



1. Etymology
2. Information theory approach
3. As sensory input
4. As representation and complexity
5. As an influence which leads to a transformation
6. As a property in physics
7. The application of information study
8. Technologically induced information
- 9.



techvshuman.com



gerd.cloud



gerdtube.com



@gleonhard



futuristgerd.com

10 THINGS YOU NEED TO KNOW ABOUT THE FUTURE AND WHAT THEY MEAN FOR YOUR INDUSTRY

Information is that which informs. In other words, it is the answer to a question of some kind. It is thus related to data and knowledge, as data represents values attributed to parameters, and knowledge comprises understanding of real things or abstract concepts.[1] As it requires data, the information's existence is not necessarily coupled to its being beyond an event horizon. For example, while in the case of knowledge, the information requires a cognitive organism.[2]

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At its most fundamental level, information is not predication of cause and effect within a system.[3] Information is conveyed either as the content of a message or through direct or indirect observation of anything that which is perceived.

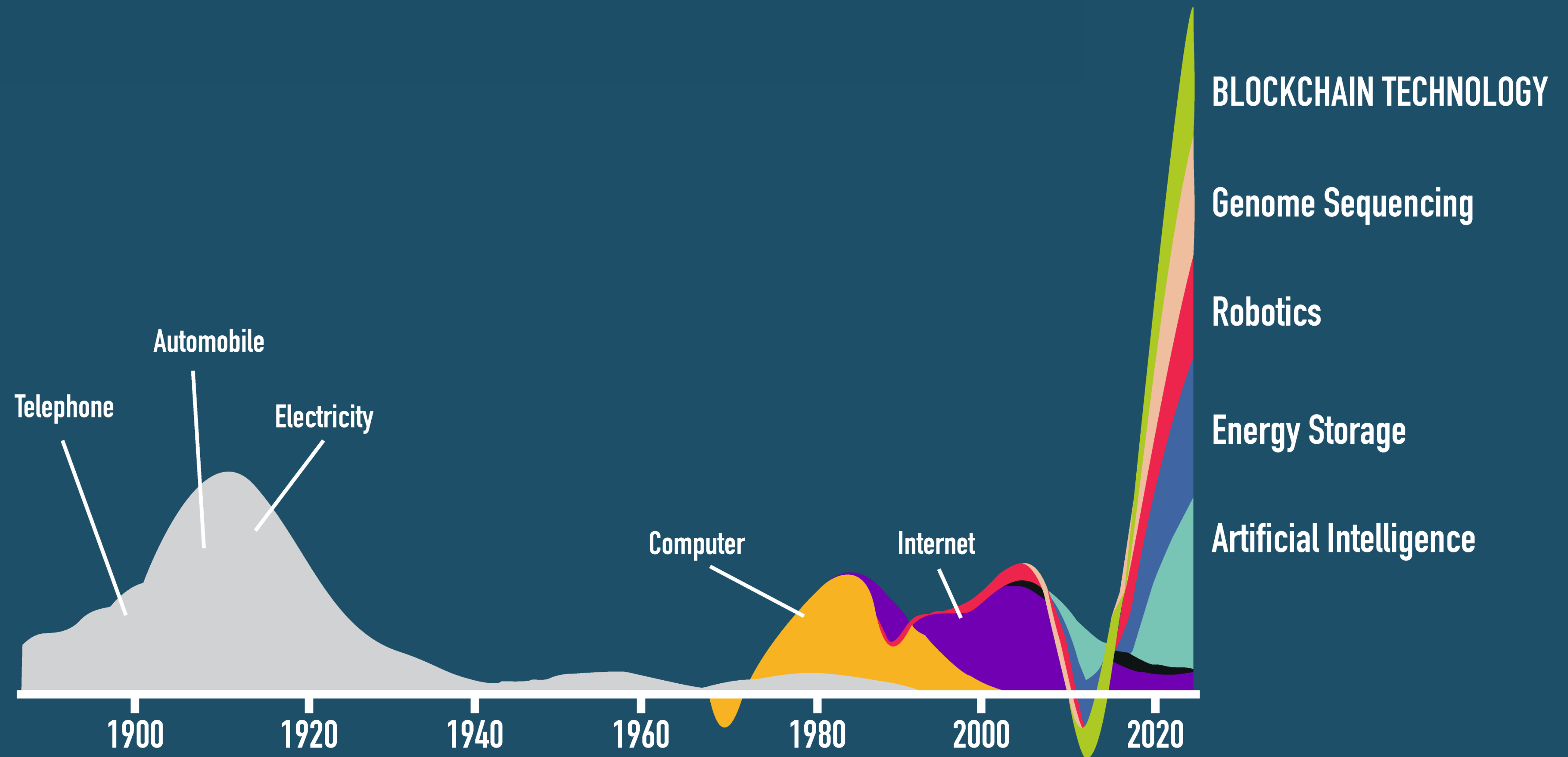
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Our world is going to change more in the next 20 years than the previous 300 years!



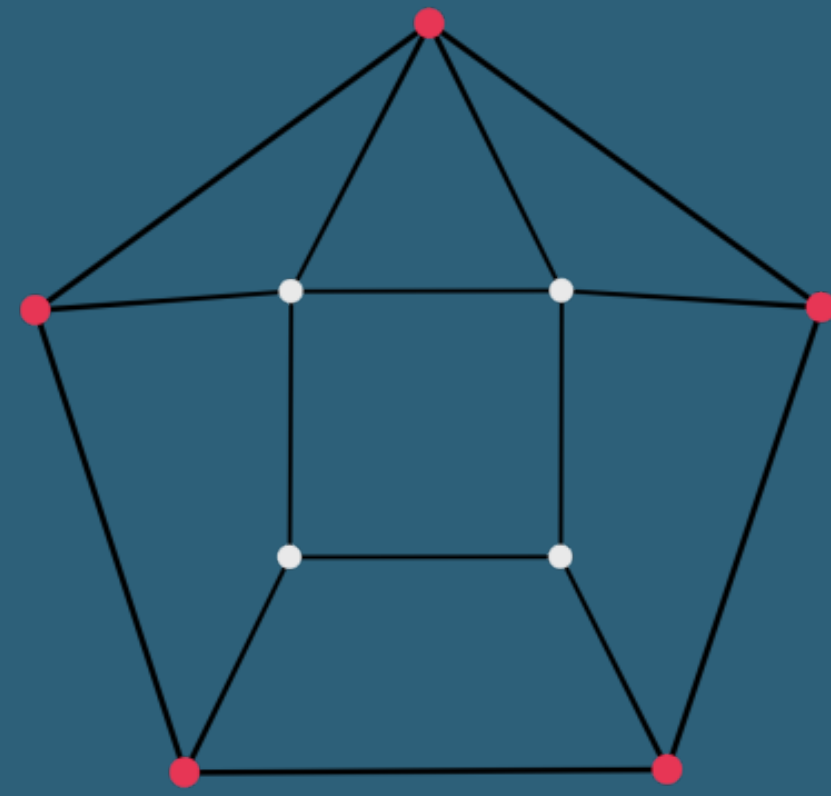
The biggest technological transformation in human history



