Applications of AI in a “Real world”

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Technlogy Consulting & Training

Juan Ramón Gutiérrez Villar
Digital Operations’ Transformation Director
juraguvi@juraguvi.com
www.juraguvi.com

Technology Consulting
&
Training

Welcome!!

Born in Barcelona (1967).
Telecom Engineering Degree– UPC (Electronics)
Professional Career (1995 – 2021): **IBM – PwCC – IBM – Sener – Grupo BC**

- Large Deals Business Development Executive, Industrial Sector
- Industry Solutions leader, Industrial Sector – IBM España, S.A.
- Consulting Service Line Leader – SENER Engineering S.A.
- Digital Transformation Director – Grupo BC Global Services
- Engel Solar – (Interin) COO ; Gamma UX – D.X.O. Leader

Business Process Management Professor (2011 - 2023):

- Escuelas Gimbernat, Ing. Informática (UAB – Sant Cugat)
- Follow-up Postgrad Education Director for Professionals (Fundació UPC).

"Engineer by education, Consultant through profession development and Vocational Teacher; passionate for Education and Learning"

PhD student: "A New Paradigm to convert Knowledge into Learning: Learning Pills and Path", (Institut de Ciencies de l'Educació, UPC).


NEW START
LOADING...

IoT

IoT

…rk?

…with built in sensors are connected to an Internet of Things …tes data from the different devices and applies analytics to …nformation with applications built to address specific needs.

…can pinpoint **exactly what information is useful and …is information can be used to detect patterns, make …ossible problems before they occur.**

…ar manufacturing business, I might want to know which …leather seats or alloy wheels, for example) are the most …rnet of Things technology, I can:

…sors to detect which areas in a showroom are the most popular, and … customers linger longest;
…l down into the available sales data to identify which components are selling …astest;
Automatically align sales data with supply, so that popular items don't go out of stock.

The information picked up by connected devices enables me to make smart decisions about which components to stock up on, based on real-time information, which helps me save time and money.

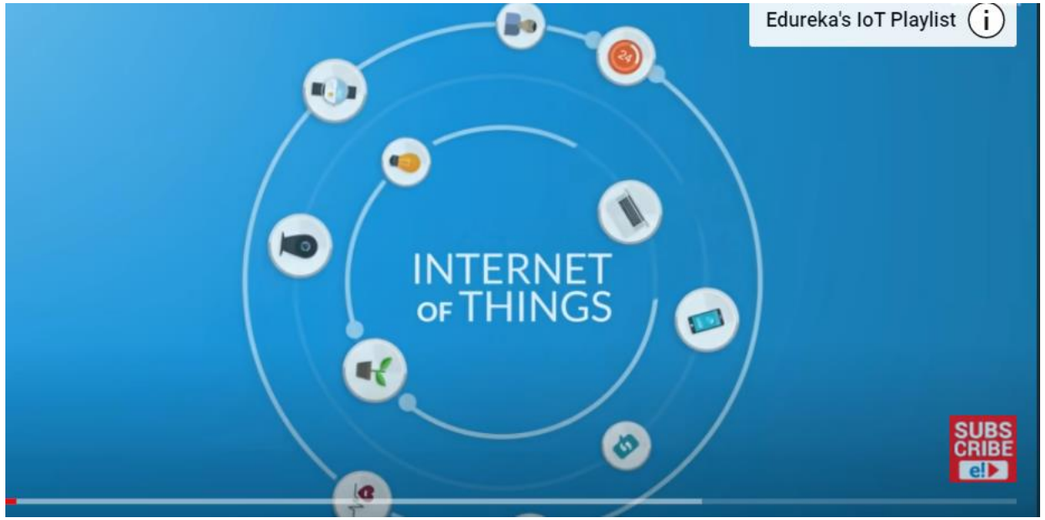
Every device can almo…
elevators,…

Key Concepts:
IoT Platform
IoT Language: Internet Protocol (e.g.) M…
Storage Data
Perform Analytics
Secured communication
Asset Management

…ght provided by advanced analytics comes the power **to …ocesses more efficient.** Smart objects and systems mean …**can automate certain tasks,** particularly when these are repetitive, mundane, time-consuming or even dangerous.

IoT

https://www.youtube.com/watch?v=LlhmzVL5bm8



Every device can almost become a sensor (e.g.) Fit Band, traffic lights, elevators,…

Key Concepts:
IoT Platform
IoT Language: Internet Protocol (e.g.) MQTT
Storage Data
Perform Analytics
Secured communication
Asset Management

How does it work?

Devices and objects with built in sensors are connected to an Internet of Things platform, which integrates data from the different devices and applies analytics to share the most valuable information with applications built to address specific needs.

These powerful IoT platforms can pinpoint **exactly what information is useful and what can safely be ignored.** This information can be used to detect patterns, make recommendations, and detect possible problems before they occur.

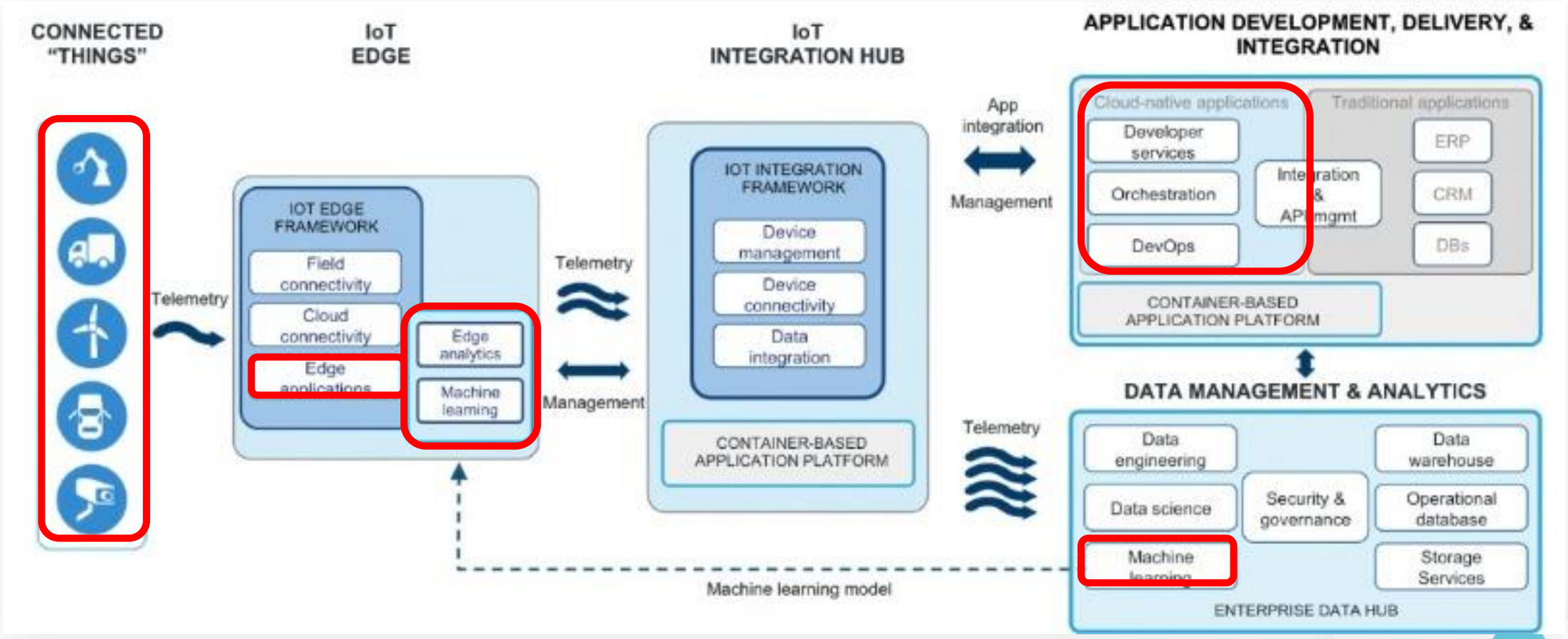
For example, if I own a car manufacturing business, I might want to know which optional components (leather seats or alloy wheels, for example) are the most popular. Using Internet of Things technology, I can:

- Use sensors to detect which areas in a showroom are the most popular, and where customers linger longest;
- Drill down into the available sales data to identify which components are selling fastest;
- Automatically align sales data with supply, so that popular items don't go out of stock.

The information picked up by connected devices enables me to make smart decisions about which components to stock up on, based on real-time information, which helps me save time and money.

With the insight provided by advanced analytics comes the power **to make processes more efficient.** Smart objects and systems mean you **can automate certain tasks,** particularly when these are repetitive, mundane, time-consuming or even dangerous.

IoT Architecture



Where can I find AI in this architecture?

IoT Architecture

Gateways. Data goes from things to the cloud and vice versa through the gateways. **A gateway provides connectivity between things and the cloud part of the IoT solution**, enables data preprocessing and filtering before moving it to the cloud (to reduce the volume of data for detailed processing and storing) and transmits control commands going from the cloud to things. Things then execute commands using their actuators.

Cloud gateway facilitates data compression and secure data transmission between field gateways and cloud IoT servers. It also ensures compatibility with various protocols and communicates with field gateways using different protocols depending on what protocol is supported by gateways.

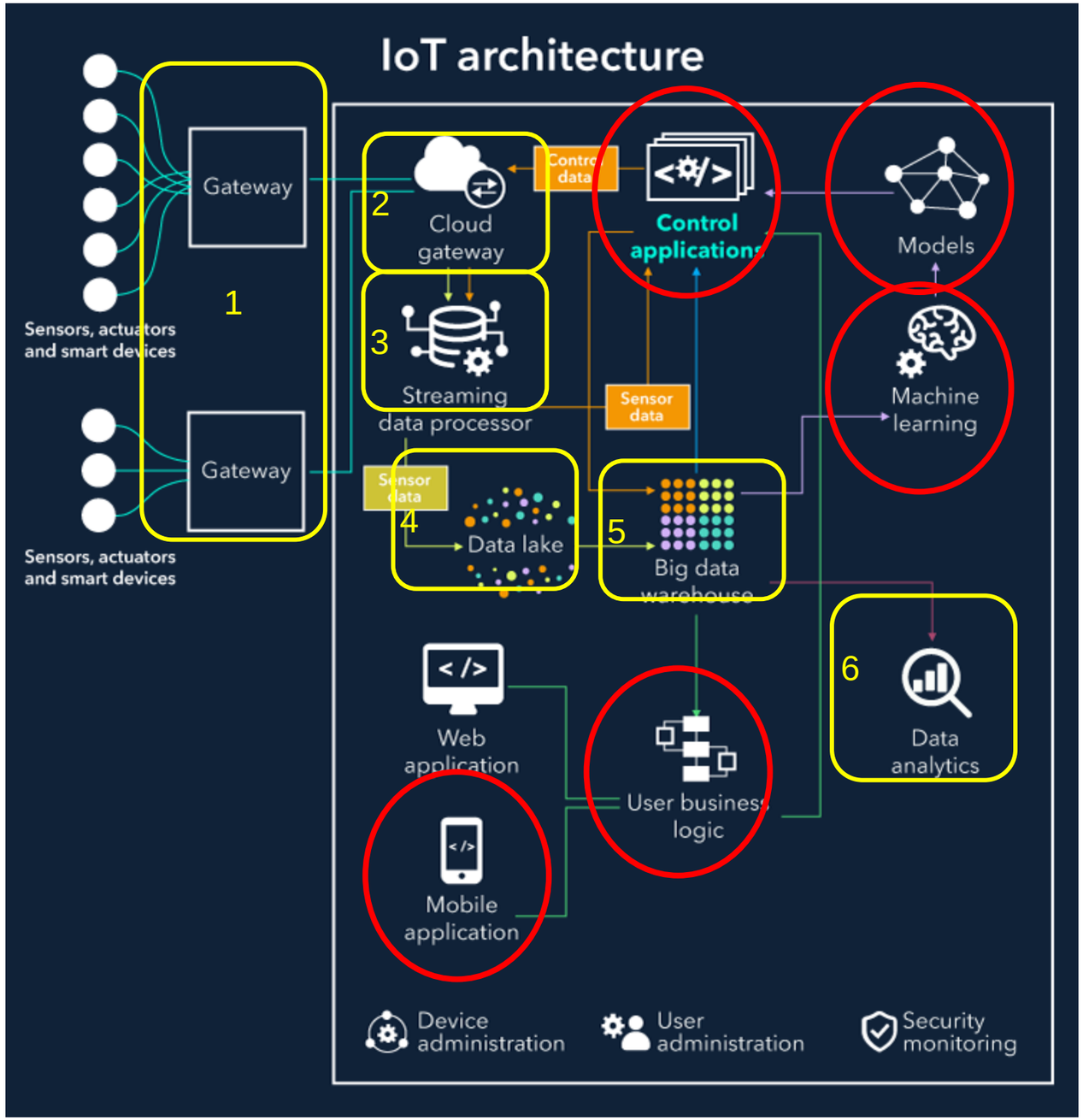
Streaming data processor **ensures effective transition of input data** to a data lake and control applications. No data can be occasionally lost or corrupted.

Data lake. A data lake is used for **storing the data** generated by connected devices in its natural format. Big data comes in "batches" or in “streams”. When the data is needed for meaningful insights it’s extracted from a data lake and loaded to a big data warehouse.

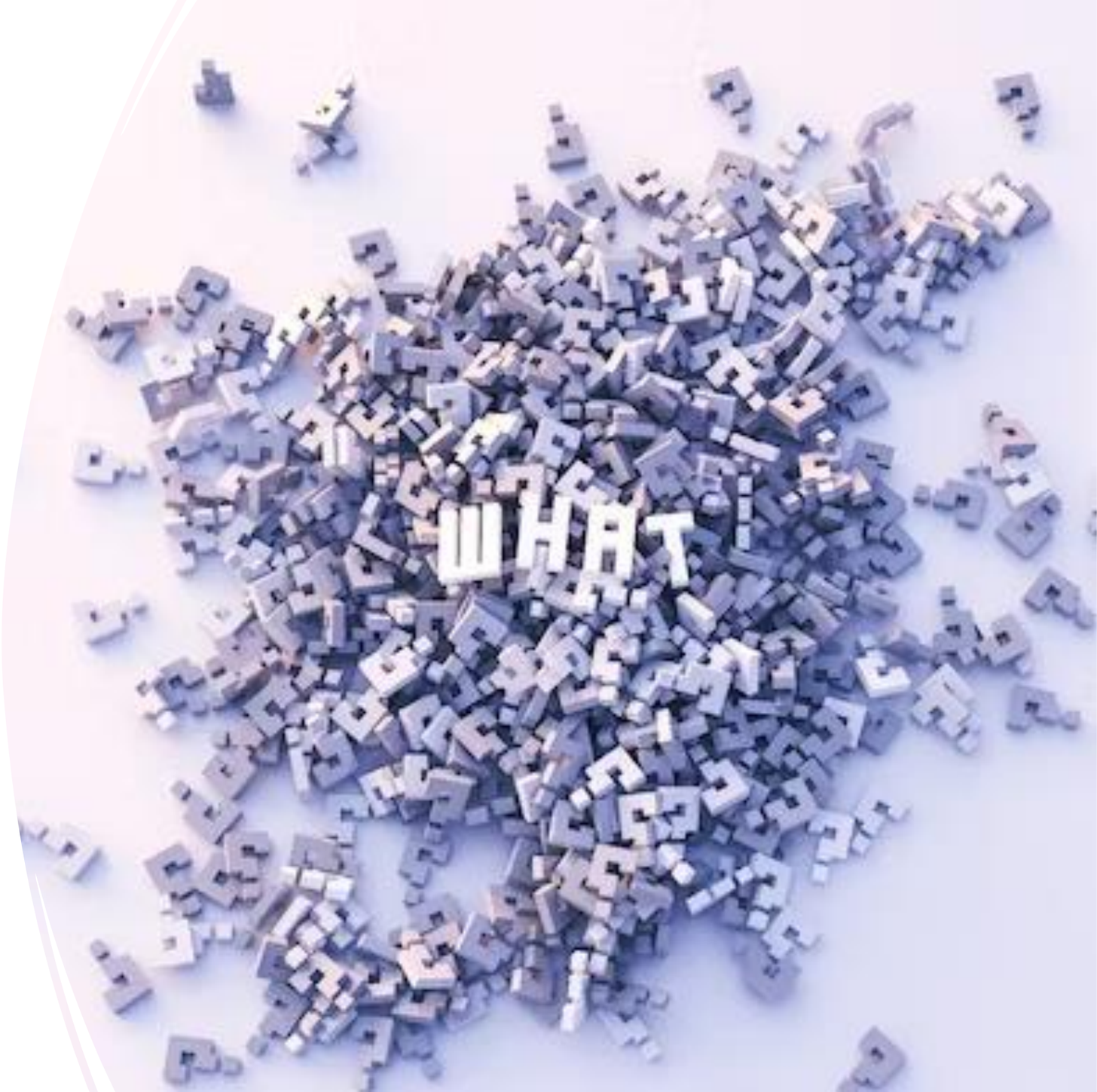
Big data warehouse. Filtered and preprocessed data needed for meaningful insights is extracted from a data lake to a big data warehouse. A big data warehouse contains only cleaned, structured and matched data (compared to a data lake which contains all sorts of data generated by sensors). Also, data warehouse stores context information about things and sensors (for example, where sensors are installed) and the commands control applications send to things.

