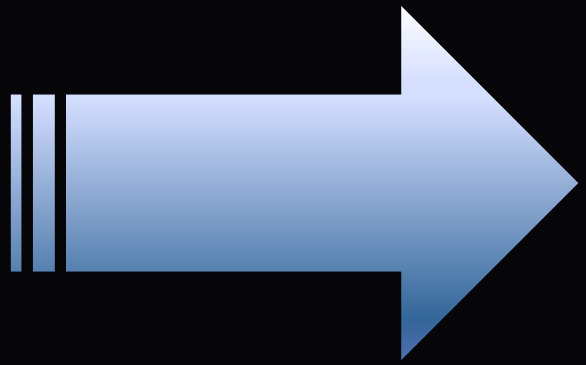
Main Technology Shift

Automating the World



Understanding the World

Program → **Train**

H-Factor

Knowledge Workers → **Learning Workers**

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What is the Goal of Digital Cognitive Systems?

Artificial Intelligence = Machine Intelligence

Star Trek: Mr Data

An individual smart machine

VS

The Goal!

Augmented Intelligence =
Human Intelligence + Machine Intelligence

Iron Man: Tony Stark & Jarvis

Man and machine co-operation

"Capability to use language with machines for **coordinating** and **reasoning** for better outcomes. Increases **human intelligence** by use and not diminish it."

Project CIMON

AIRBUS

Project *CIMON* (**C**rew **I**nteractive **M**obile Companio**N**) is a mobile and autonomous assistance system helping astronauts aboard the ISS. The first form of artificial intelligence (AI) aboard the ISS will be tested by ESA astronaut Alexander Gerst during the Horizons mission. Airbus, in cooperation with IBM, developed project CIMON for the DLR Space Administration.

Benefits for astronauts

Minimise **Stress Level** of Crew

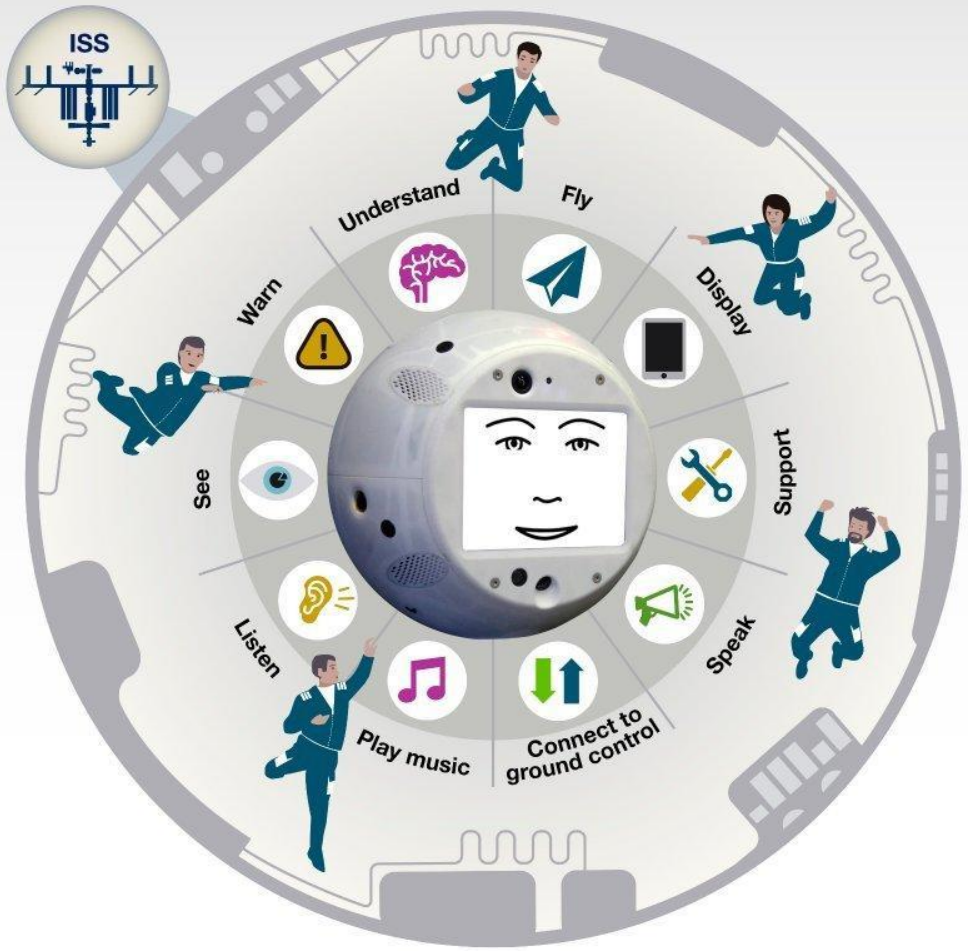
Help Crew to perform **tasks more efficiently**