Gradually, then suddenly

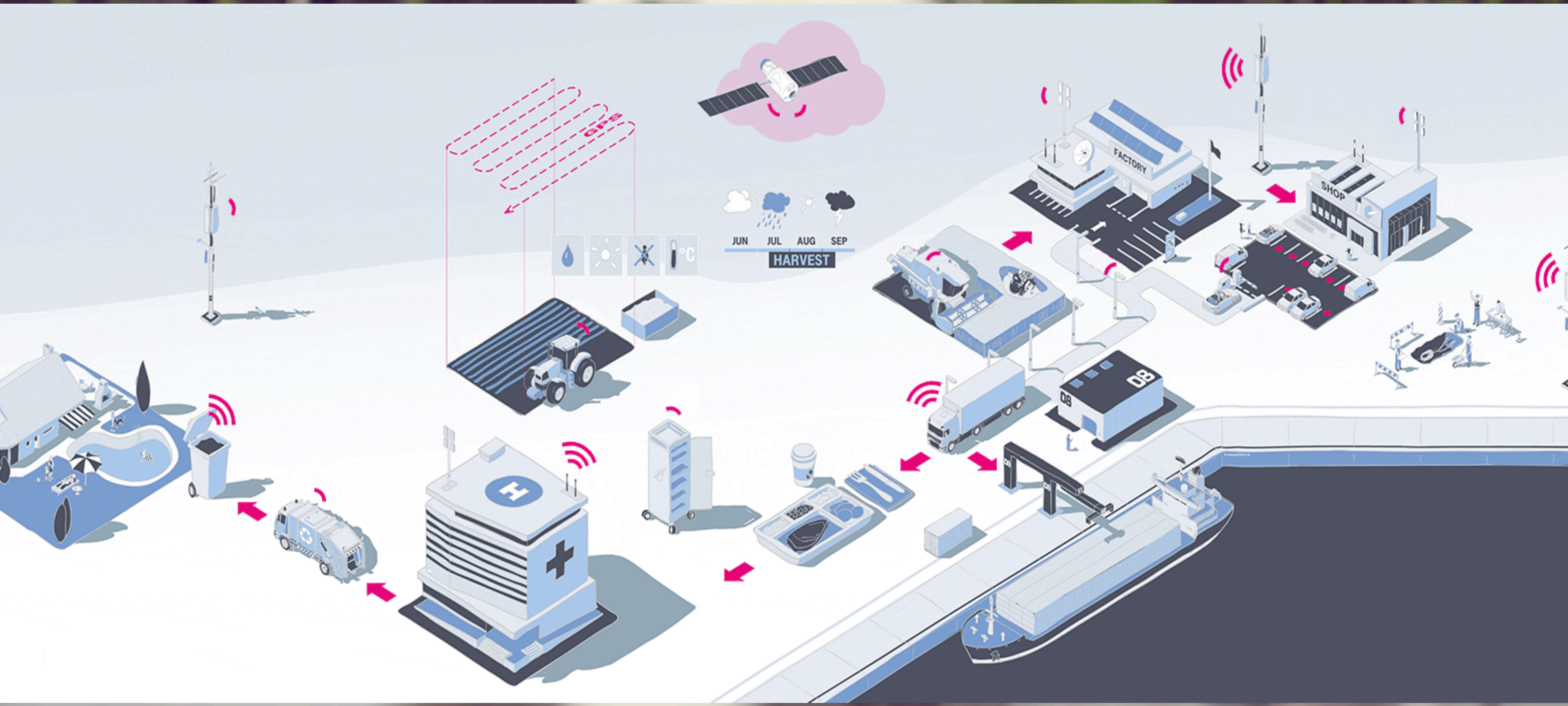
e^x

EXPONENTIAL



COMBINATORIAL

1 2 **4** 8 16 32 64 128 256 512

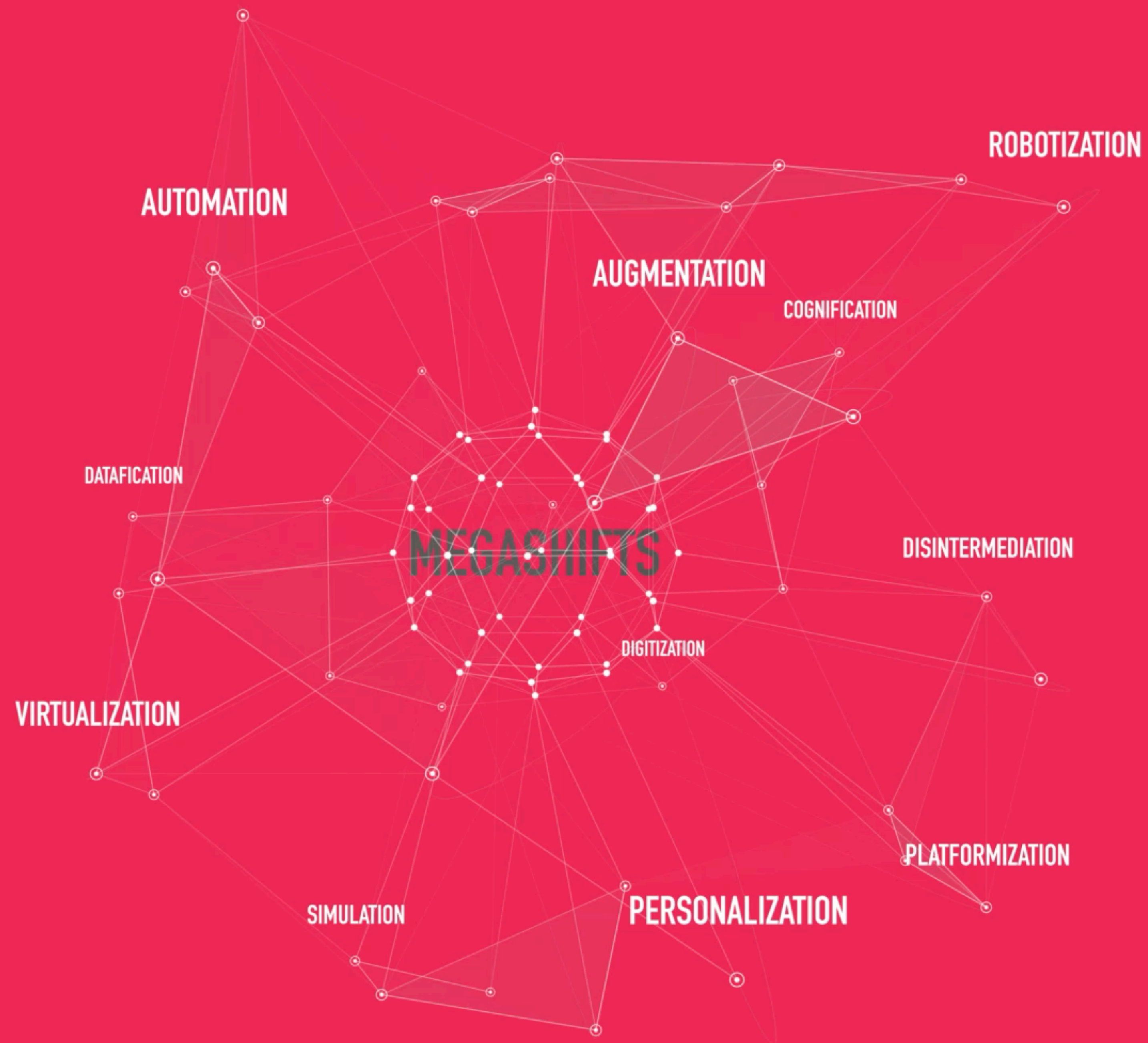


Science fiction is increasingly becoming science fact

VESSEL RECONFIGURATION DURING PORT TIME



- Flexible power configuration,
diesel, gas and battery packages



COGNIFICATION

DATAFICATION

AUTOMATION