Data analytics. Data analysts can use data from the big data warehouse **to find trends and gain actionable insights.** When analyzed (and in many cases – visualized in schemes, diagrams, infographics) big data show, for example, the performance of devices, help identify inefficiencies and work out the ways to improve an IoT system (make it more reliable, more customer-oriented). Also, the correlations and patterns found manually can further contribute to creating algorithms for control applications.

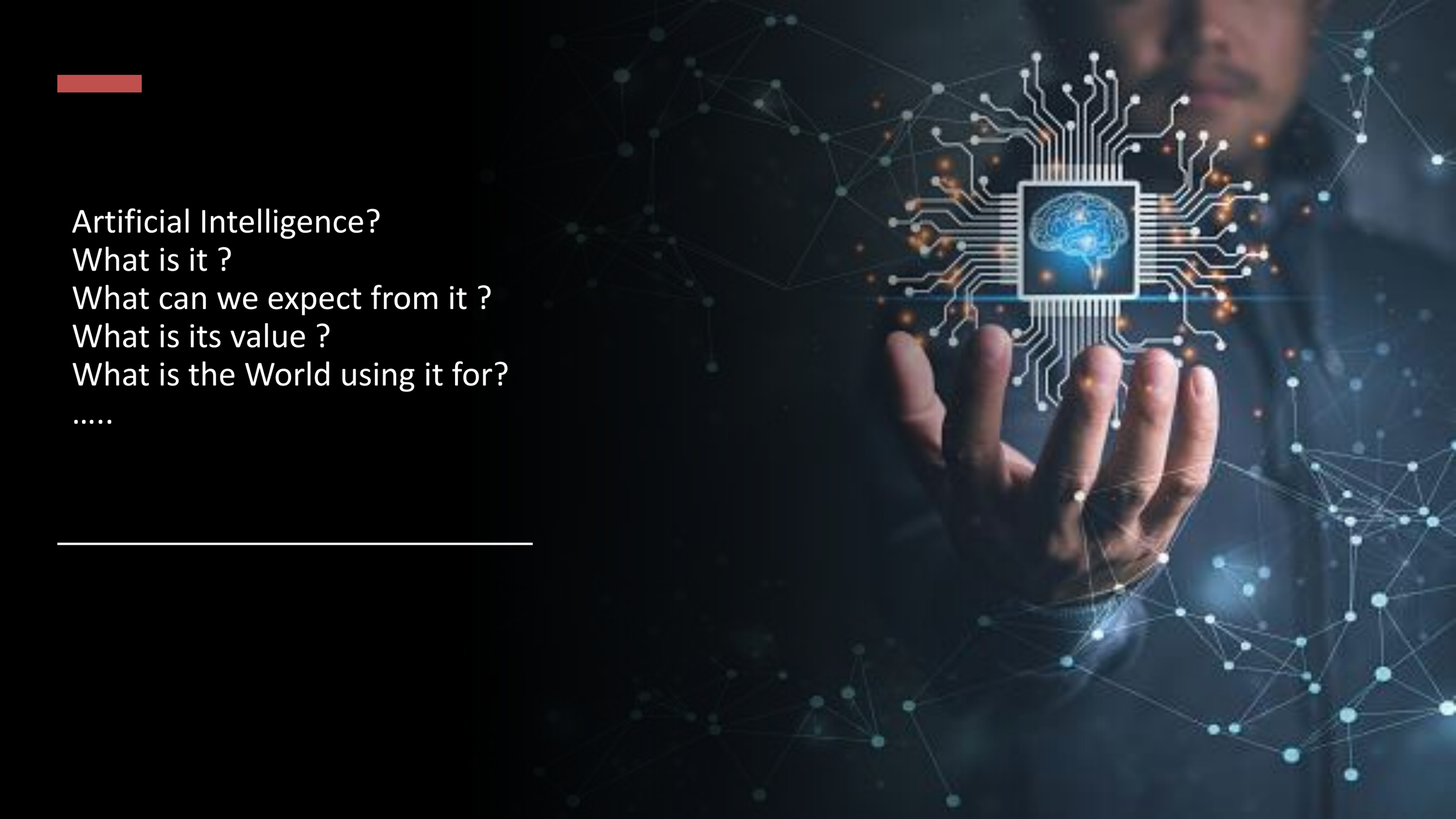
Machine learning and the models ML. With machine learning, there is an opportunity **to create more precise and more efficient models for control applications**. Models are regularly updated (for example, once in a week or once in a month) based on the historical data accumulated in a big data warehouse. **When the applicability and efficiency of new models are tested and approved by data analysts, new models are used by control applications.**



AI



Artificial Intelligence?
What is it ?
What can we expect from it ?
What is its value ?
What is the World using it for?
…..



The Key Challenge:

As for 2015

90%

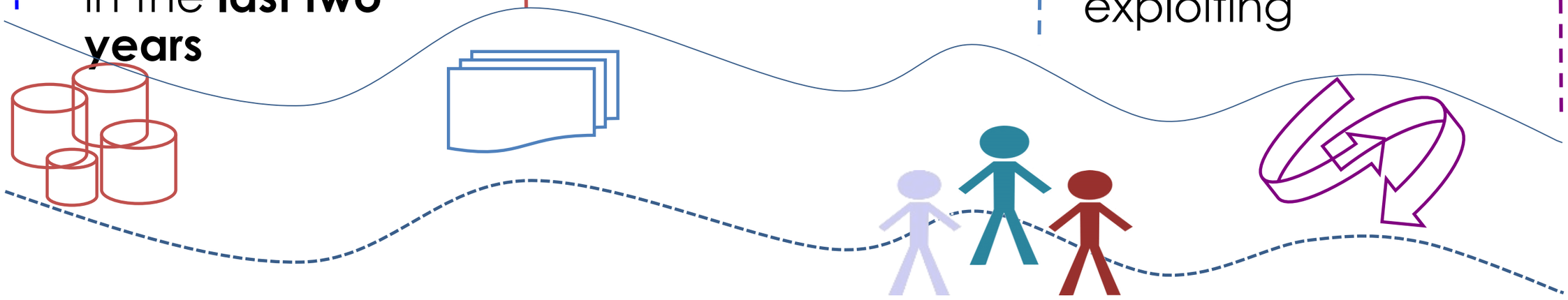
Of the data created in the world have been created in the **last two years**

80%

Today's world data is **"unstructured"**

20%

It is the volume of data that traditional systems are capable of exploiting



Continuing with the concept of intelligence ... you could think that someone capable of handling a lot of information, of remembering a lot of data, could be considered intelligent ... In this sense, machines are very good at handling a lot of information and doing operations, but the challenge is to transform that information into knowledge.

The Key Challenge:

As for 2023

97%

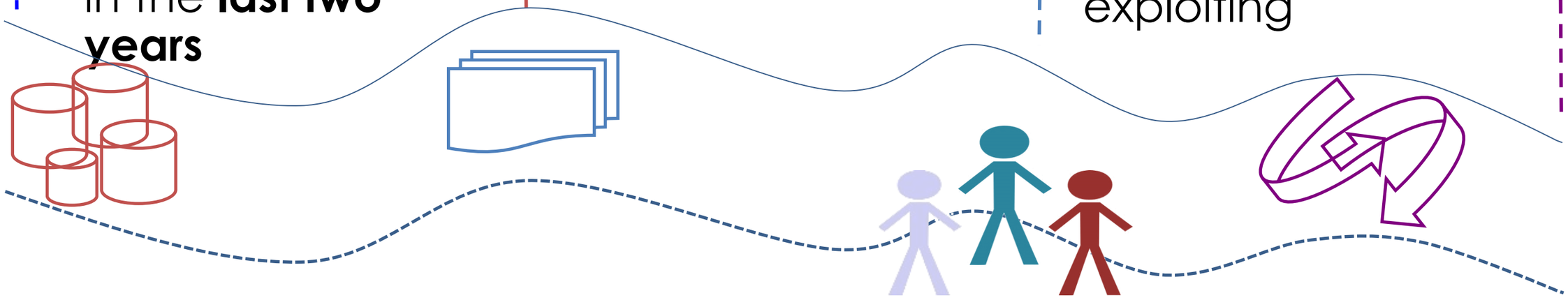
Of the data created in the world have been created in the **last two years**

92%

Today's world data is **"unstructured"**

6%

It is the volume of data that traditional systems are capable of exploiting



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From Intelligence to Artificial Intelligence

INTELLIGENCE: According to Real Academia Española (RAE), this term stands for:

- ✓ Capacity to understand and comprehend
- ✓ Capacity to solve problems

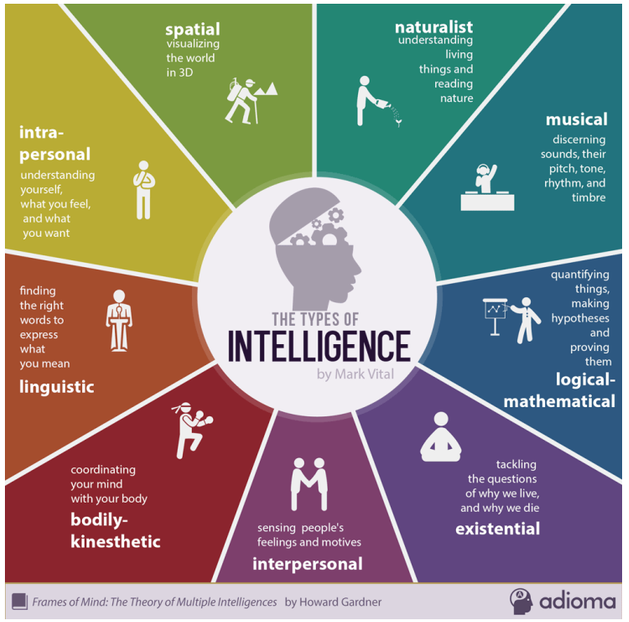
⟺

• Musical. • Spatial or visual • Linguistic-verbal • Mathematical logician • Corporal-kinesthetic • Interpersonal. • Intrapersonal • Naturalist • Existential • Another

ARTIFICIAL INTELLIGENCE is the "scientific **discipline** that deals with creating computer programs that perform operations comparable to those performed by the human mind, such as learning or logical reasoning."
Bellman proposes another definition: «The automation of activities that we link with human thought processes, activities such as decision making, problem solving, learning…»

Weak AI: In the first case, it is an AI that is specifically trained to perform an activity, that is, it is about performing tasks that require intelligence in very specific environments.

Strong AI (General AI): This is about simulating more human behavior or human intelligence.

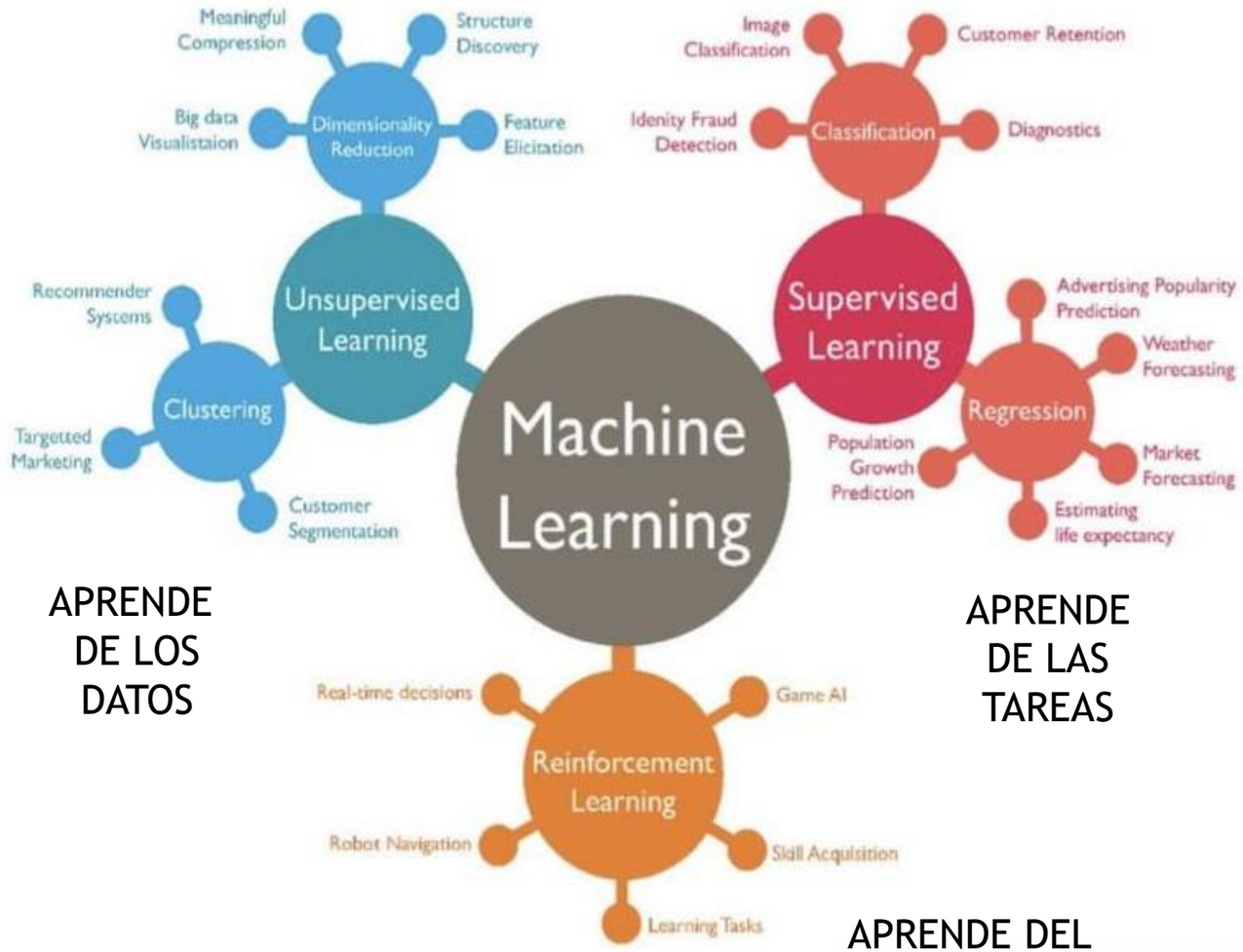


10 TYPES of intelligence

Gardner, H., «Frames of mind: The theory of multiple intelligences», New York, Basics Books, 1983.

MacLean, E. L. et al., «The evolution of self-control», Proceedings of the National Academy of Sciences, 111 (20), Washington, abril 2014, p. E2140-E2148. Fraser Pub. Co., San Francisco, 1978 6 (UK), septiembre 1980, pp.417-457. 28 Bellman, R., «An introduction to artificial intelligence: Can computers think?»,
Boyd & Searle, J. R., «Minds, Brains, and Programs», Behavioral and Brain Science, 3 , Cambridge

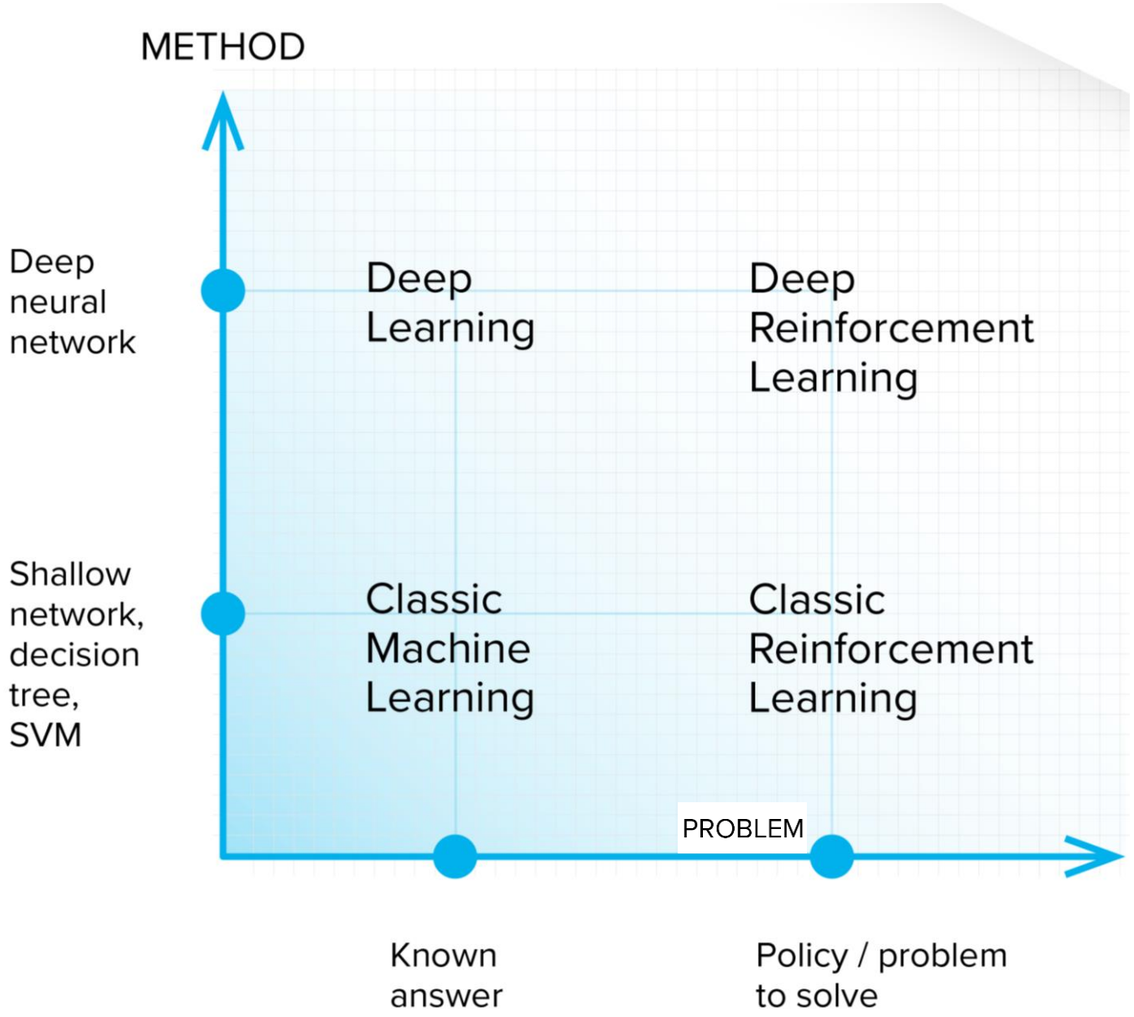
Types of Systems learning
Machine, Deep, Reinforcement Learning