Increase Spacecraft **Safety**

Visualise Human Spaceflight to stakeholders and public

Man-machine interaction

The assistant for complex tasks can:



Diameter

32 cm

Weight

5 kg

Battery runtime

2 h

High tech elements

3D printed structure

Ready for **augmented reality**

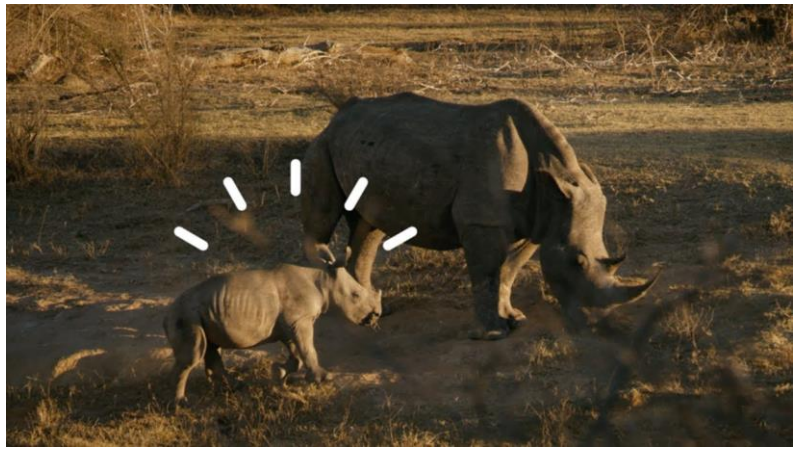
Absolute navigation

Artificial intelligence

Face detection and **recognition**

Battery powered propulsion system

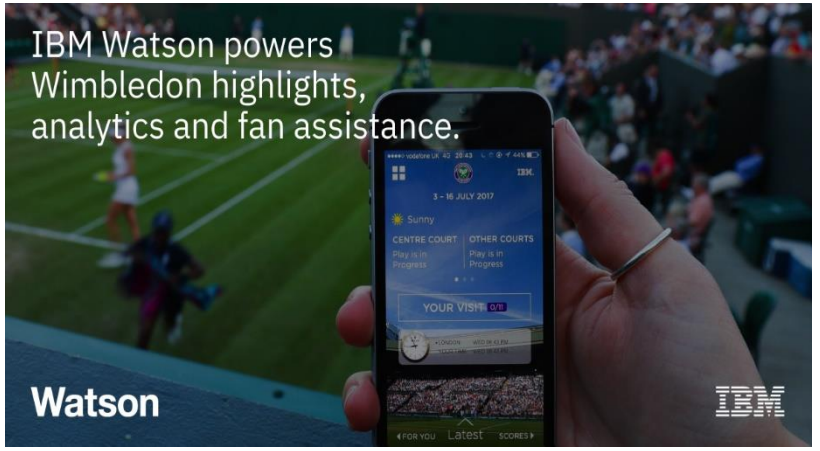
IBM Projects



Smart Wildlife

Use The Force - Move a BB-8 with Your Mind

IBM IoT and the Dubai Camel Race



IBM Watson at Wimbledon

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Cognitive systems rely on collections of data and information:

Data, information, and expertise create the foundation.