COGNIFICATION

DATAFICATION

MEGASHIFTS

VIRTUALIZATION

VIRTUALIZATION

SIMULATION



AUTOMATION

ROBOTIZATION

AUGMENTATION

'Business as usual' is dead or dying!



'Business as usual' is dead or dying!



MEMPHIS
M E A T S



‘Business as usual’ is dead or dying!

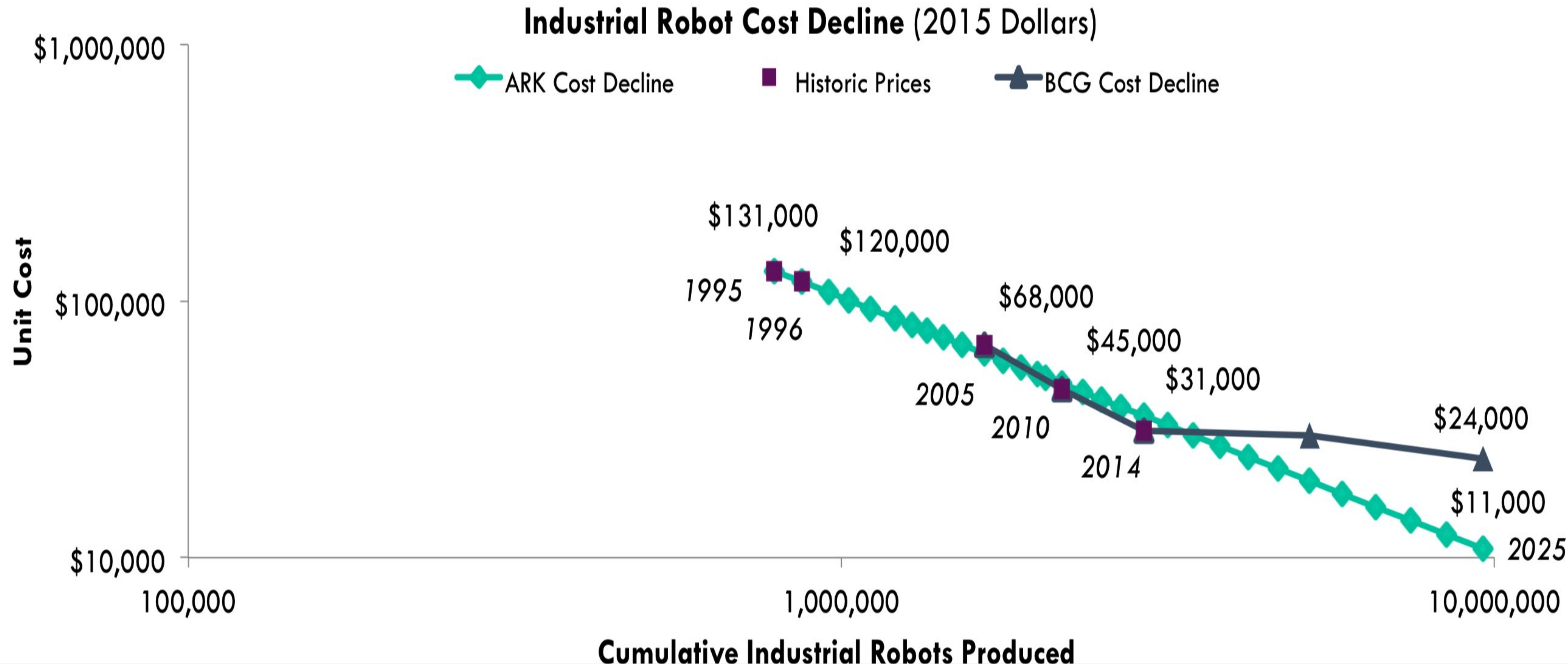
Forget Package Delivery Drones – Here Come Autonomous Containers