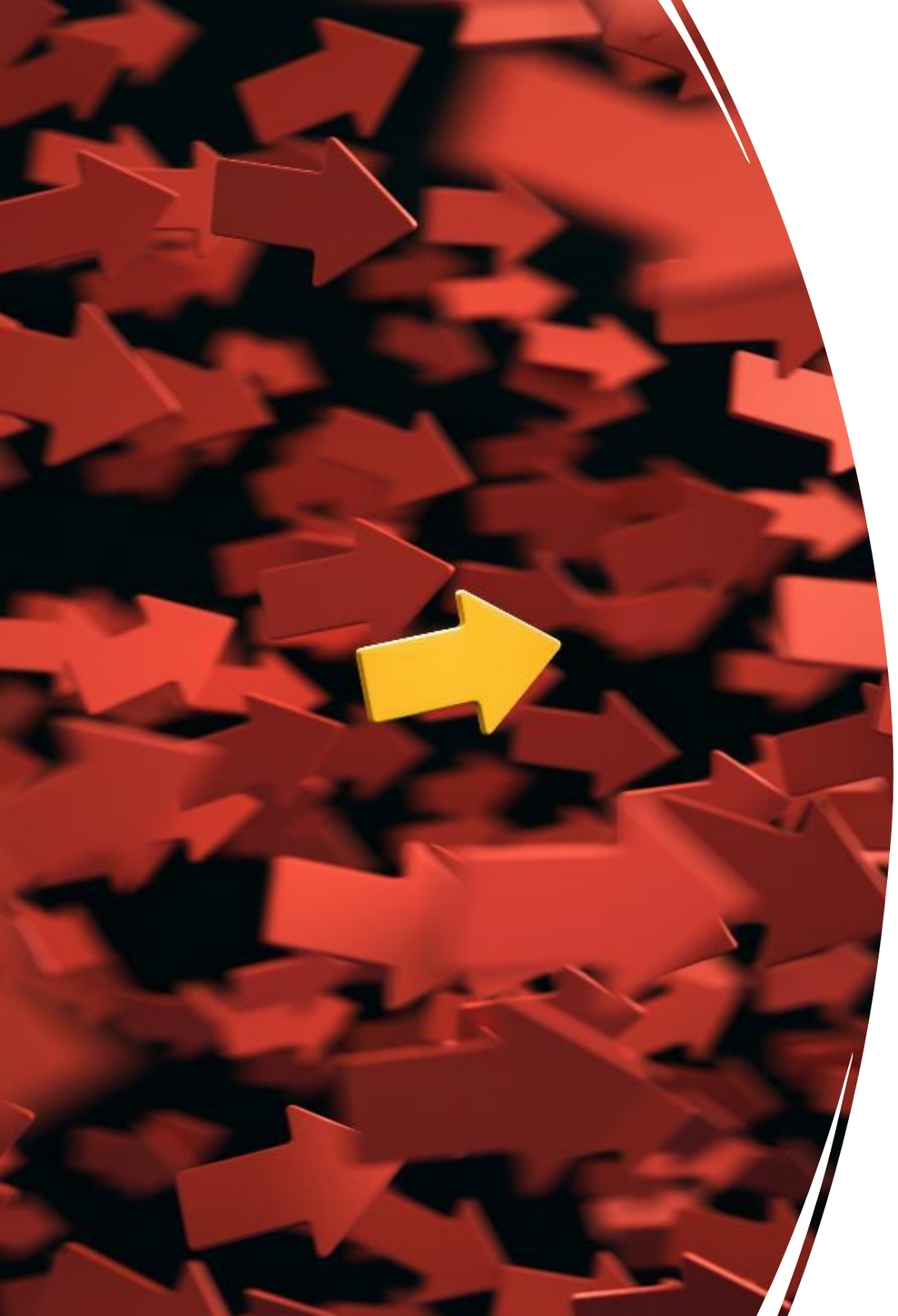


APRENDE DE LOS DATOS

APRENDE DE LAS TAREAS

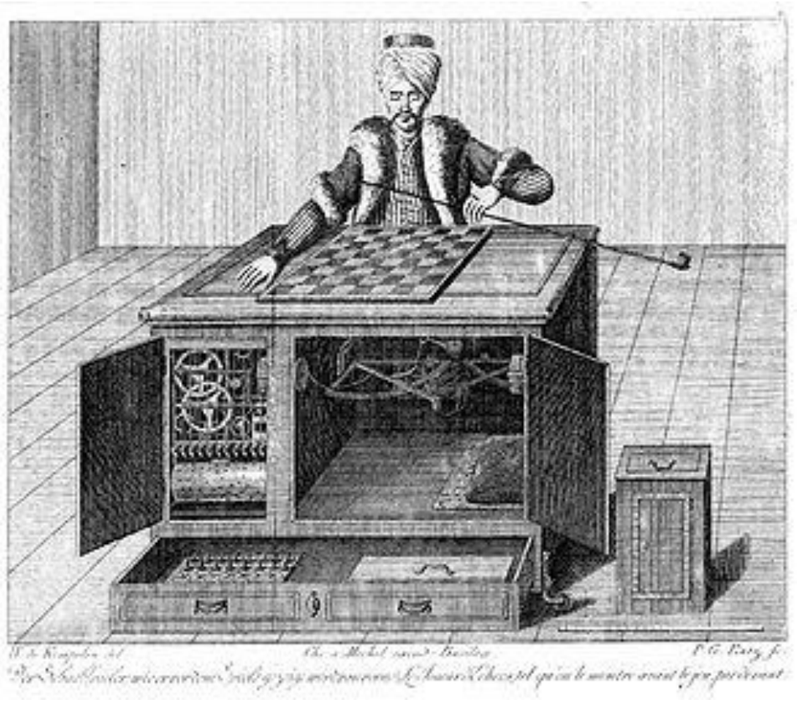
APRENDE DEL ERROR





History and Trends

A Good Trial...”The Turkish”



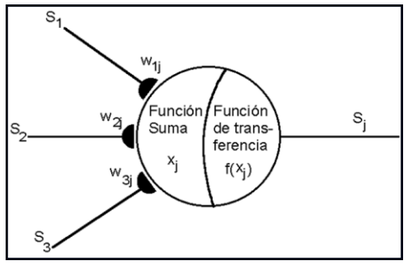
The Turkish was a famous structure that seemed to be an automaton that played chess. It was built and revealed by Wolfgang von Kempelen (1734-1803) in **1769**.

The cabin had doors that once opened showed a clockwork mechanism and when activated it was capable of playing a game of chess against a human player at a high level.

However, it is believed that the cockpit was a well-posed optical illusion that allowed a short stature chess master to hide inside and operate the mannequin, the Turk was able to do this thanks to the mannequin's eyes sending the master of chess the positions of the pieces of the board by means of mirrors.

Artificial Intelligence comes from far:

Warren McCulloch & Walter Pitts



1899: Birth of Warren Sturgis McCulloch
1923: Birth of Walter Pitts
1927: McCulloch: PhD in Psicology
1943: On of the first neuron-based Mathematics model is proposed.
McCulloch-Pitts. “A logical calculus of the ideas immanent in nervous activity”
1947: McCullch-Pitts. “How we know universals: the perception of visual and auditory forms”
1949: Donald Hebb publishes ond of the first “lerarning rules”.
1956: The term Artificial Intelligence is coined
1957: Frank Rosenblatt presents Perceptron
Sixties: Perceptron-based models: Adaline y Madaline
1969: McCulloch y Pitts die
1969: Back propagation

Antificial Intelligence “dances” with the Technology

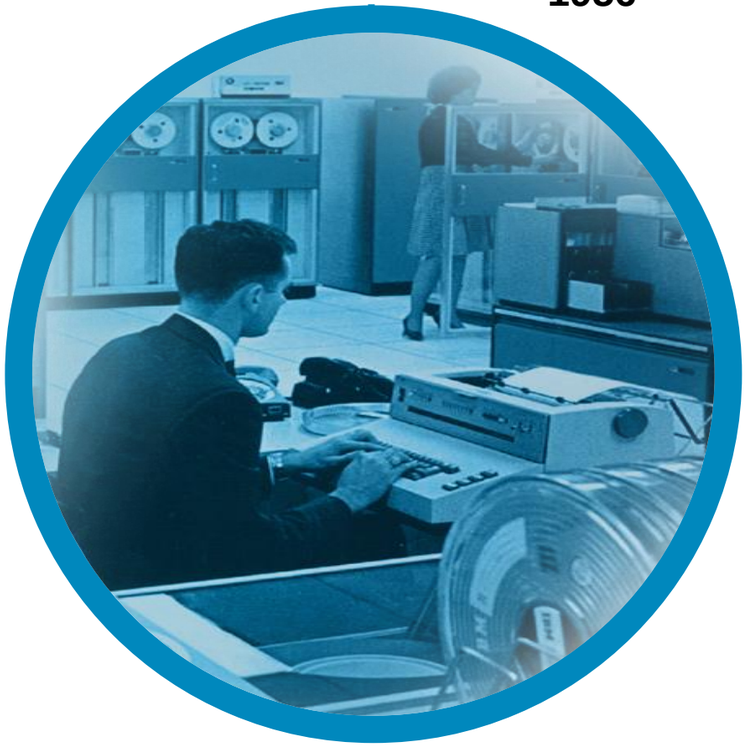
Tabulating Systems Era

1900

Programmable Systems Era

1950

1956

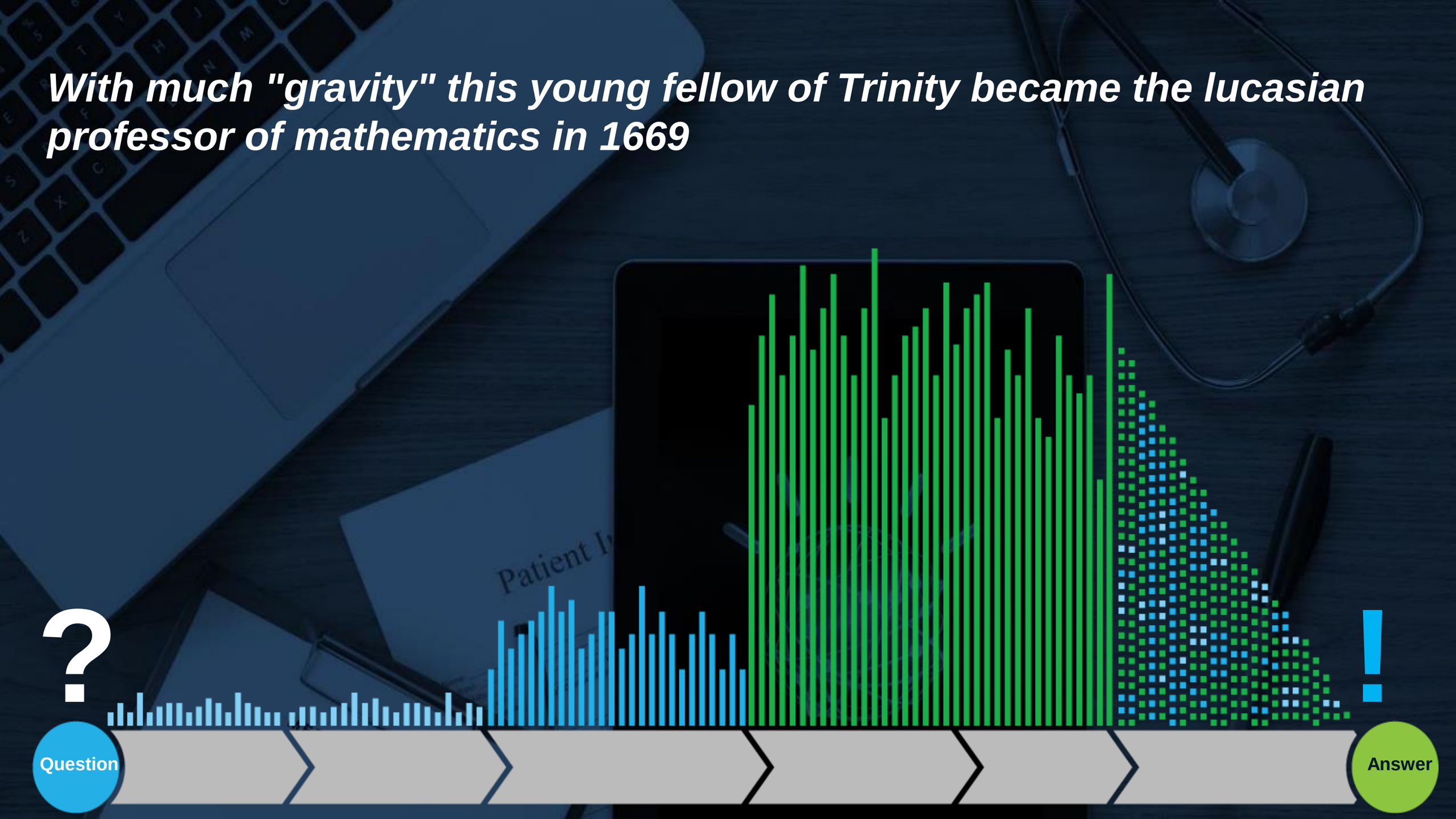


Cognitive Systems Era

2011

Let’s challenge your brains!!