Examples include:

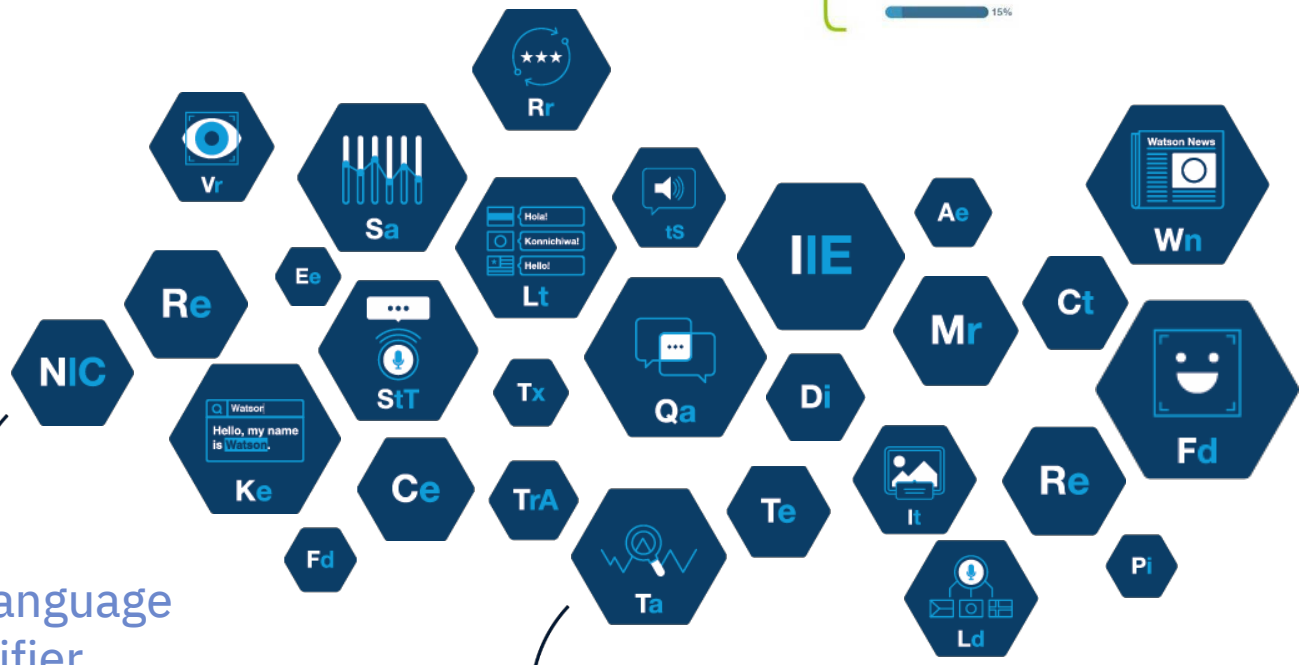
- Analyst reports
- tweets
- Wire tap transcripts
- Battlefield docs
- E-mails
- Texts
- Forensic reports
- Newspapers
- Blogs
- Wiki
- Court rulings
- International crime database
- Stolen vehicle data
- Missing persons data

...and then leverage Watson APIs to apply cognitive capabilities.

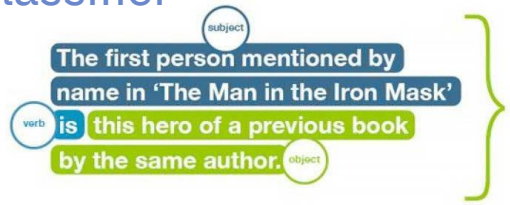
50 underlying technologies

Entity Extraction
Sentiment Analysis
Emotion Analysis (Beta)
Keyword Extraction
Concept Tagging
Taxonomy Classification
Author Extraction
Language Detection
Text Extraction
Microformats Parsing
Feed Detection
Linked Data Support
Concept Expansion
Concept Insights
Dialog
Document Conversion
Language Translation
Natural Language Classifier
Personality insights
Relationship Extraction
Retrieve and Rank
Tone Analyzer
Emotive Speech to
Text Text to Speech
Face Detection
Image Link Extraction
Image Tagging
Text Detection
Visual Insights
Visual Recognition
AlchemyData News
Tradeoff Analytics

Compare and Comply



Natural Language Classifier



Tone Analyzer

IBM Cloud Catalog

https://cloud.ibm.com/catalog

- Compute
- Containers
- Networking
- Storage
- AI
- Analytics
- Databases
- Developer Tools
- Integration
- Internet of Things
- Security and Identity
- Starter Kits
- Web and Mobile
- Web and Application