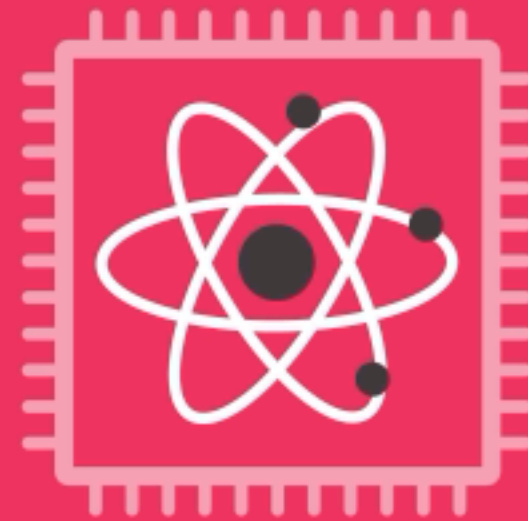
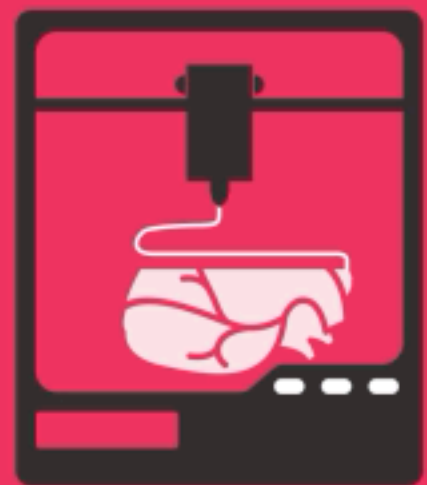
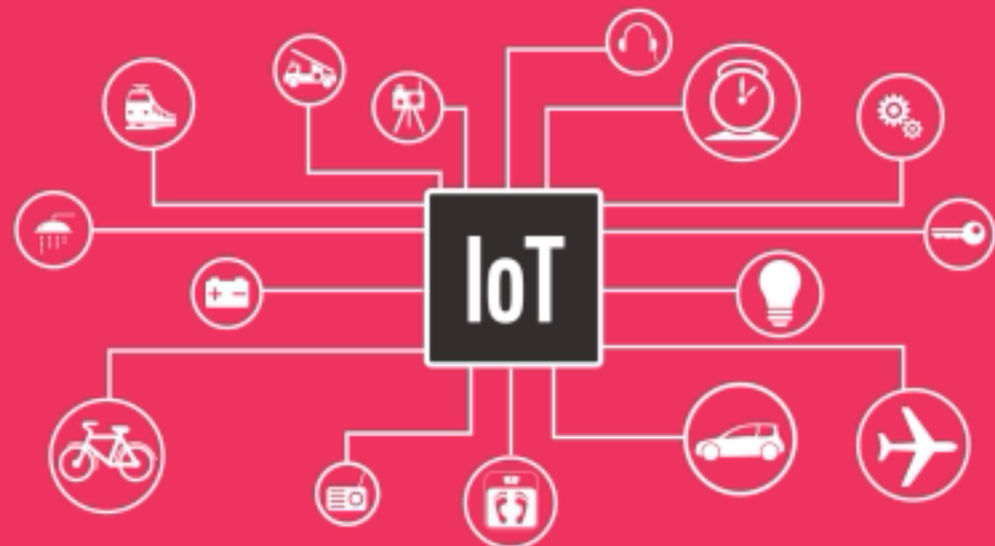
April 25, 2019



'Business as usual' is dead or dying!

Industrial robots are continuing to decline in cost, expanding the addressable market.





The Game Changers

DATA every-where/thing

CLOUD everything

SMART everything (AI, IA)

CONNECTED everything (IoT)

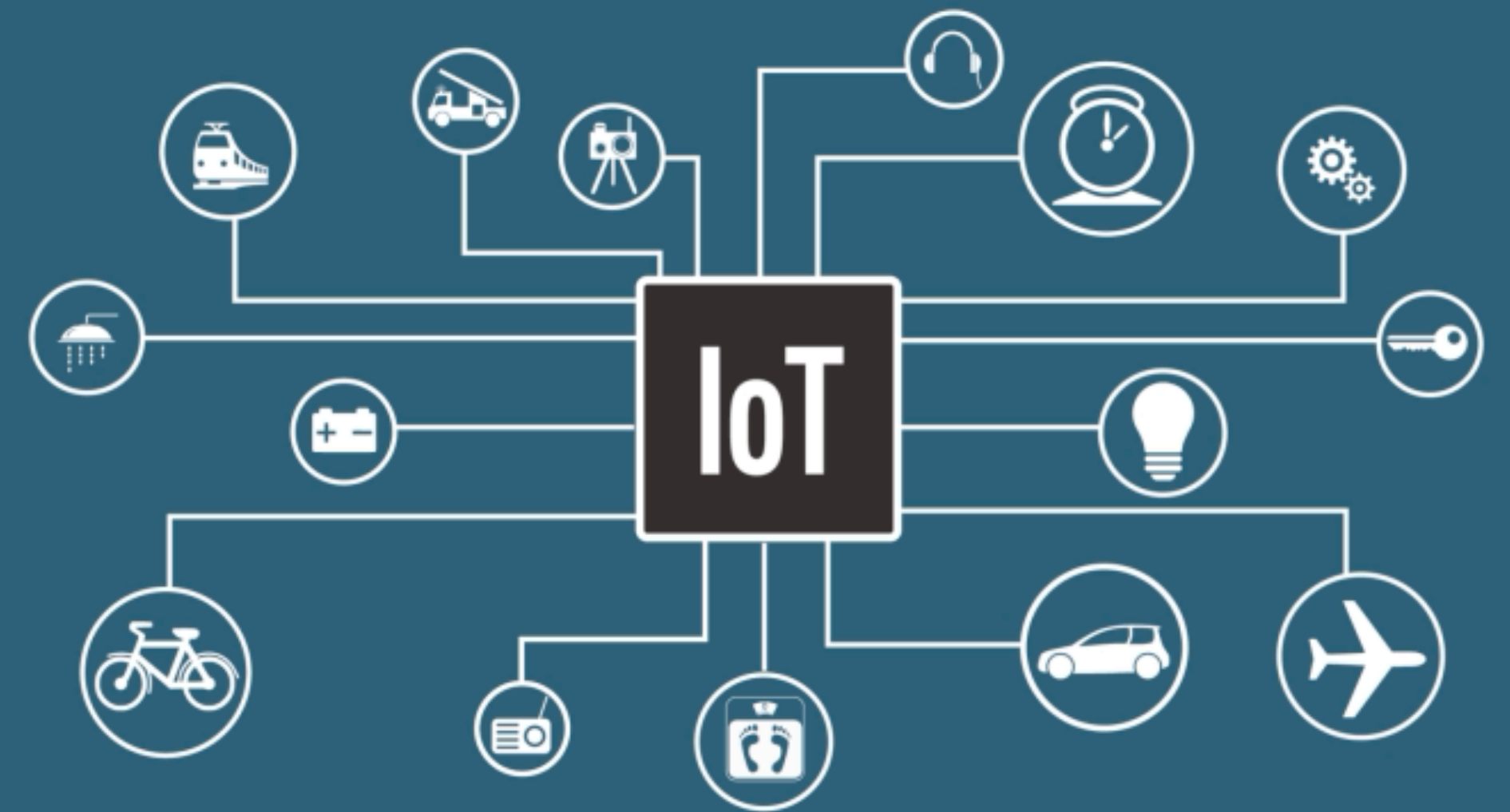
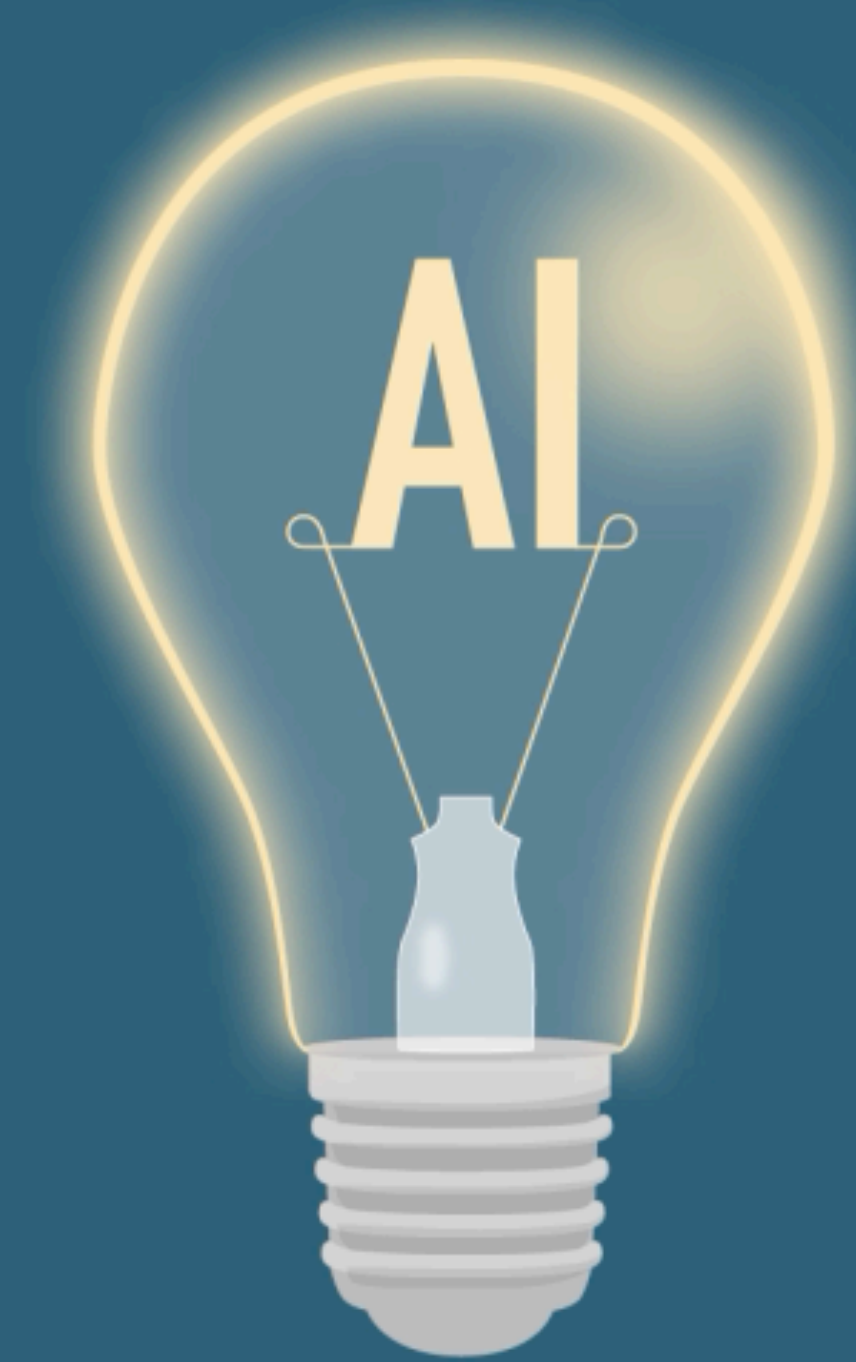
COMPUTE anything (Quantum)