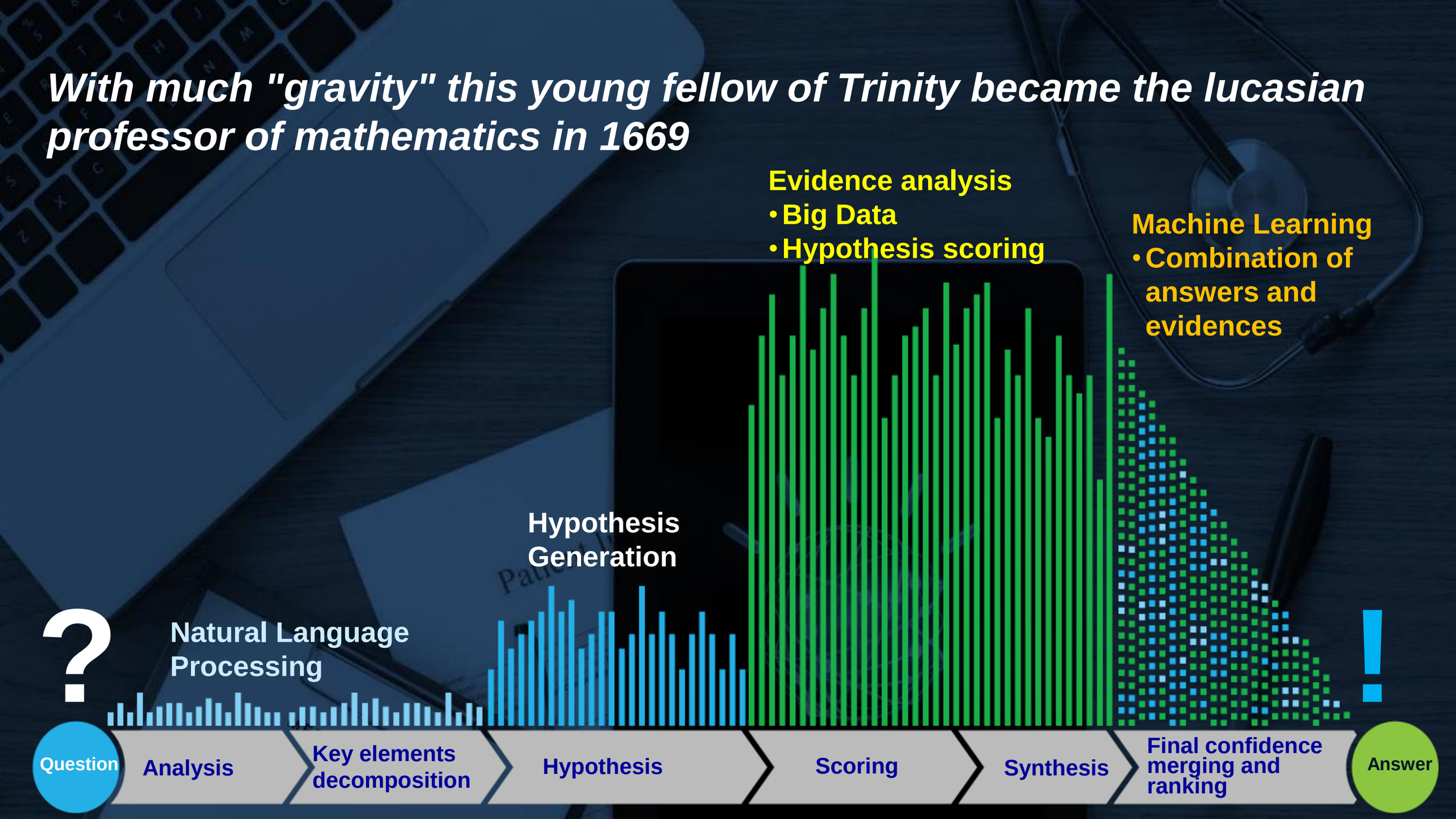
With much "gravity" this young fellow of Trinity became the lucasian professor of mathematics in 1669



Question

Answer

With much "gravity" this young fellow of Trinity became the lucasian professor of mathematics in 1669

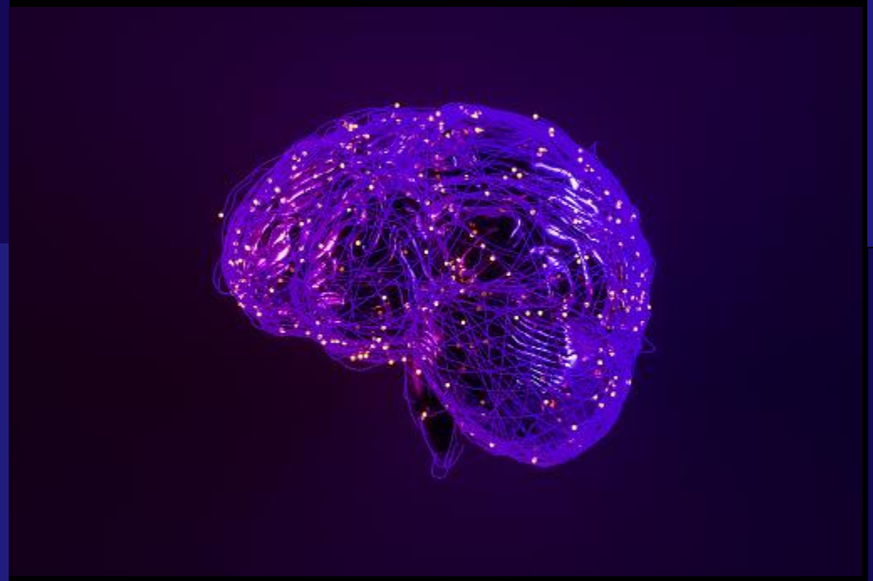


UNDERSTAND

Cognitive Systems understand language, images and other unstructured information ACCORDING TO HUMAN PATTERNS

LEARN

They use any data and interaction at all times to refine "their experience"; NEVER STOP LEARNING



REASON

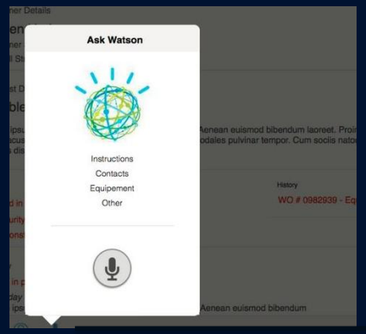
Reuse ALL our arguments, analyze them, extract concepts, deduce hypotheses INFERATE AND EXTRACT NEW IDEAS

INTERACT

They INTERACT with human beings listening (without fatigue) when spoken to, visualizing (without degradation of quality) **COMPLEMENTING** the capacities of the individual to reason

Watson's 5 core capabilities

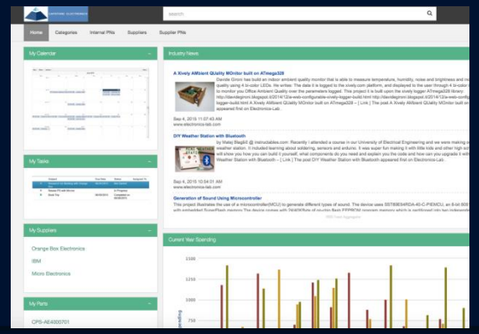
Watson enables five classes of cognitive services working across structured and unstructured data with Natural Language Processing and Machine Learning



ASK

Ask questions for greater insight

Natural language dialogue

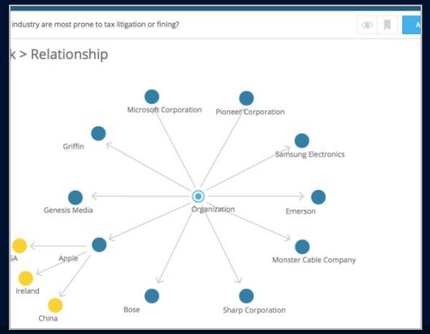


EXPLORE

Natural language dialogue

Find external information in real time

Monitor social sentiment



DISCOVER

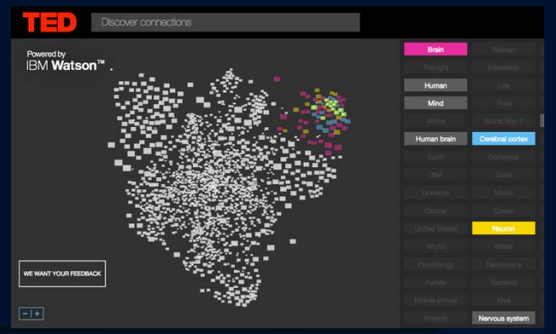
Find rationale for given responses

Prompt for inputs to yield improved responses

DECIDE

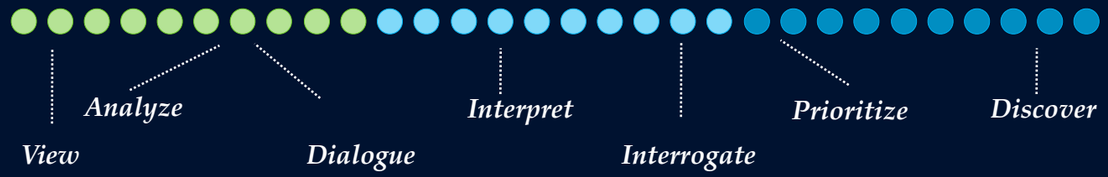
Ingest and analyze domain sources, info models

Evidence-based decisions with greater confidence



VISUALIZE

Consolidate and visualize information across enterprise applications and big data assets



$ 1,000 computation

Years by which, according to Kurzweil, $1,000 of computation will equal (or has already equaled) the intelligence of...

All human brains

One human brain

One mouse brain

One insect brain

Karzweil's Projected Trend line

Apple Mac II

Univac I

Bell Calculator Model II

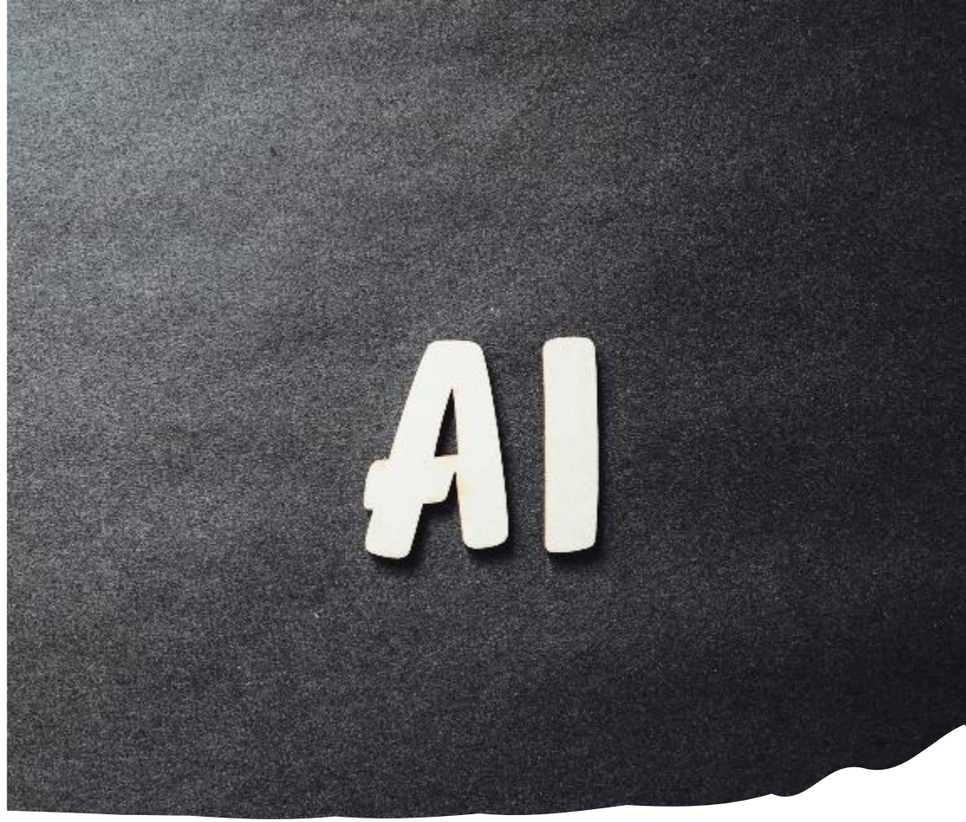
Hollerith Tabulator

2001 '10 '20 2050 2075

AI = **ALL** human brains

We are HERE!!

Machine = 1 human brain



Where is industry going to with AI?

“Natural” Intelligence “dances” with the Industry

The Industrial Revolution

1760

240 YEARS

It began in England in 1760, finally reaching the United States by the end of the 18th century.

Workers would make their own schedules, which made it difficult to regulate.

In 1712, the steam engine was invented by Thomas Newcom and this began to be used to pump water out of mines.

By the late 18th century, Newcom’s invention was improved upon by James Watt and it was now used to power machinery, ships and locomotives.

Assembly Line

1901

47 YEARS

The assembly line was first patented in 1901 by Ransom E. Olds, a car manufacturer.

This allowed them to drastically decrease their prices.

Allowed factories to parallelize avoiding “individual waste” of intelligence.

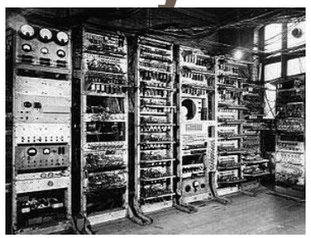
Lean Manufacturing

1948

In 1948, Toyota Motor Corporation developed what they called “Lean Manufacturing”

It’s now been renamed the ‘Just in Time System’ and it emphasizes making only “what is needed, when it is needed, and in the amount needed.”

This system was a drastic change from previous systems as it required more persistence and **detailed observation**.



Robotics

1926
1933
1969

It may surprise you, but modern-day robotic thinking began all the way back in the year 1926 with a robot called Televox (R.J. Wensley). This robot was introduced by the Westinghouse Electric Corporation and the robot could respond to the human voice and perform useful tasks.

According to an article by The New York Times, Wensley was quoted in 1933 as saying, “In time to come the only work to be done by men and women will be that which requires faculties of discernment, discretion, and judgment. All other work – anything repetitive, routine, standardized – can better be done by machines.”

Victor Scheinman created the Stanford Arm in 1969. This was a 6-axis robot which could move and assemble parts in a continuous repeated pattern.

https://inventionland.com/blog/manufacturing-past-present/

AI, the “definitive lever”:

1760 - 1840

71 years

Industrial Revolution

- Machinery
- Steam Engines
- Mechanical Engines
- Electricity
- ….
- Electronics

June 1911

72 years

Computer Revolution

- Semiconductors
- Microprocessors
- Advanced Peripherals
- Personal Computers
- Portable Computers
- Big Data

IBM PC Hard Disk/Drives

1983

28 years

Internet Mobile Revolution

- Mobile Devices
- 4G
- VPNs
- Secure Remote Access
- Ubiquity
- Process Automation
- Robotics

2011

14 years

Artificial Intelligence Revolution

- Virtual assistants
- Visual Recognition
- Acoustics Insights
- Machine Learning
- Deep Learning

IBM Watson

IBM Watson

Siri

Microsoft Cortana 2 de abril de 2014

Amazon Alexa 6 de noviembre de 2014

Bixby 21 de abril de 2017

2025

Cognitive Systems Revolution

- AI Ethics
- Health & Micro Health
- Health & Safety
- …..
- ??????

Why Cognitive is interesting for industry?

- Economical needs
  - Experts highly qualified are expensive and unaffordable
  - A way for training new experts
  - Knowledge preservation

- Computational efficiency
  - General decision methods are slowly and inefficient
  - Massive information needs to be processed

- Decision support system
  - Get fast, efficient and justified decisions
  - Autonomous decisions systems

Companies need specific systems to solve specific problems using the knowledge from domain and the expertise from experts .

Industrial IoT https://www.youtube.com/watch?v=HmbUJEShA-8

Applying AI is a journey to cognitive solutions with use case driven application for value

Image Analytics

Enables monitoring of unstructured data from images snapshots to identify quality defects and failure patterns

Machine Learning

Automates data processing, identifies the best model for the data and continuously monitors new data to learn and improve results

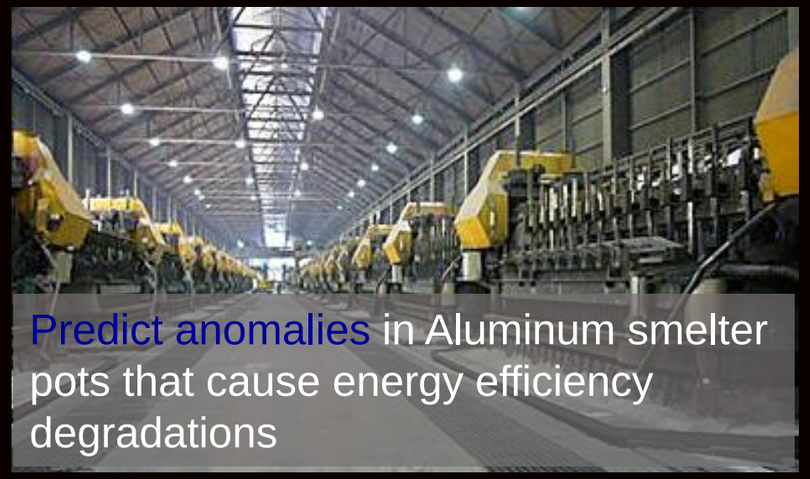
Textual Analytics

Enables mining of textual sources to find correlations and patterns in structured and unstructured text such as logs and notes

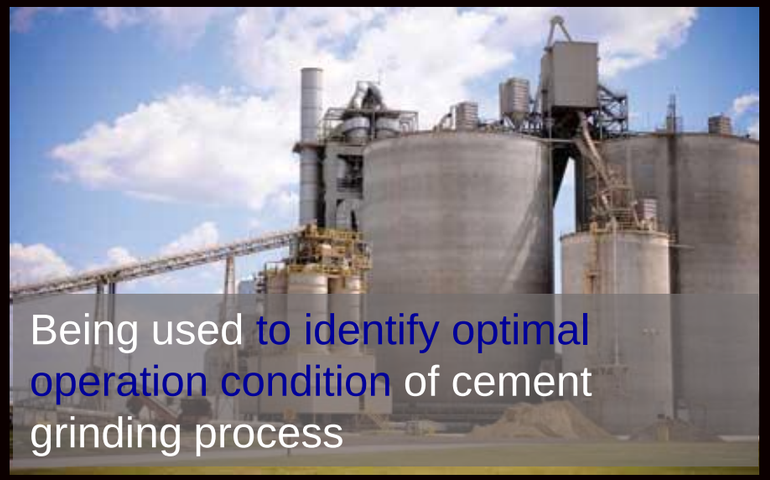
Acoustics Analytics

Utilizes audio as an additional source of unstructured data to enable anomaly detection and pattern recognition

AI is solving real problems



Predict anomalies in Aluminum smelter pots that cause energy efficiency degradations



Being used to identify optimal operation condition of cement grinding process

Provide early headlights on project health for large engineering construction projects

Successfully identified an indication of a critical failure in apron feeders of their mining equipment

Improve throughput in semiconductor fabs using virtual metrology

Provided an anomaly detection system for rotating equipment

Accessing information you would never manage to read in 10 lives

Advances in natural language processing and machine learning enable us to transform expertise and professionals.

1M

Watson can process 500 gigabytes, the equivalent of a million books, per second.