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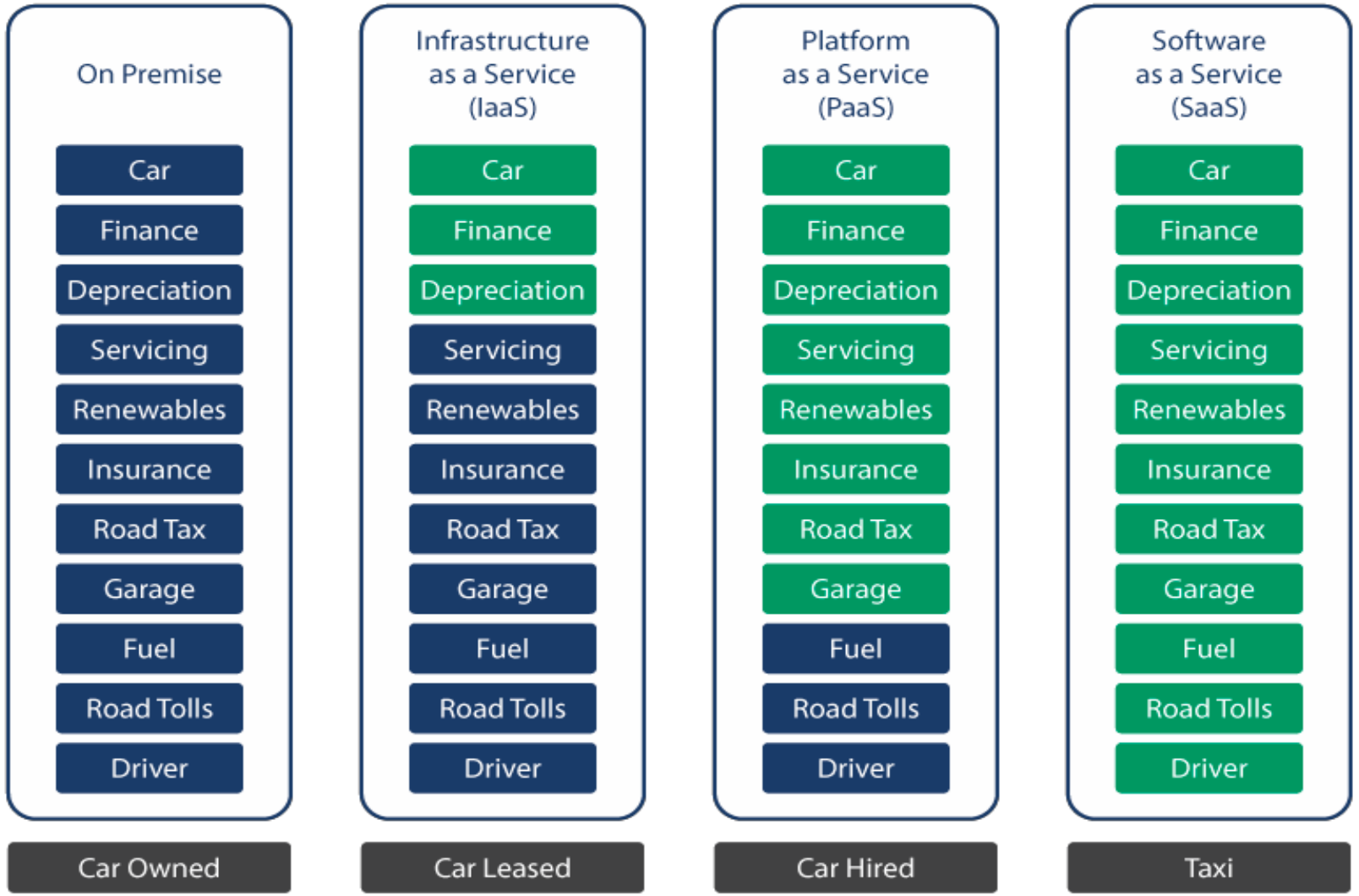
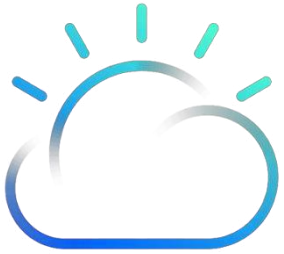
Car as a Service