MAKE anything (3D printing)

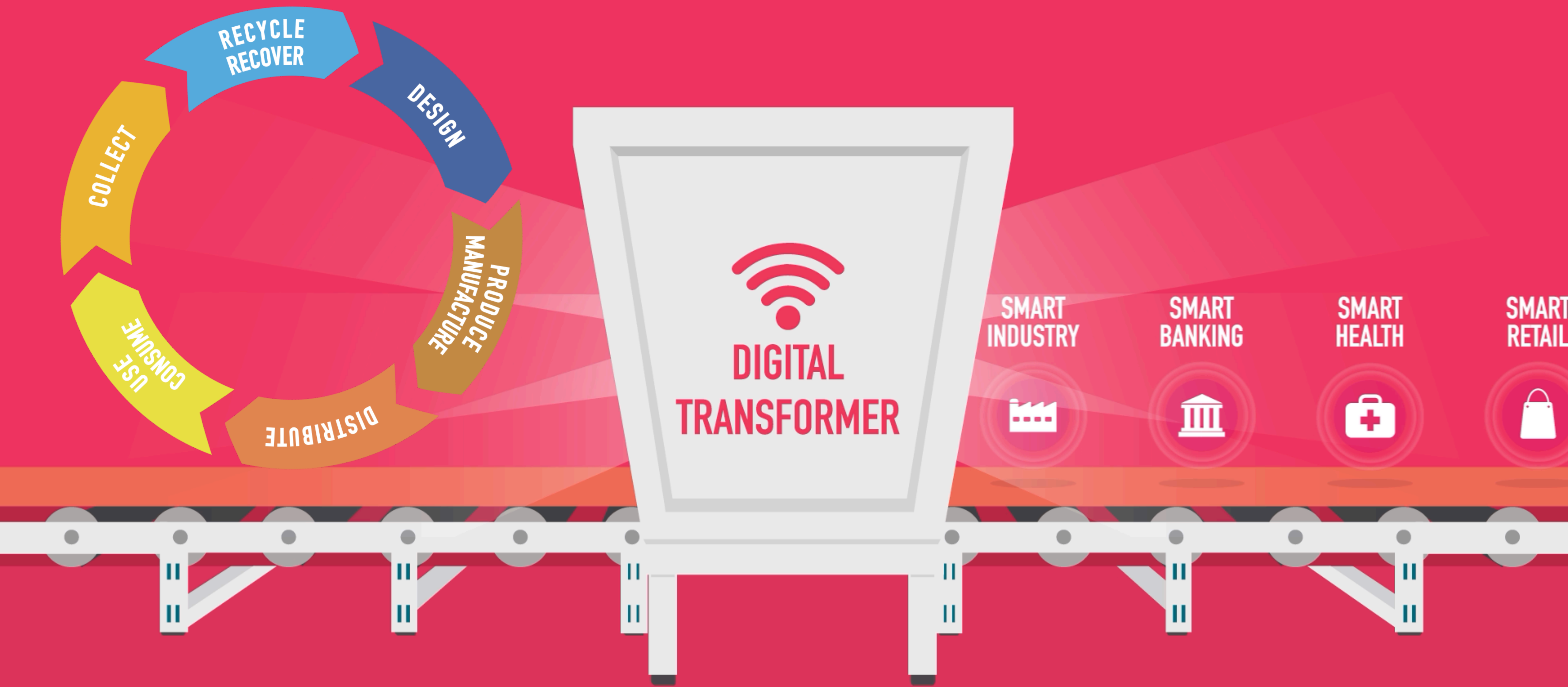
TRANSACT anything (Blockchain)