Equipment Advisor helped predict and prevent failure of US Army's mission critical assets

Business Need

- Stryker availability critical to mission readiness
- US Army found the maintenance of Strykers difficult and had no visibility of the health of the Strykers until they broke down
- Repair process itself was difficult because of experienced skill requirement and lengthy wait time for parts

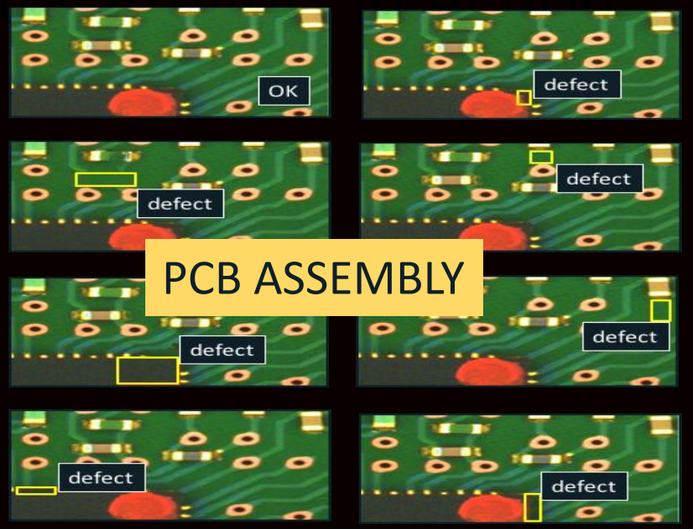
IBM Approach

- Predictive Maintenance + Watson IoT Equipment Advisor solution to analyze unstructured, structured data and sensor data directly from military assets
- Generated survival models and health status capability for current view and 30-day forecast
- Created health status scores and tied them to repair recommendations

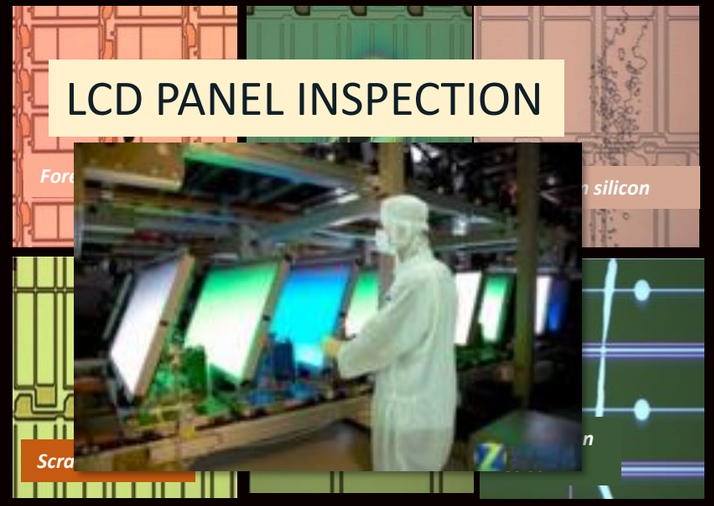
Results Achieved

- Over a 6 month period, IBM Identified 60+ engine replacement actions costing more than $11 million
- By halting failures before they happen, the Army will realize significant savings and increase efficiency.

Visual Insights in Action



PCB ASSEMBLY



LCD PANEL INSPECTION

RAILCAR SAFETY

Incomplete Frame detection & localization

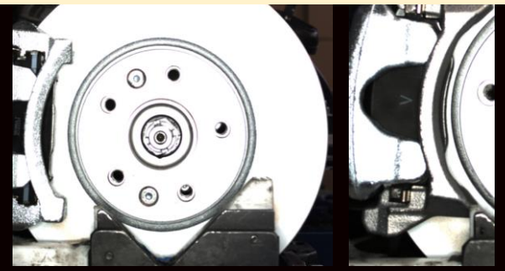
Reverse nut detection & localization

Deformation detection & localization

OLED HEADLAMP UNITS FOR CARS

DC MOTOR MACHINING INSPECTION

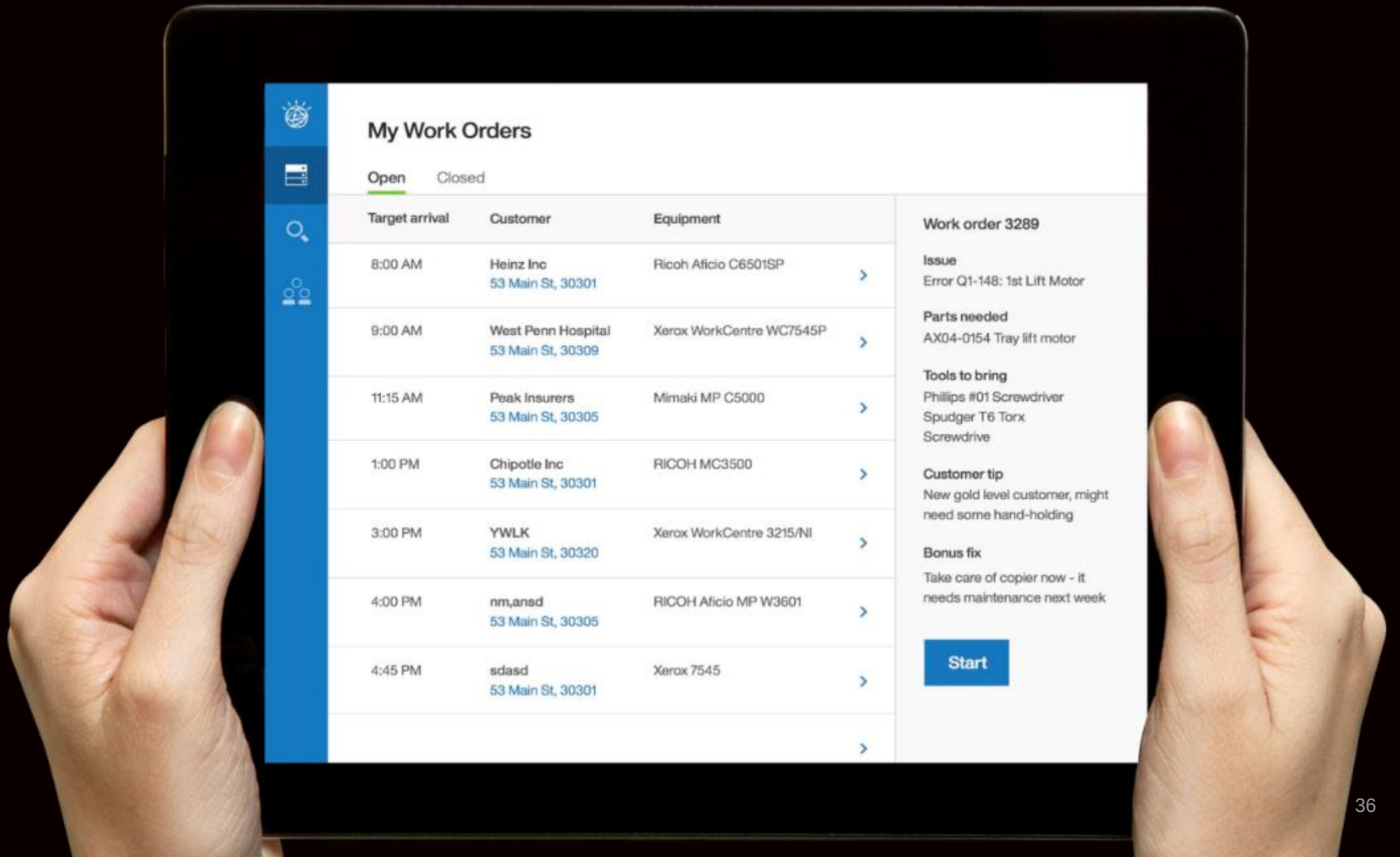
Part/Assembly Validation



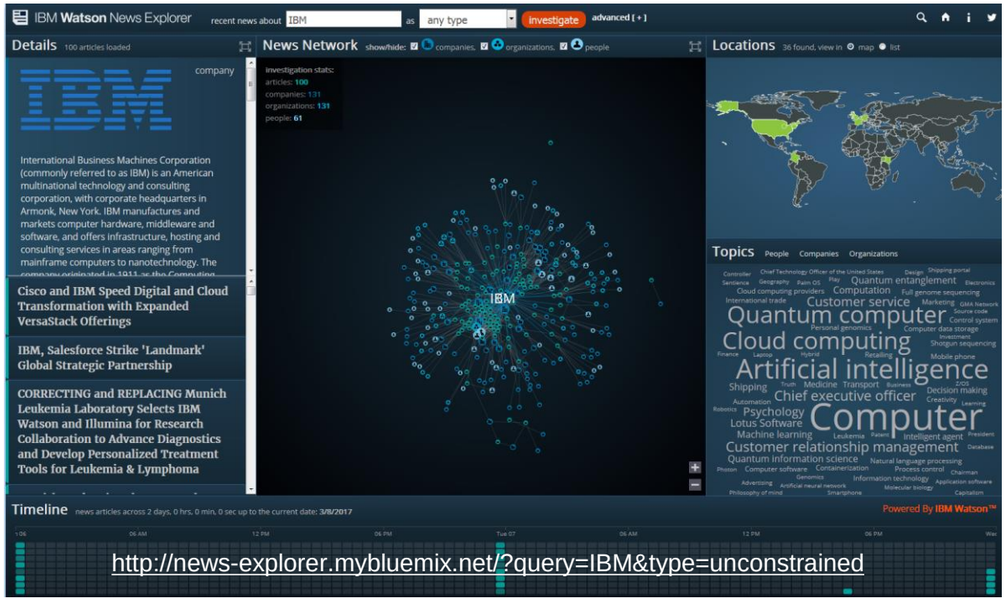
IBM Watson for Field Service enables Technicians to resolve service requests using cognitive insights that elevate the expertise of the field force and drive operational efficiency

THE MINIMUM VIABLE PRODUCT:

- ✓ Mobile responsive laptop application
- ✓ Surfaces answers for issue resolution
- ✓ Aggregates data to find the right information
- ✓ Deliver semantic indexing for improved search
- ✓ Leverages structured and unstructured data to drive insights
- ✓ Connects with social tools



Some **basic** examples

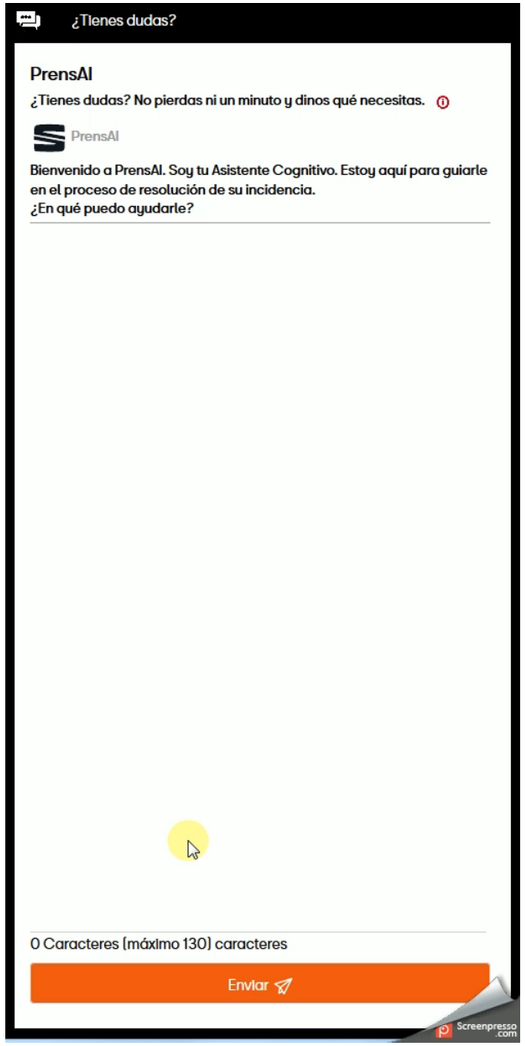


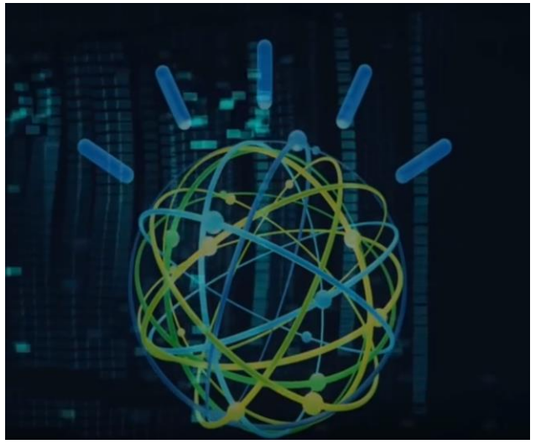
http://news-explorer.mybluemix.net/?query=IBM&type=unconstrained

Watson News Explorer has been deactivated
due to the sunsetting of the Watson Discovery News Service

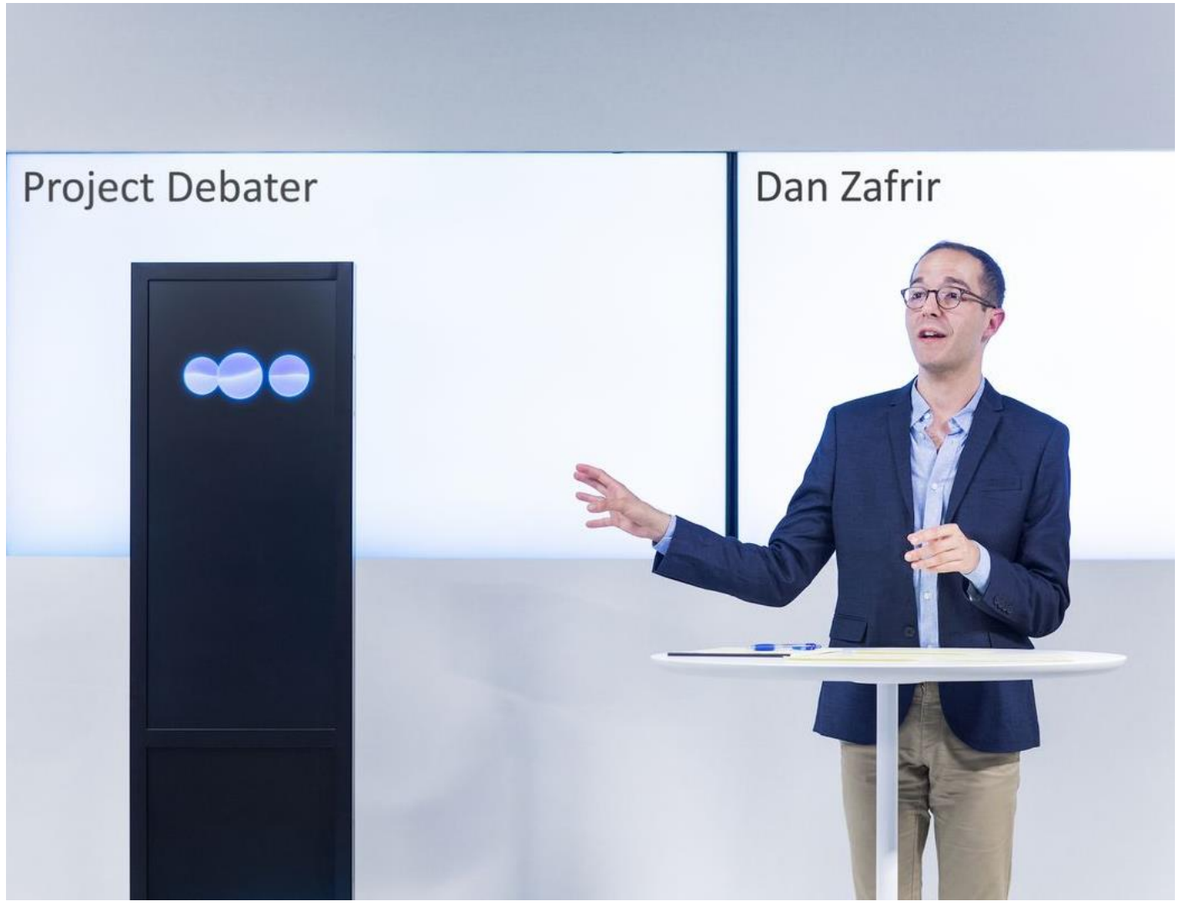
https://www.youtube.com/watch?v=aGUYoXoo1iM