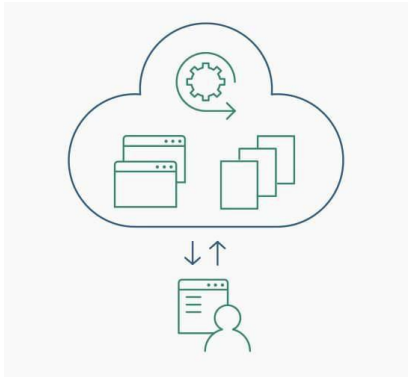


IBM Cloud Computing

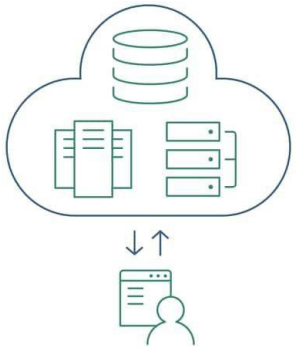


Computing as a Service

Software as a Service



Platform as a Service



Infrastructure as a Service

Public

Private

Hybrid

IBM AI Cloud Products

https://www.ibm.com/cloud/products

Watson Studio

Build and train AI models, and prepare and analyze data, all in one integrated environment.

Watson Knowledge Catalog

Intelligent data and analytic asset discovery, cataloging and governance to fuel AI apps

Watson Assistant

Build and deploy virtual assistants

Watson Personality Insights

Predict personality characteristics, needs and values through written text

Watson Discovery

Uncover connections in data by combining automated ingestion with advanced AI functions

Watson IoT Platform

Leverage a fully managed, cloud-hosted service for device registration, connectivity, control, rapid visualization and data storage

Watson Speech to Text (STT)

Easily convert audio and voice into written text

Deep Learning

Design and deploy deep learning models using neural networks, easily scale to hundreds of training runs

Watson Text to Speech (TTS)

Convert written text into natural-sounding audio in a variety of languages and voices

Watson Language Translator

Dynamically translate news, patents or conversational documents

Watson Natural Language Classifier

Interpret and classify natural language with confidence

Data Refinery

A self-service data preparation tool for data scientists, engineers and business analysts

Watson Natural Language Understanding

Analyze text to extract metadata from content such as concepts, entities and sentiment

Watson Visual Recognition

Tag, classify and search visual content using machine learning

Watson Tone Analyzer

Analyze emotions and tones in written content

Watson® Machine Learning

Create, train and deploy self-learning models using an automated, collaborative workflow

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Popular application styles

A specific type of application that you want to build that is functionally constrained by the problem you are solving.

Application modernization

Move applications to the cloud in stages or work through a complete transformation.

Cognitive

Gain business advantage by unlocking new intelligence from structured and unstructured data.

Microservices

Take a cloud-native approach to building mobile and web applications with a microservices architecture.

Data and analytics

Store, analyze and report on data by using analytic engines to drive actionable insights and visualization.

Blockchain

Record a history of transactions in a shared, immutable ledger for transactional applications.

Internet of Things

Connect to IoT devices and build scalable apps and visualization dashboards to gain business insights.

Mobile

Develop, deploy, and manage scaleable apps for mobile devices.

e-commerce

Develop, deploy, and manage scalable e-commerce solutions.

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AI

Watson Assistant (formerly Conversation)
Lite • IBM

Add a natural language interface to your application to automate interactions with your end users. Common applications include virtual agents and

Compare Comply
IBM • Beta

Process governing documents to convert, identify, classify, and compare important elements

Discovery
Lite • IBM

Add a cognitive search and content analytics engine to applications.

Knowledge Catalog
Lite • IBM

Discover, catalog, and securely share enterprise data.

Knowledge Studio
Lite • IBM

Teach Watson the language of your domain.

Language Translator
Lite • IBM

Translate text, documents, and websites from one language to another. Create industry or region-specific translations via the service's customization

Machine Learning
Lite • IBM

IBM Watson Machine Learning - make smarter decisions, solve tough problems, and improve user outcomes.