SEE everything (VR / AR / MR)

DATA IS THE NEW OIL AI IS THE NEW ELECTRICITY THE IOT IS THE NEW NERVOUS SYSTEM



Connected Everything | Smart everything | Sustainable everything

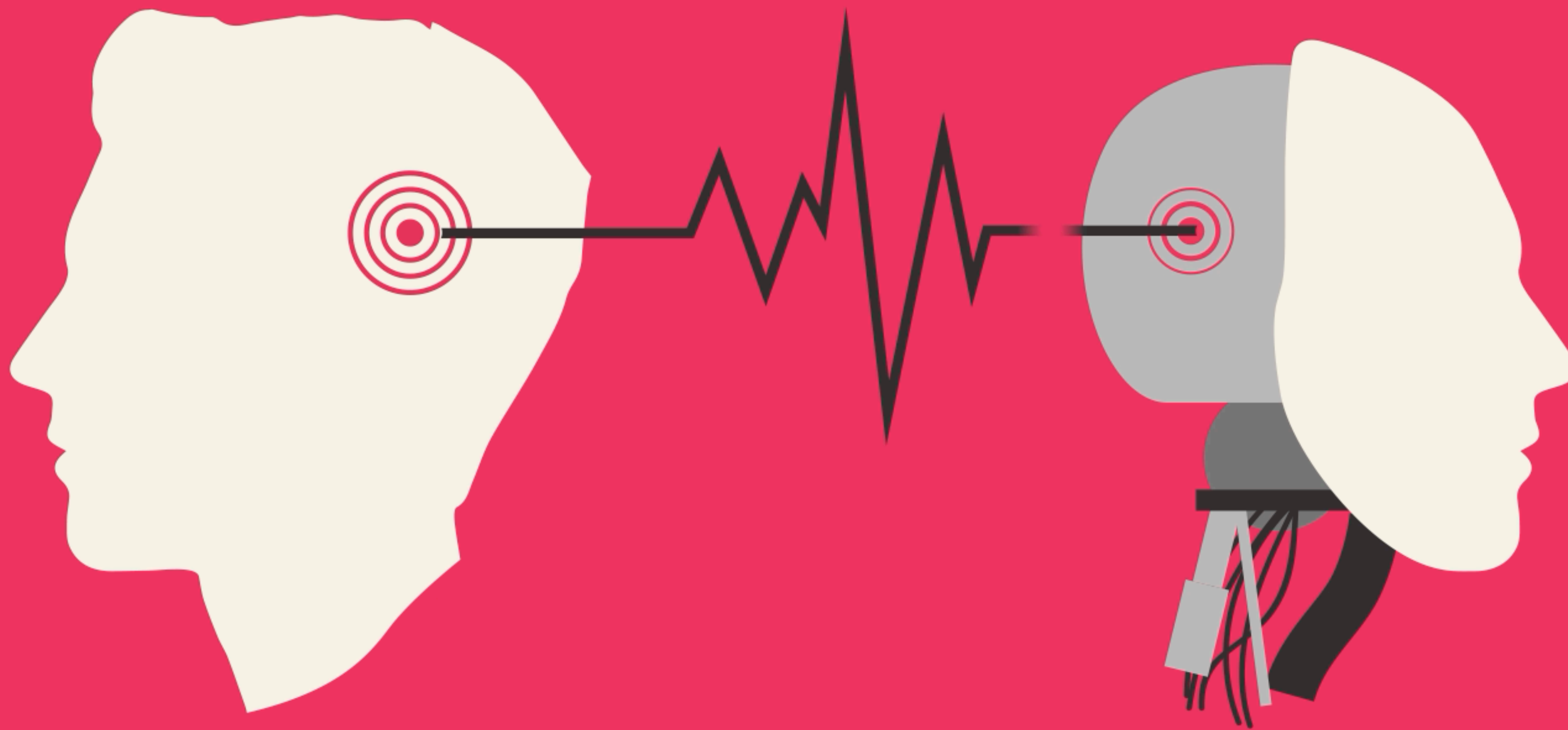


Connected Everything | Smart everything



IBM Services