From IA to Cognitive Systems





IBM | Ask Watson - Bing video

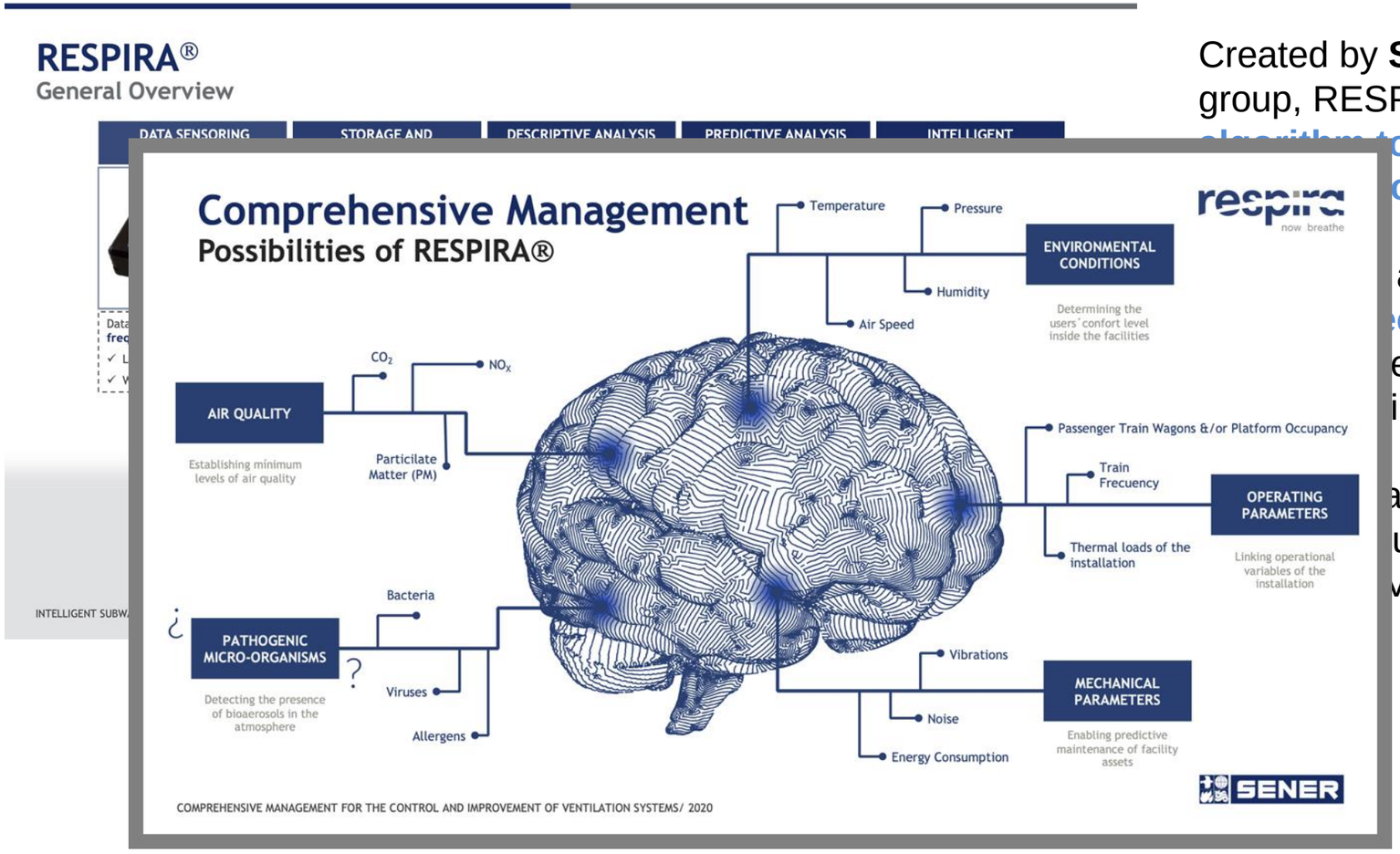


https://www.research.ibm.com/artificial-intelligence/project-debater/

Project in development of IBM Research, started in 2012 with the aim of creating a system capable of profoundly mastering natural language.

https://youtu.be/-d4Uj9ViP9o

Helping to design Photo Voltaic plants



Created by **SENER**, a global engineering and technology group, RESPIRA® **uses artificial intelligence and a dynamic algorithm to predict and control environmental conditions ons in real time**.

account everything from **weather predictions to casts to expected ridership levels** and provides eration based on targeted objectives or more ired outcomes.

ated to improve thermal comfort in stations, its uld prove to be an effective, strategic tool in helping VID-19.

https://www.bing.com/videos/search?q=respira+video+sener&docid=608037034146086646&mid=04F8FD13B9F88EB8479C04F8FD13B9F88EB8479C&view=detail&FORM=VIRE

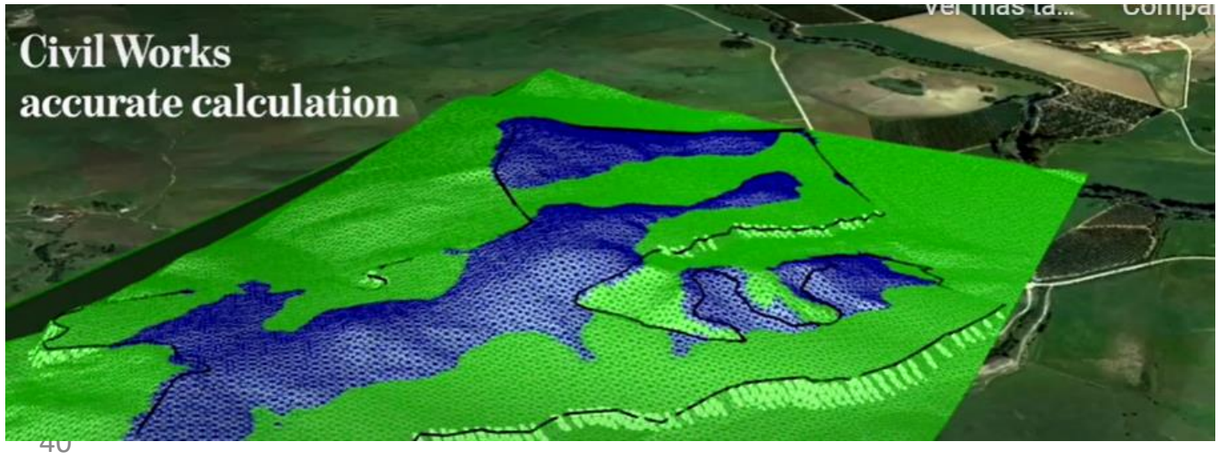
Helping to optimized Photo Voltaic plants

ORUGA®

3D Optimization for PV Projects

SENER

ORUGA® finds the optimized solution out of thousands of possibilities



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https://www.kone.com/en/products-and-services/kone-people-flow-planning-and-consulting/

https://www.youtube.com/watch?v=Am_f24xA_6s

IMPROVED USER EXPERIENCE

Round-the-clock monitoring increases safety and improves accessibility. The end result is smooth people flow and satisfied users.

EFFORTLESS MAINTENANCE AND PLANNING

By proactively identifying and fixing issues before they cause problems, we save facility managers' time and cut their workload. Fact-based recommendations for asset management help prolong the equipment lifetime.

A BOOST FOR YOUR BUSINESS

When your equipment runs smoothly, so does your business. By addressing issues proactively and optimizing maintenance schedules according to your needs, we give people flow, and your business, a boost.

THE SMART WAY TO ADD VALUE

Smart predictive maintenance and fact-based asset management planning helps you to make better investment decisions, prolongs equipment lifetime and keeps your building ahead of the game.

PROACTIVE IDENTIFICATION OF FAULTS

Share of proactively performed maintenance activities during the first 2 years:

+70%

FEWER FAULTS VISIBLE TO END USERS

Reduction in amount of call-outs during the first 2 years:

-30%

What if we use Technology to replicate reality…Things, People and …PROCESSES?

Digital Twin

A digital twin is a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision making

Component twin
Component twin
smallest exampl
twins are roughly
components of s

System or Unit tw
The next level of
twins, which enab
come together to
System twins pro
of assets, and ma
enhancements.

s
or more components work together, they
s known as an asset. Asset twins let you
nteraction of those components, creating a
erformance data that can be processed and
into actionable insights.

ns
s, the macro level of magnification, reveal
work together to create an entire
acility. Are those systems all synchronized
peak efficiency, or will delays in one
t others? Process twins can help
e precise timing schemes that ultimately
erall effectiveness.

ion.

History of digital twin technology

The idea of digital twin technology **was first voiced in 1991**, with the publication of *Mirror Worlds*, by David Gelernter. However, Dr. Michael Grieves (then on faculty at the University of Michigan) is credited with **first applying the concept of digital twins to manufacturing in 2002** and formally announcing the digital twin software concept.

Eventually, NASA's John Vickers introduced a **new term—"digital twin"—in 2010.**

However, the core idea of using a digital twin as a means of studying a physical object can actually be witnessed much earlier. In fact, it can be rightfully said that **NASA pioneered the use of digital twin technology during its space exploration missions of the 1960s**, when each voyaging spacecraft was exactly replicated in an earthbound version that was used for study and simulation purposes by NASA personnel serving on flight crews.

It is common to have different types of digital twins co-exist within a system or process.

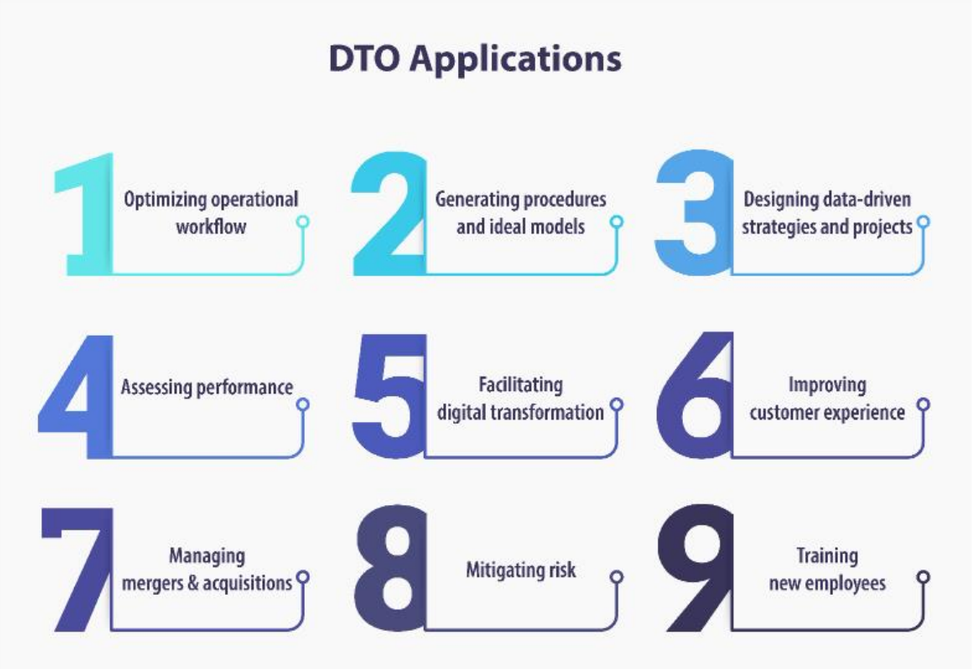
Digital Twin Organization

The global digital twin market size was valued at $3 billion in 2020 and is estimated to reach **±$73.5 billion by 2027.**
One of the recent concepts emerging from digital twins is a digital twin of an organization (DTO). DTOs are built to **analyze an organization's processes or services in a virtual environment** to run simulations and address issues which may confronted the business in real-life situations.

A digital twin of an organization (DTO) is a virtual model of a physical process, product, or service, which includes data about:

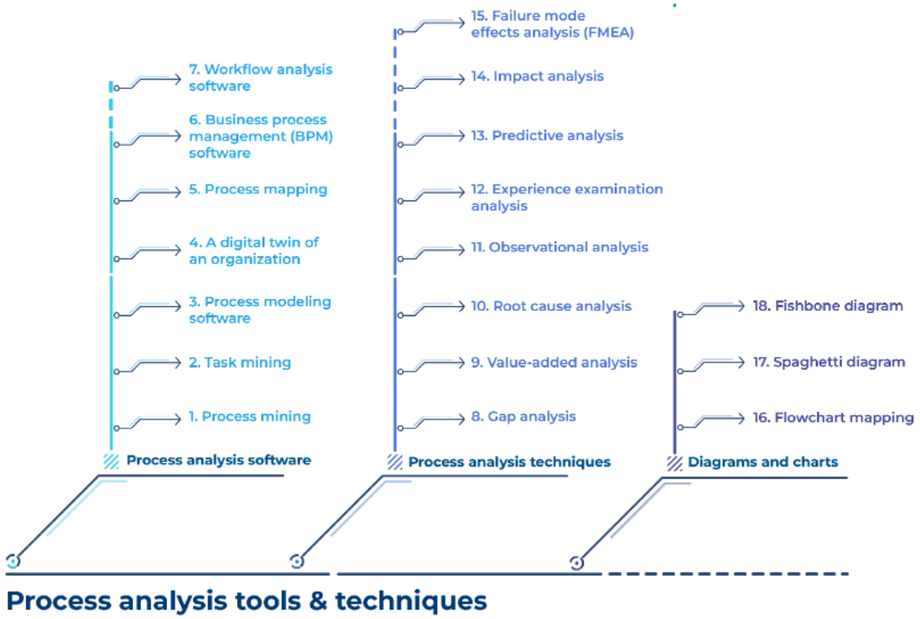
- ✓ Previous performance
- ✓ Business goals
- ✓ Business models
- ✓ Business processes
- ✓ Performance KPI indicators with target levels
- ✓ Detailed transaction-level situational process analysis

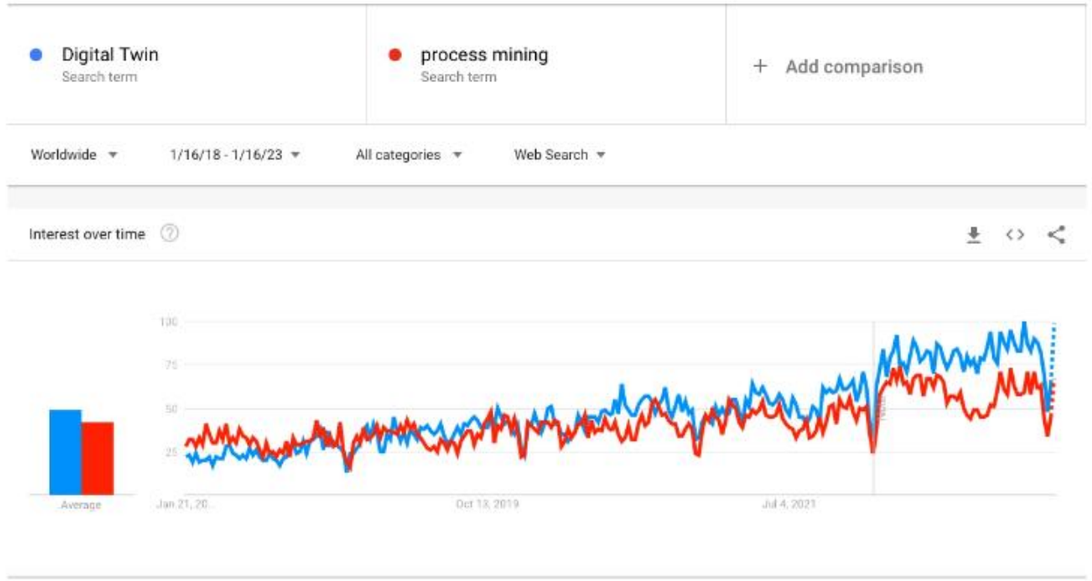
The digital twin of an organization (DTOs) allows business leaders and analysts to increase coordination across departments, identify bottlenecks, and simulate scenarios for predicting outcomes, risks and costs of changes and new adoptions.



https://research.aimultiple.com/digital-twin-of-an-organization-use-cases/

DTO in Figures





Source: Google Trends

According to a 2020 research study2, advances in AI, specifically Reinforcement Learning (* RL) will help create sustainable, competitive advantages for businesses that utilize DTO models in operation management. The agent is put in an uncertain, potentially complex environment, and starts out by performing random actions, gets rewarded or punished as a result of its actions, eventually performing logical actions to attain the operator's goal.
Other AI trends that will further advance DTO modeling include:

- Advances in computing power required to solve complex problems and achieve best case scenario.
- Advances in quantum computing which enable faster optimizations.
- Easiness of obtaining real-time data via sensors and IoT devices required for updating DTO models.

Source: https://research.aimultiple.com/digital-twin-of-an-organization/

(* RL) Reinforcement learning (RL) is a type of machine learning where no predefined suggestions are given to the agent.

Process mining vs task mining

Process mining

Process mining **starts from event data.** Input for process mining is an event log. An event log views a process from a particular angle. **Each event in the log refers to**:

1. a particular process instance (called case)
2. an activity
3. a timestamp

There may be additional event attributes referring to resources, people, costs, etc., but these are optional.

Process mining transforms this data into an event log, and then creates visualizations of the end-to-end process, along with insightful analyses. Thus, process mining uses these event data to answer a variety of **process-related questions.**

Process mining software can be used in:

- Process discovery to enable **process automation.**
- Process discovery to enable **decision automation.**
- Process optimization
- **Conformance validation**
- Process simulation
- Organizational mining

Task Mining

Task mining **is a process of collecting data from a step-by-step workflow** of the users, using detecting systems they interact with. Task mining works by:

- Capturing desktop data (clicks, scrolls, screenshots)
- Collecting words, numbers, and additional texts on users' screens using optical character recognition (OCR)
- Cluster actions into meaningful activities, therefore, giving them "labels".
- Task mining **then uses an algorithm to automatically generate an event log** for tasks within a process activity to derive an end-to-end process of the task.