Natural Language Classifier
IBM

Natural Language Classifier performs natural language classification on question texts. A user would be able to train their data and the predict the

Natural Language Understanding
Lite • IBM

Analyze text to extract meta-data from content such as concepts, entities, emotion, relations, sentiment and more.

Personality Insights
Lite • IBM

The Watson Personality Insights derives insights from transactional and social media data to identify psychological traits

Speech to Text
Lite • IBM

Low-latency, streaming transcription

Text to Speech
Lite • IBM

Synthesizes natural-sounding speech from text.

Tone Analyzer
Lite • IBM

Tone Analyzer uses linguistic analysis to detect three types of tones from communications: emotion, social, and language. This insight can then be used

Visual Recognition
Lite • IBM

Find meaning in visual content! Analyze images for scenes, objects, faces, and other content. Choose a default model off the shelf, or create your own

Watson Studio
Lite • IBM

Embed AI and machine learning into your business. Create custom models using your own data.

Industry solutions

Architectures, solutions, and artifacts applied to a specific industry.

Banking and financial markets

Develop, test and deploy banking cloud services and applications in a multi- vendor, multi-cloud environment.

Automotive

Create an immersive, connected experience for drivers with cognitive manufacturing that predicts and averts disruptions to your production line and supply chain.

Insurance

Intelligent solutions with insurance analytics and cloud models can unlock the future for insurers. Innovate at lower cost, modernize and meet regulatory requirements.

Retail

Always-connected consumers are demanding more of retailers, who need to become more agile and efficient to compete and innovate at the speed of retail.

Energy and utilities

New technology, smarter grids and fundamentally changing business models are creating new challenges – and opportunities in the energy and utilities industry.

Healthcare and life sciences

Find the technology and expertise you need to power thriving organizations, support vibrant communities and solve health challenges.

Telecommunications, entertainment, and media

All the biggest moments are now being watched by millions - often at the same time. How are you planning to keep up with the demand?

Education

Explore architecture solutions that help you personalize learning, increase research capacity, and optimize operations.

Manufacturing

Optimize your supply chain, enhance operations, and maximize throughput with cognitive manufacturing solutions that transform the value chain beyond the factory walls.

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IBM Solutions by Industry

https://www.ibm.com/industries

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Qiskit | Terra | Aer | Aqua | Ignis | IBM Q Account | Community | Tutorials | API Documentation

Welcome to Quantum

Qiskit is an open-source quantum computing software development framework for leveraging today's quantum processors in research, education, and business

Get Started!

Qiskit on Youtube

Would you like to learn how to code a quantum computer? Take a look at the Coding with Qiskit Video Series, where Abraham Asfaw explains everything you need to know. Starting with installing Qiskit, to investigating the latest algorithms and research topics.

Watch it

IBM Q Awards

The IBM Q Awards are back again, now with two new categories. The Teach Me Qiskit Video Award and the Quantum Game Award are just two of the six categories open for students, educators and developers.

Learn more

https://qiskit.org/

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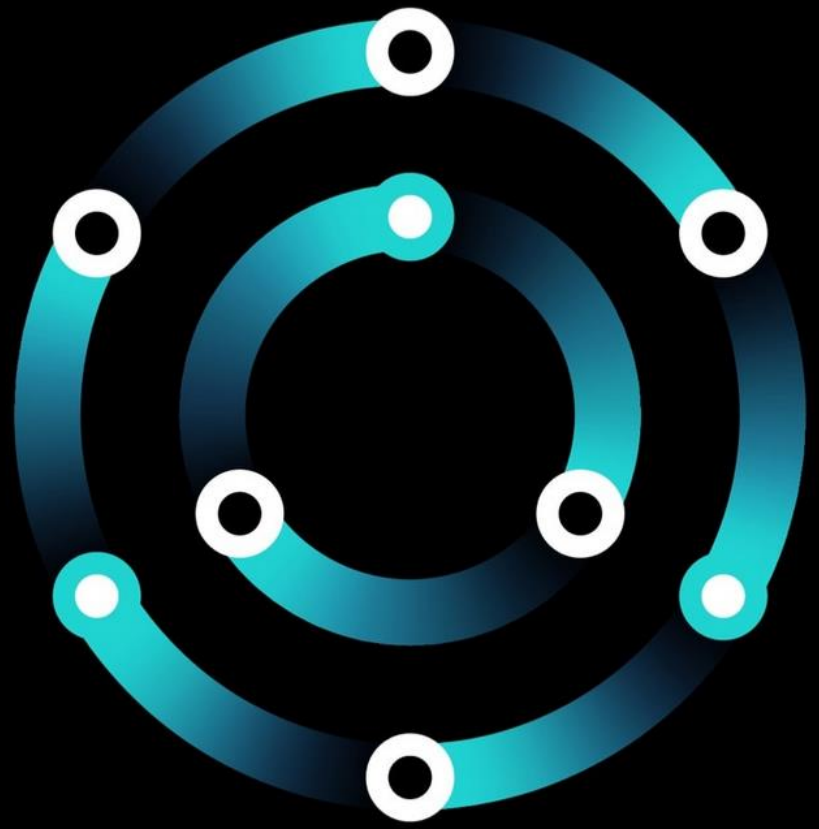
https://www.youtube.com/watch?v=3WrVUb7ej0o
Tanmay Bakshi