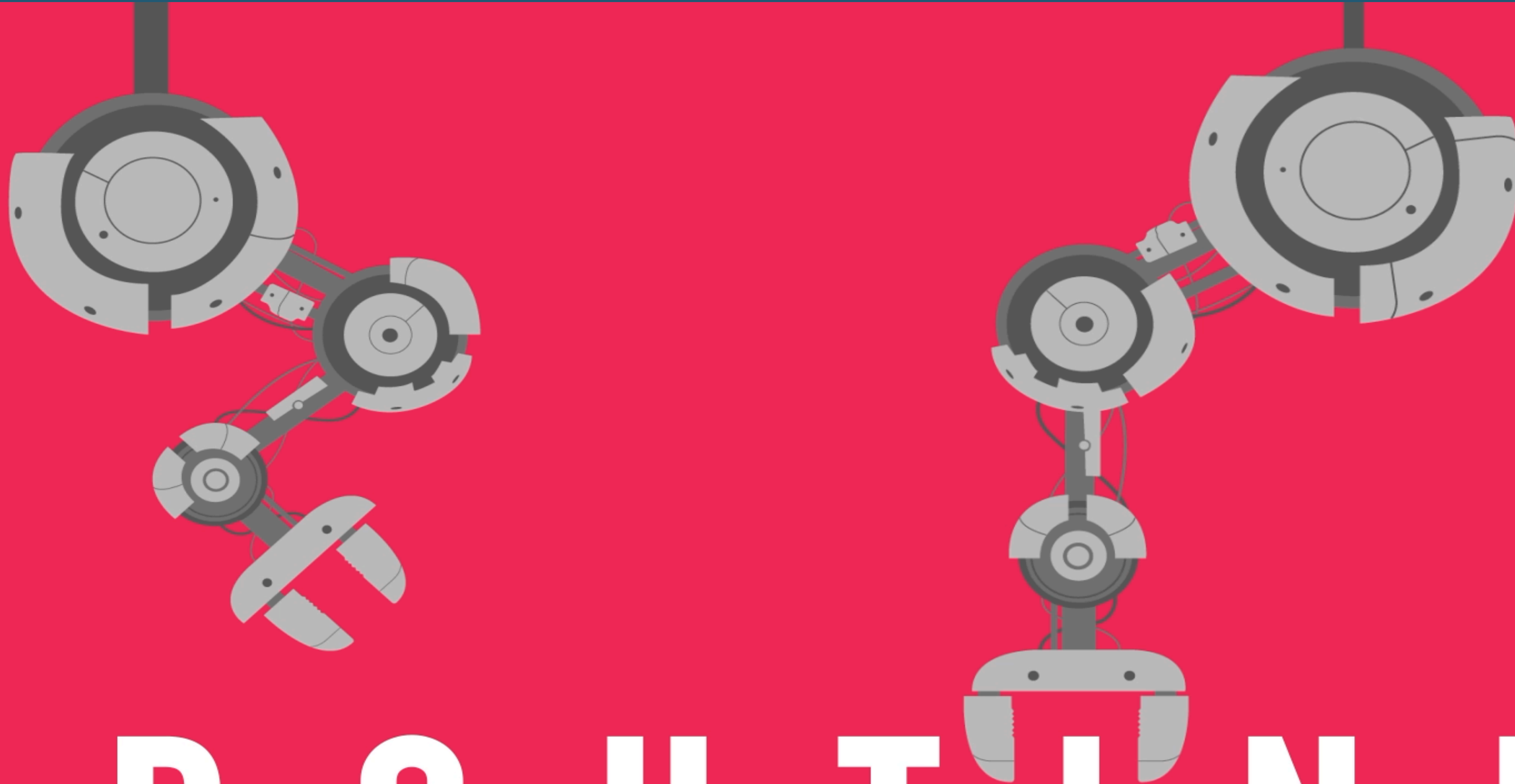
Humanity Technology



Humanity Technology



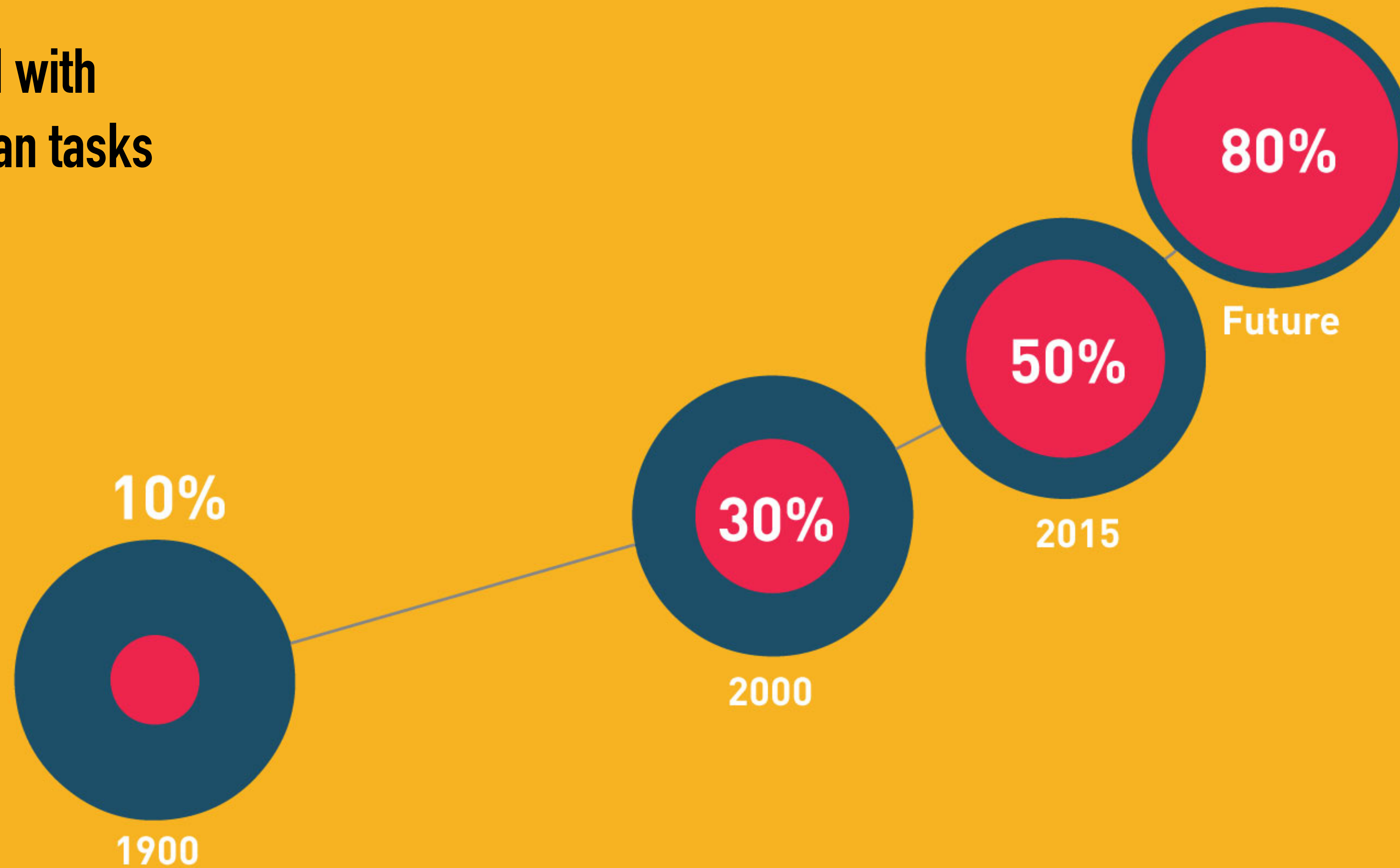
Anything that can be digitized or automated, will be: the END OF ROUTINE



ROUTINE

The End of Routine does NOT mean the end of human work!