DTOs represent a high-resolution digital copy of a process model that **uses the most current business data** to show companies how the complete organization is running in **almost real-time.**
This enables numerous changes to be tested in the virtual model before implementation in the real process, giving businesses a quick and risk-free way to find **the best process change initiatives** that will be relevant to the market and guarantee added value.

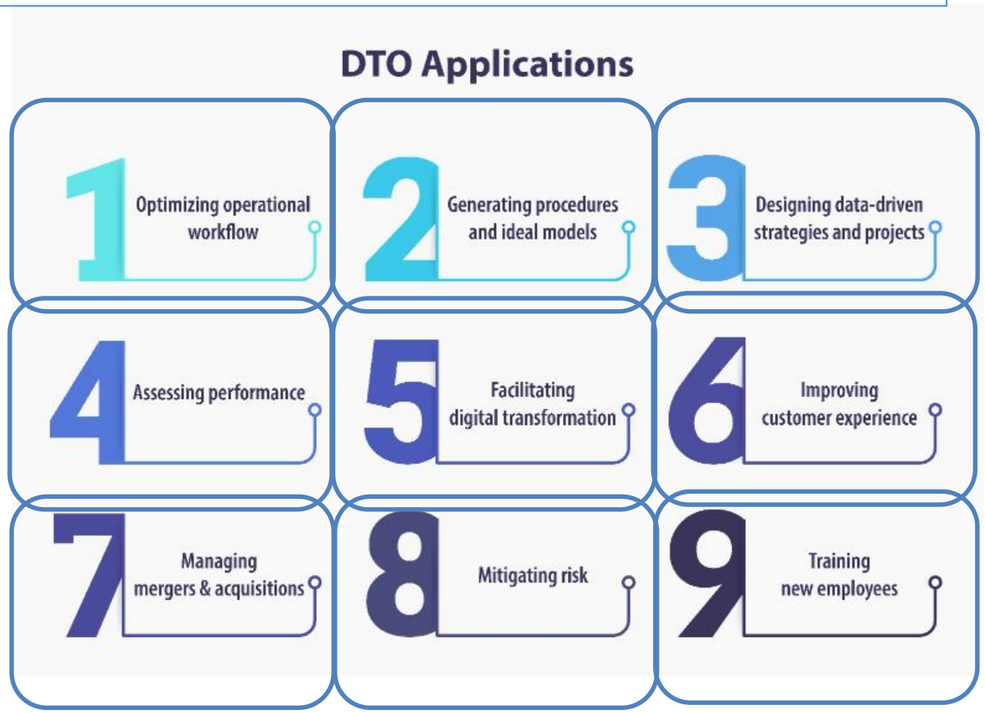
Top 9 Digital Twin of an Organization Use Cases (DTO) in ’23

DTOs **generate a dynamic digital replica** of any organization. This enables business leaders to fully understand the operations and tasks that employees execute on a daily, weekly, and monthly basis. Once the leaders better understand their operational workflow, they can **identify specific tasks and operations that require modifications.**

DTOs contain information on actual processes, so they can be helpful to **assess the performance** while **capturing the complex relations among different factors**. For example, DTOs allow managers and supervisors to compare various aspects of the business, such as finance, risk, and operation key figures for each product, area, or brand. In addition, DTOs can **increase coordination and communication** over the indicators across teams by generating a **single source of truth for understanding and measuring relevant KPIs.**

DTOs can overcome M&A challenge by allowing executives to **generate both organizations, systems or units digitally and compare** their combinations visually. The executives can simulate the M&A process to **predict potential risks and outcomes to plan** the merging and make the necessary arrangements. Also, the relevant teams and managers **can align their sub-processes and services** with the help of DTOs.

DTOs can **ease the procedure and standard adoption** period by generating a virtual replica of the extracted process flow and work instructions. Also, DTOs offer **simulation capabilities**, allowing users to run hypothetical situations **to obtain the most efficient process model**. As a result, they **enable business analysts to create more consistent and accurate process procedures** and establish the optimal ones as reference models.



DTOs can **provide insights** on Risks’ dependencies by **visualizing risk objectives, risk controls and components** of the risks such as markets, IT systems or products.

DTOs **bring more transparent, visual, and data-driven** approaches to strategy development and project management by **mapping the actual process data**. With DTOs, project managers and strategists **can identify pain points** and simulate the changes they want to implement, measure the results, **and predict possible risks** without any financial commitments. Eventually, DTOs could help businesses **allocate capabilities effectively** and adapt to changing conditions agilely.

DTOs **can facilitate the customer experience management** by allowing marketing and sales teams to identify the customer processes, interactions, and the expectations of customer segments in terms of KPIs and company goals. Based on such insights, teams can **improve customer processes to meet their expectations,** thus **increasing customer satisfaction** in the process.

DTOs can **rapid the learning period** by **serving as a training tool** during on-boarding. Newcomers can **visualize the actual and ideal processes** and procedures **to understand** process dynamics, organizational structure, and operational workflow. They **can simulate different scenarios** to detect the optimal methods. Consequently, **they can internalize the company’s operations faster than usual.**

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DTO Applications

Digital transformation is essential **to increase effectiveness and improve customer relations.** However, digital transformation is a costly, risky and **unclear journey** with demanding financial strategy planning.

DTOs can help develop a financial strategy and digital transformation projects by allowing analysts and executives to **visualize the entire organization and simulate the transformation before implementing any changes.**

With DTOs, business analysts **can detect the processes requiring RPA, orchestration**, or other **automation technologies.** Business analysts and leaders can run hypothetical cases with processes that they want to automate. With DTOs, they **can identify the conditions shaping digitization** and **predict the impacts** and risks associated with undertaking a certain automation project. As a result**, they can obtain long-term benefits and ROI and develop a digital transformation project.** That is why a DTO is considered an automation enabler together with process mining and task mining.

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COVID – 19 Knowledge Graph

for the Spanish Care

Solution Steps

Ingestion at scale

- Content in documents are characterized (Annotated) so that AI Algorithms can extract hidden elements of data.
- This structured data can be use for:
  - Deep analysis
  - As input for Watson Processing Service to generate Knowledge Graphs

Knowledge Graph Generation

- Structured data (data bases / Corpus Conversion Services' output) is used.
- Entities and relationships across different elements are used to generate Knowledge Graphs

Deep Querying

- Deep search capabilities allow users to build complex query workflows on the knowledge graph in order to obtain specific answers from the literature.

Solution Steps: Ingestion at scale (I/III)

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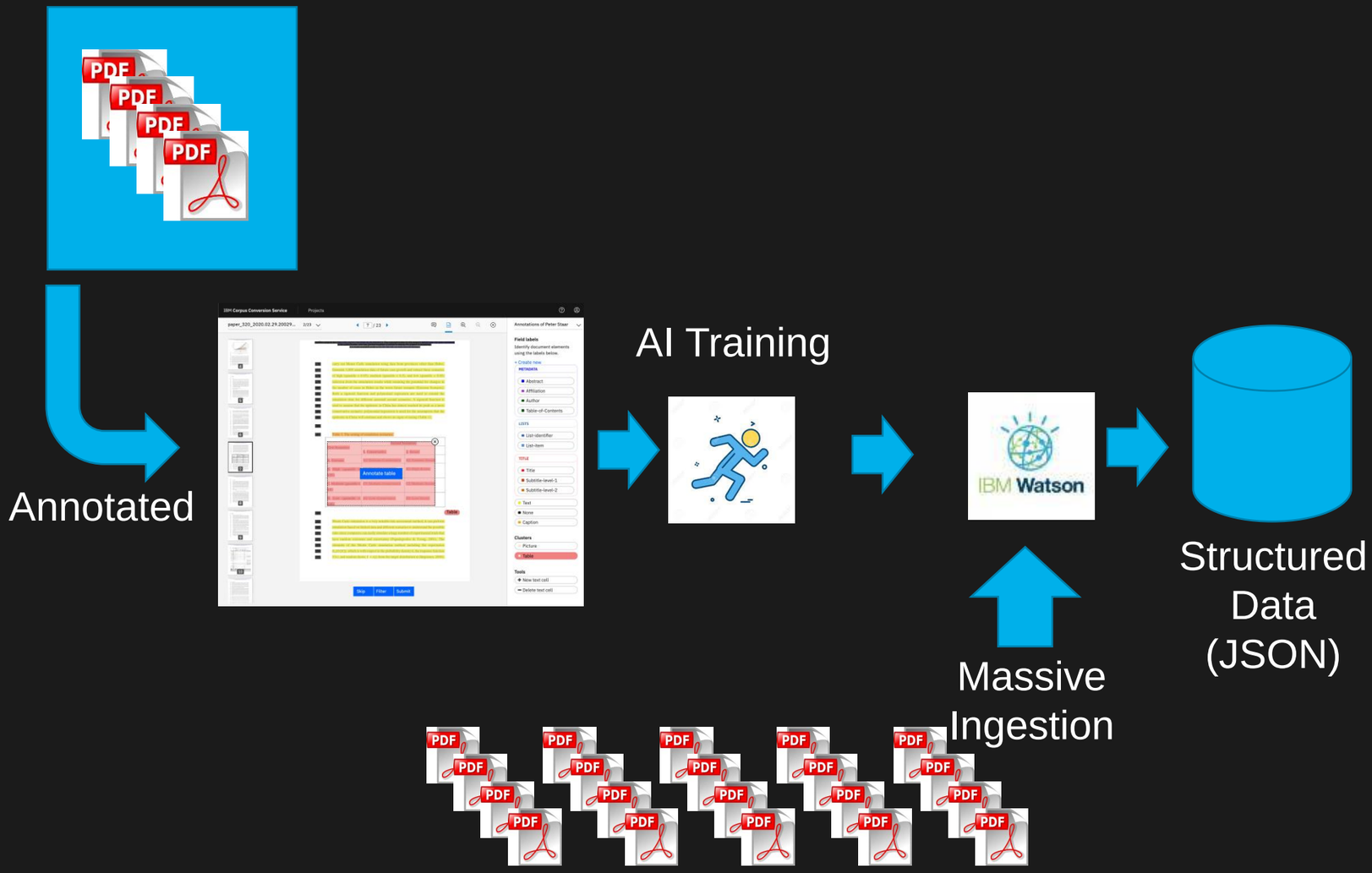
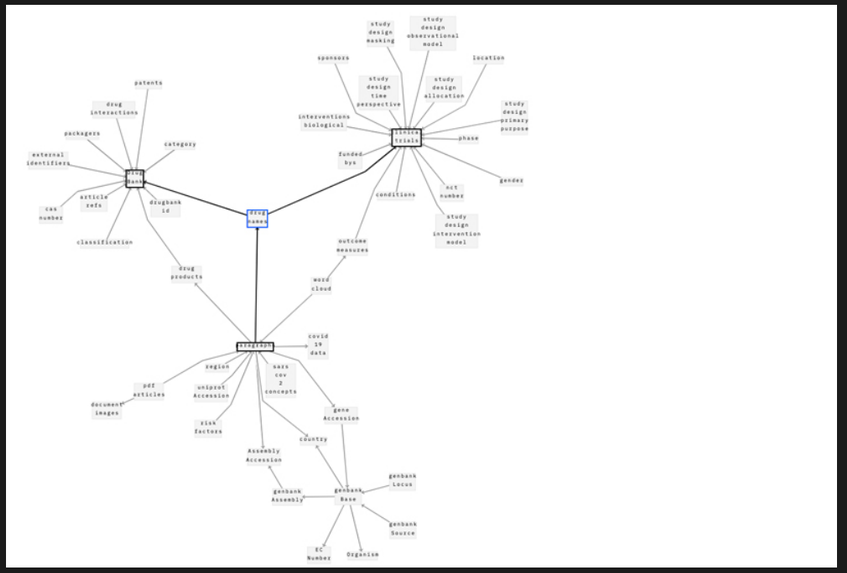


Solution Steps: Knowledge Graph Generation (II/III)

Knowledge Graph Generation

- Structured data (data bases / Corpus Conversion Services' output) is used.
- Entities and relationships across different elements are used to generate Knowledge Graphs

Structured Data (JSON)



The knowledge graph incorporates data from various sources, both unstructured (e.g. CORD-19 documents and converted PDF files) as well as structured (e.g. Drugbank, Genbank and clinical trials). The current knowledge graph contains approximately 4 million nodes and 50 million edges.
The knowledge graph will be updated and extended regularly to incorporate newly reported data.

Solution Steps: Deep Querying (III/III)

Deep Querying

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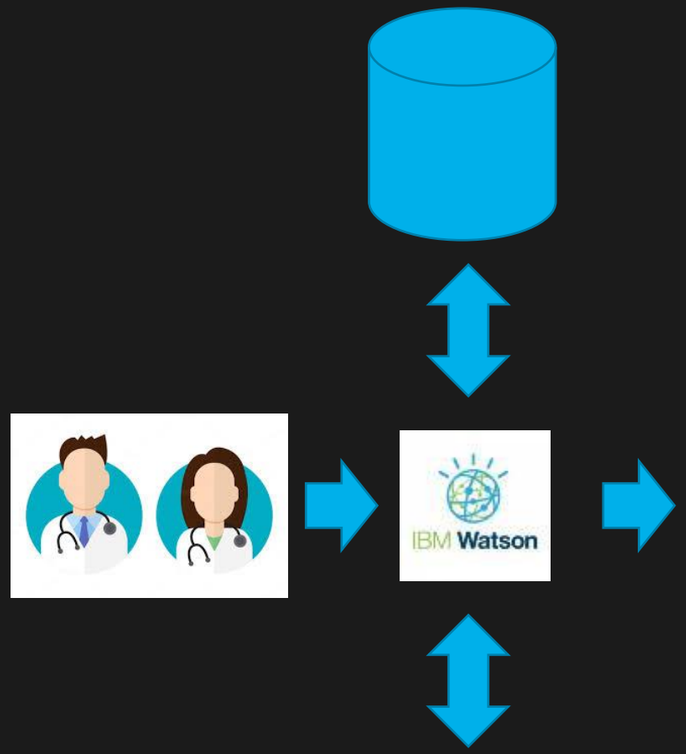
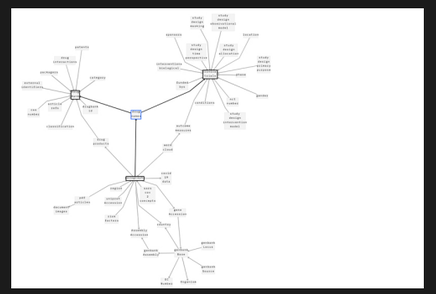
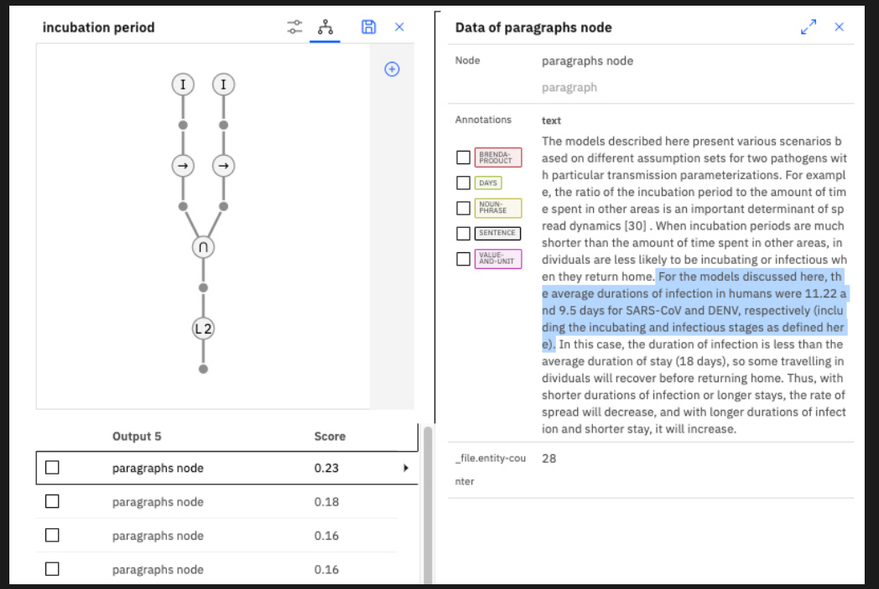


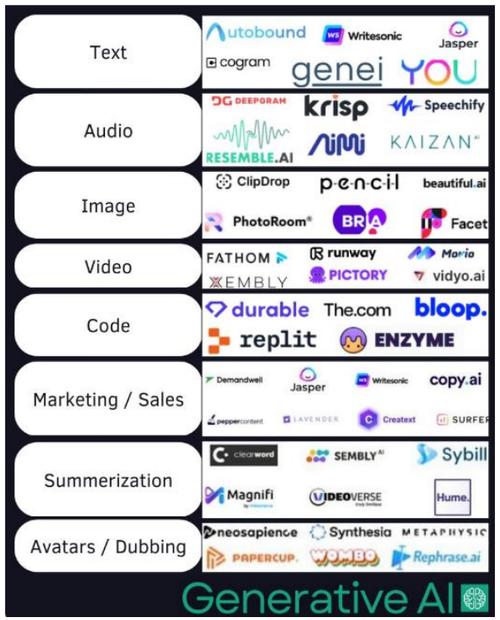


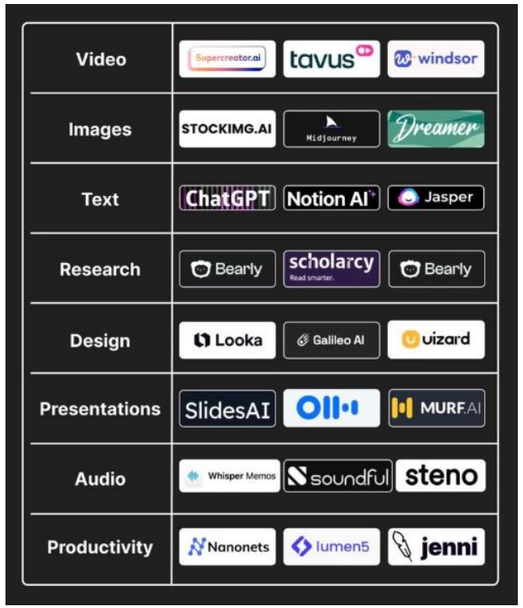


AI in the SSNN today…

More than 100 Awesome AI Tools have been released in the last month!
AI tools that are much more personalized to your tasks than ChatGPT.