How to put AI to work



Learn how you can infuse AI across your enterprise.

Explore offerings

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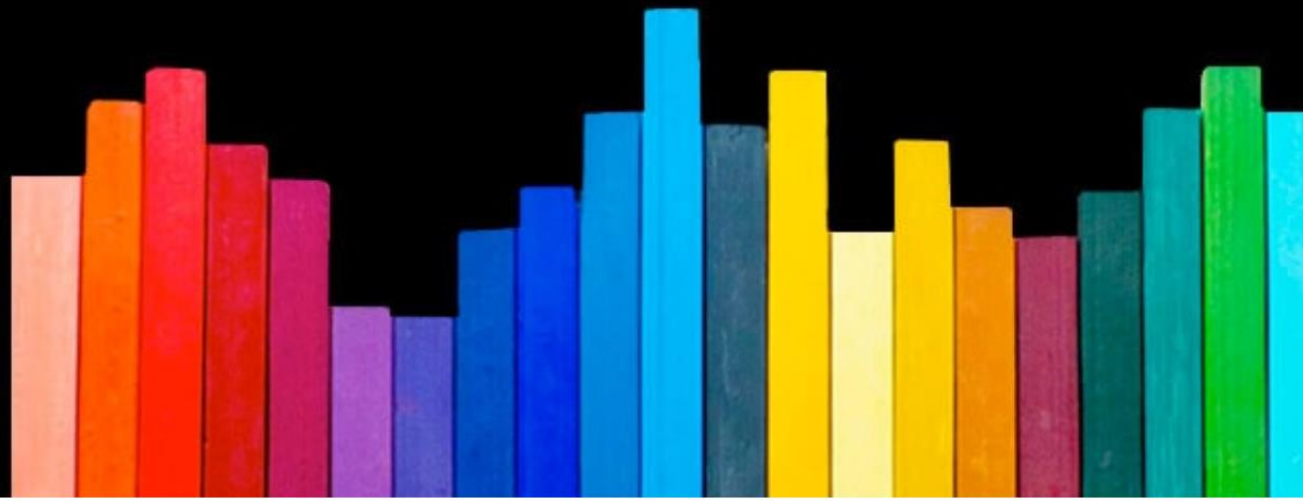
Watson Tone Analyzer Pricing Sign up

Watson Tone Analyzer

Understand emotions and communication style in text.

Get started free → View demo



https://www.ibm.com/cloud/watson-tone-analyzer

What is Watson Tone Analyzer?

The IBM Watson™ Tone Analyzer service uses linguistic analysis to detect emotional and language tones in written text.

Watson Tone Analyzer features

Conduct social listening

Analyze emotions and tones in what people write online, like tweets or reviews. Predict whether they are happy, sad, confident, and more.

Enhance customer service

Monitor customer service and support conversations so you can respond to your customers appropriately and at scale. See if customers are satisfied or frustrated, and if agents are polite and sympathetic.

Integrate with chatbots

Enable your chatbot to detect customer tones so you can build dialog strategies to adjust the conversation accordingly.

Let's talk

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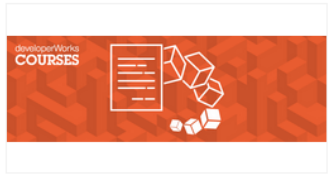
PY0101EN
Beginner



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Beginner

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IBM Developer Skills Network
BC0202EN
Intermediate

IBM Cloud Essentials
IBM Developer Skills Network
CL0101EN
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Building Robots with TJBot
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Robots are coming! Build IoT apps with Watson AI, Swift, and Node-RED
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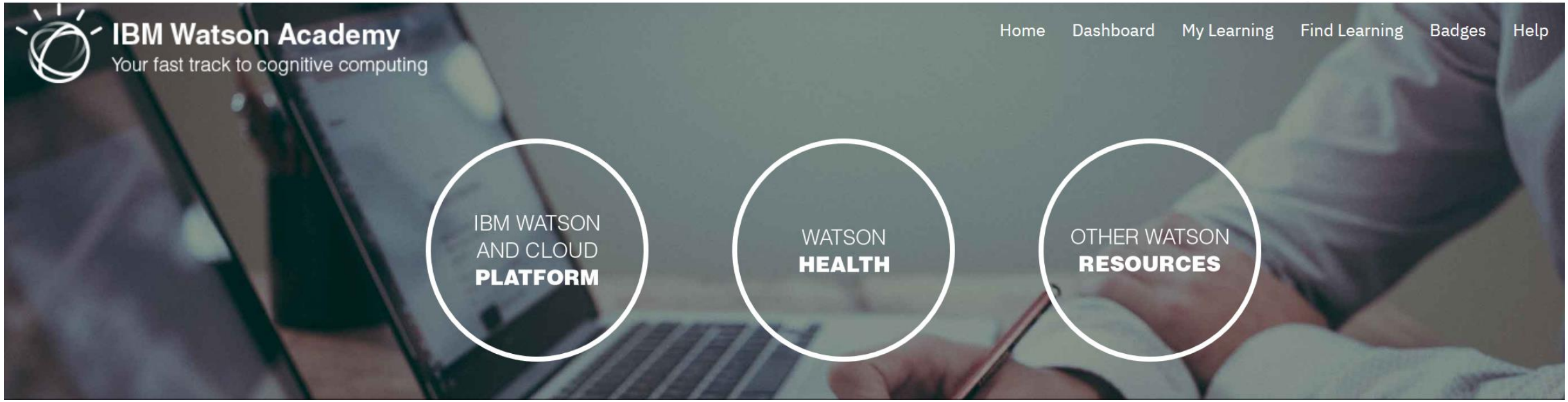
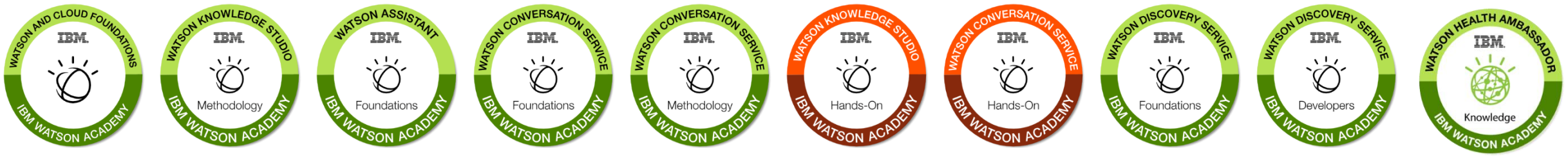
Badges

Your fast track to cognitive computing
http://www.ibm.com/services/learning/watsonacademy





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IBM Centennial Film 100 X 100 A century of achievements that have changed the world
https://www.youtube.com/watch?v=-eWxUWJgfzk

What are your next steps to becoming a cognitive professional?

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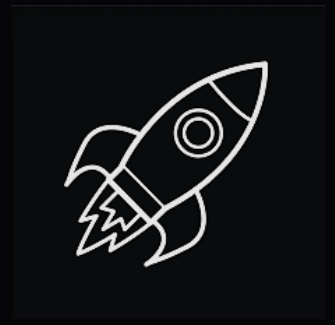

Startup with IBM

$120,000 in free IBM Cloud credits

Thank you!

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