For now, AI will not replace you, but someone comfortable using AI will!





"The critical skill in the 21st-century workplace is going to be to collaborate with the technologies that are becoming such a big and costly part of our daily working lives."

So let's all share a bit of humanity towards the technologies and the softwares and the algorithms and the robots who we work with, because we will all be the better for it.

"Which are the technologies that I'll be taking out for a coffee?"

https://www.youtube.com/watch?v=mnRlB3G9fDU

https://www.linkedin.com/posts/ted-conferences_the-critical-skill-in-the-21st-century-workplace-ugcPost-7051218870820331520-QThK/?utm_source=share&utm_medium=member_android

De-digitalization?

Coche analógico

Desdigitalización del automóvil: las marcas que vuelven a hacer coches como los de antes

Qué ocurriría si las tendencias del automóvil indicaran que los compradores de coches miran al pasado con añoranza abrumados por la tecnología y el precio de los automóviles actuales

Iván Mingo

08/04/2023- Actualizada 04:30

On the one hand, the exorbitant price of current cars and on the other, the complexity of their handling **have caused many buyers to look longingly at their old analogue cars**, which despite belonging to another era, perfectly solved their mobility needs, at a much more reasonable price.

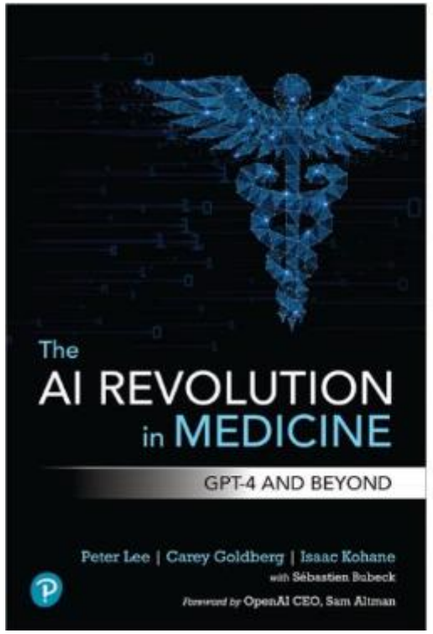
On the one hand, their price makes them more accessible than the new ones and on the other hand they satisfy the needs of many **buyers who do not feel comfortable with the current cars, which have become true spaceships.**

Volkswagen, Kia and Hyundai **have announced their commitment to physical buttons inside cars,** which means that they will reduce the prominence of the huge screen to make room for traditional buttons that allow the main automatisms of the car to be operated, such as is air conditioning or radio, *without the need to have a master's degree in space engineering.*

Volkswagen has also announced its resignation from touch and haptic controls, those virtual strips on the dashboard that complicate actions as simple as raising or lowering the volume of the radio or raising the cabin temperature to infinity.

Despite the efforts of the manufacturers so that voice control becomes the great protagonist of car handling, **the truth is that drivers do not use it on a day-to-day basis and continue to bet on traditional roulette wheels.**

Different studies support this thesis, such as one from the Swedish publication Bilagare, which verified **the time it took us and the difficulty of performing simple actions in analog cars from 2005 and in current ones:** **the result was an overwhelming victory for those of 2005 ,** represented by a Volvo V70, in which it was possible to carry out a sequence of simple actions such as raising the radio or **lowering a window in just 10 seconds, compared to 31 for a BMW iX.**



The new version of ChatGPT 4 has passed the exams for practicing medicine in the US with flying colors and has been able to diagnose in seconds a pathology that occurs once in every 100,000 cases.
(Source: Business Insider Tech - Hilary Brueck)

Dr. Isaac Kohane, who is both a computer engineer and a physician (Professor in Pediatrics, Harvard Medical School, he is also a Research Affiliate at the Massachusetts Institute of Technology Laboratory for Computer Science), decided to test GPT-4 with the aim of to see how the latest OpenAI artificial intelligence model worked in the world of medicine.

-"I am totally stunned. He is better than many doctors," he says in the book he has just published: "The AI Revolution in Medicine", co-authored by journalist Carey Goldberg and Microsoft research vice president Peter Lee.

-"It is clear that GPT4 has the potential to free up valuable time and resources in hospitals but we have to think about what a world with machines that can outperform us would look like and reflect on how we want that world to work."

I have come to read lately from AI experts that "they are just stupid stochastic parrots that spout correlated words without understanding what they are saying". But if it turns out that those stupid parrots far outnumber many of the smartest humans on the planet who have taken many years, a lot of effort, and a lot of brainpower to reach their professional achievements, what does that say about us humans?

Why is it so hard for us to accept that we are going to become irrelevant?

https://www-lavanguardia-com.cdn.ampproject.org/c/s/www.lavanguardia.com/tecnologia/20230402/8871425/edad-inteligencia-artificial-comenzado.amp.html

https://www.expansion.com/especiales/2023/03/30/642307b6e5fdea4a0b8b4579.html

"What would you say to a father with a sick child?" The model wrote a very thoughtful response, probably better than most of us here would have given. It was an amazing experience.

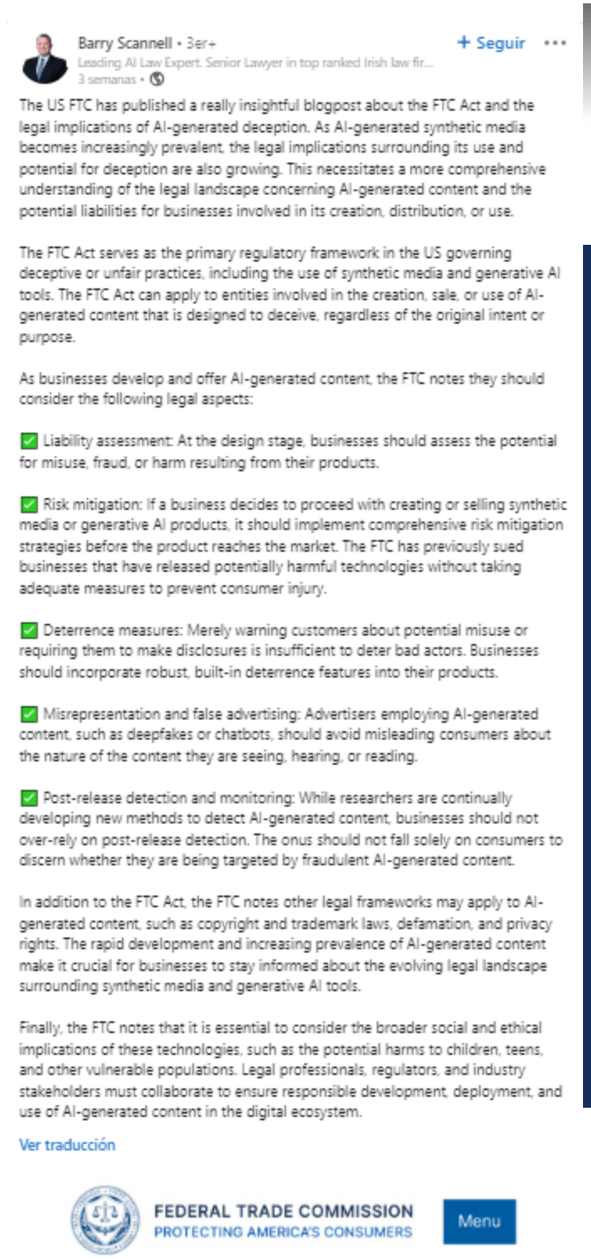
MODELOS DE LENGUAJE NATURAL

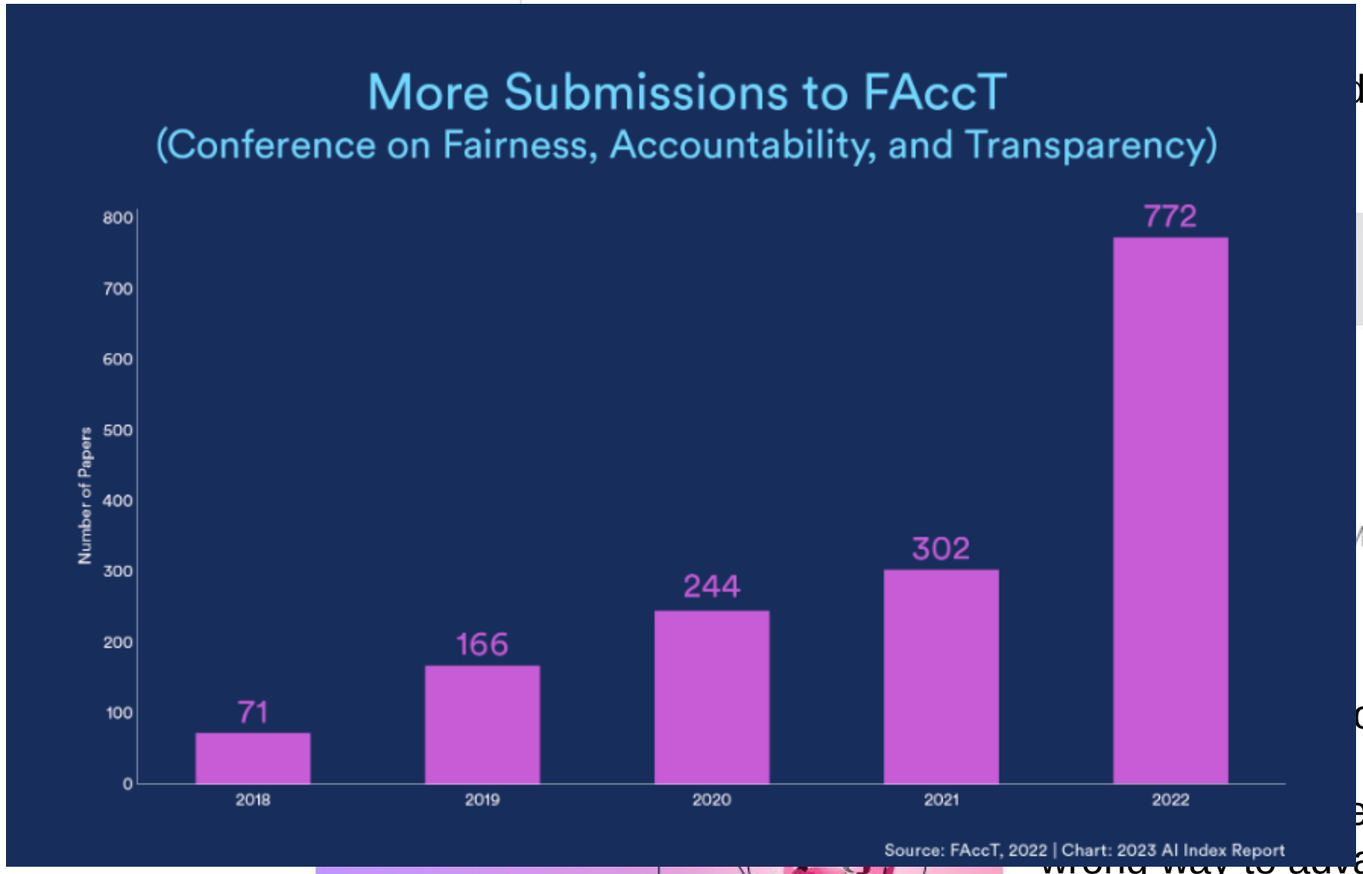
DATOS RELEVANTES Y DE CALIDAD

INTELIGENCIA ARTIFICIAL DOCUMENTAL

SOSTENIBILIDAD Y CULTURA DE DATOS

AI & Ethics





blogpost about the FTC
d deception.

Dario Gil

M Senior Vice President and
Director of Research.

ocused on the ethical
Uncontrolled, broad
ecially on the public, are the
ance any category of
innovation and particularly one as powerful
as artificial intelligence.

IBM

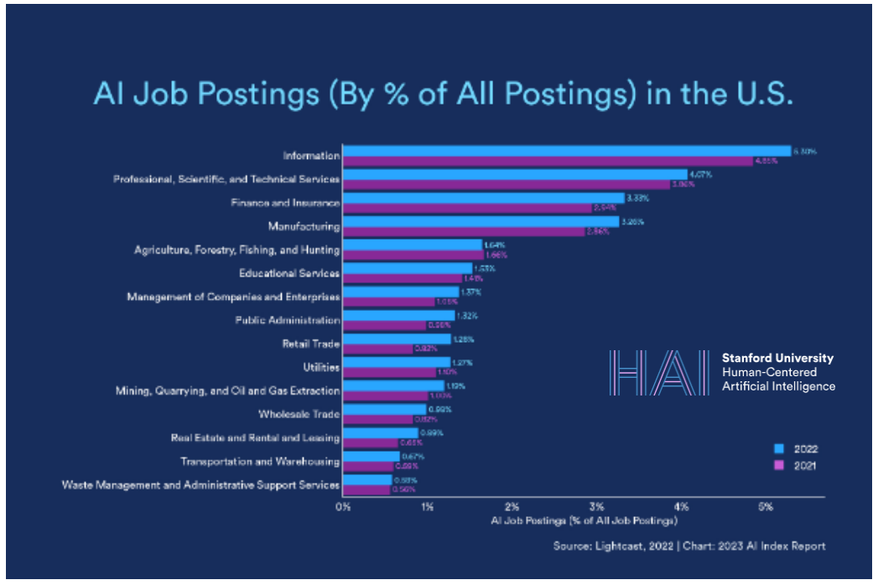
Video Killed the Radio Star…

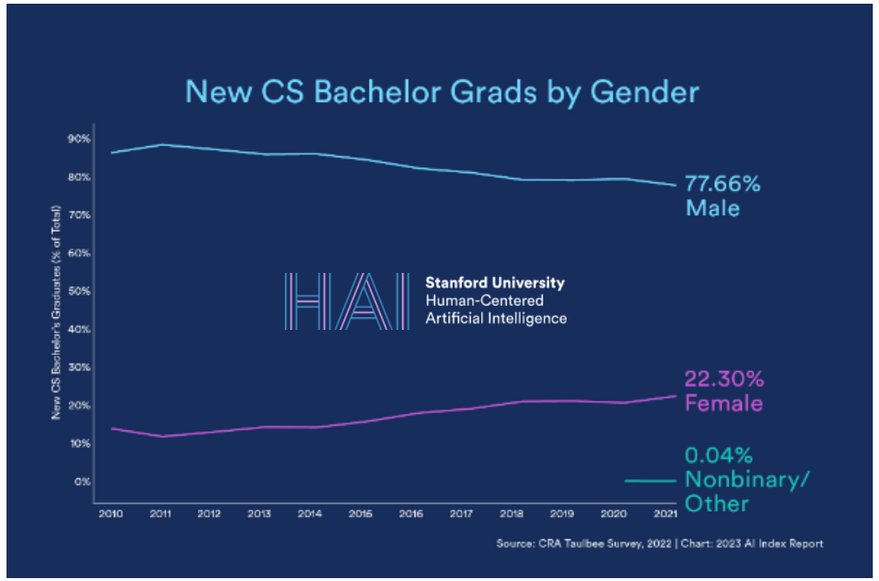
El metaverso se desinfla frente a la Inteligencia Artificial, según los movimientos de Disney, Meta y Microsoft

- Las grandes compañías cambian su hoja de ruta y apuestan por soluciones de beneficio inmediato
- Los líderes en entretenimiento y tecnológicos recortan empleos en las divisiones del metaverso

https://www.reasonwhy.es/actualidad/metaverso-desinfla-frente-inteligencia-artificial-segun-movimientos-disney-meta-microsoft

Disney liquidates the metaverse division
The most notable recent case is that of Disney, which has eliminated the business unit that was dedicated to the metaverse, where 50 people work to explore "storytelling and next-generation consumer experiences."





https://hai.stanford.edu/news/2023-state-ai-14-charts?mod=djemCIO&utm_content=buffer6b98b&utm_medium=social&utm_source=linkedin.com&utm_campaign=buffer

Thank You

Applications of AI in a “Real world”

June 17th, 2021

SENER ENGINEERING S.A.

Juan Ramón Gutiérrez Villar
Consulting Service Line Leader
Juanramon.gutierrrez@sener.es