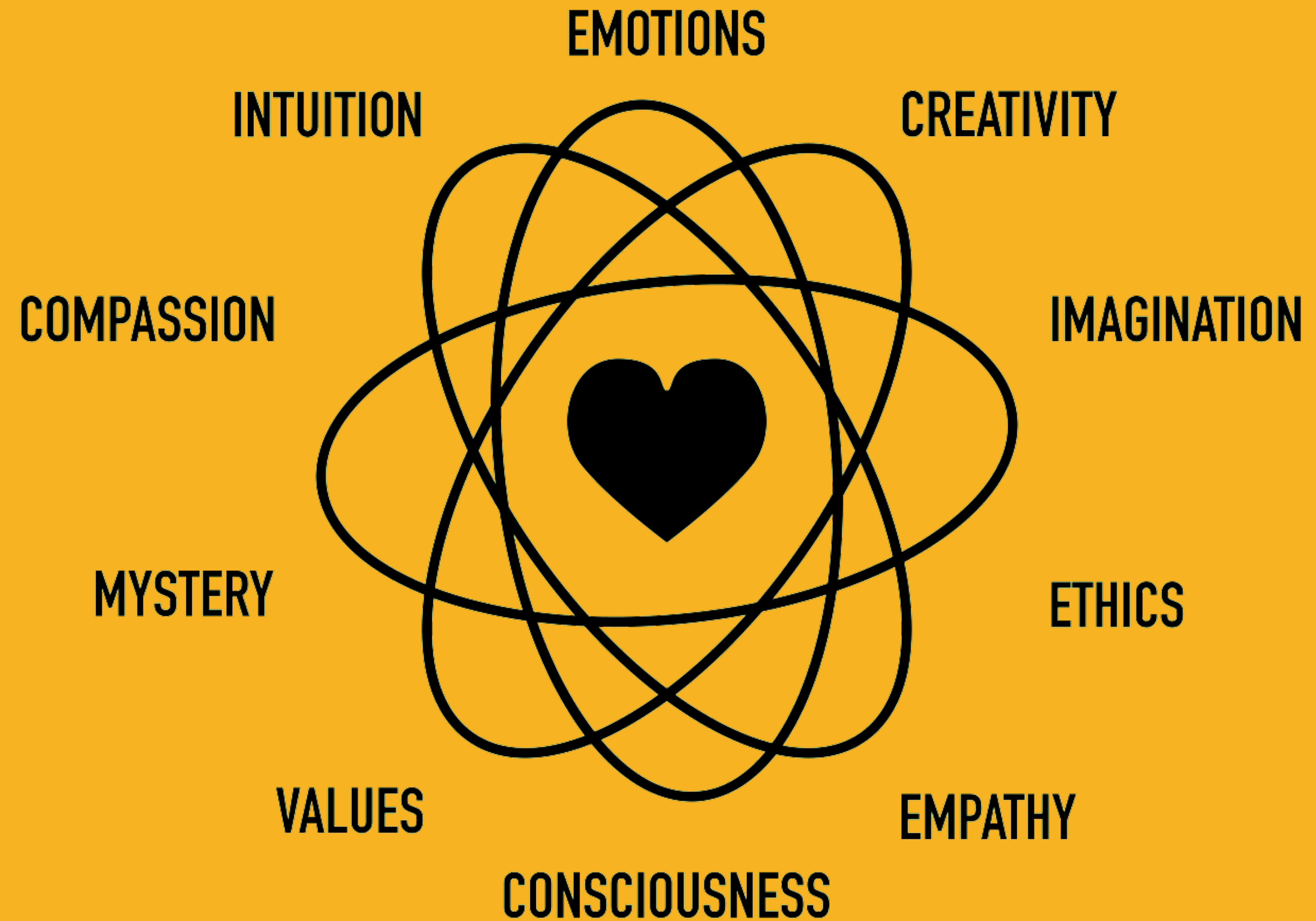
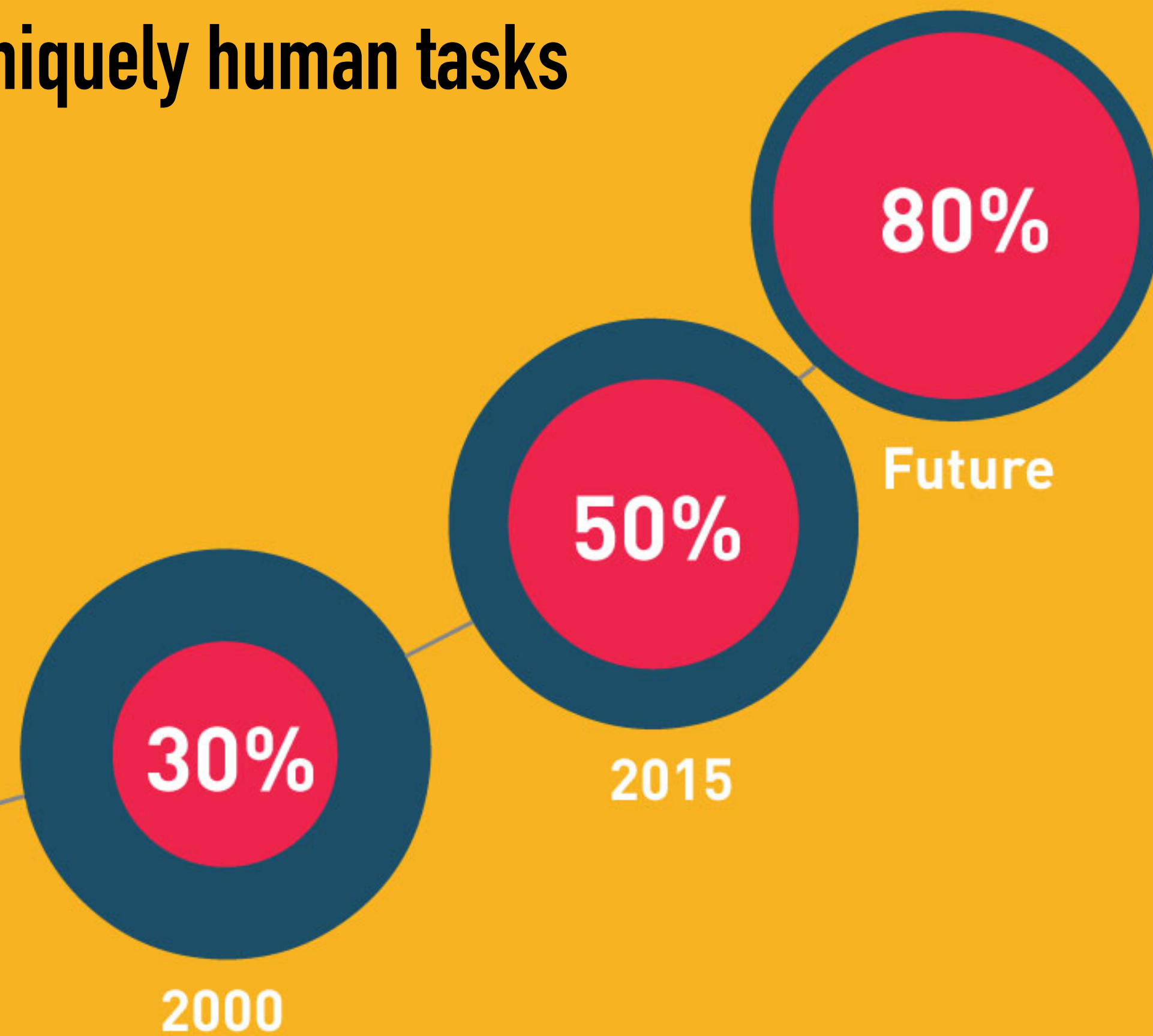
Time spend with
uniquely human tasks



Sources: Vanguard calculations based on data from McKinsey & Company, US Bureau of Labor Statistics, and US Department of Labor O*NET OnLine

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Time spend with
uniquely human tasks



PURPOSE

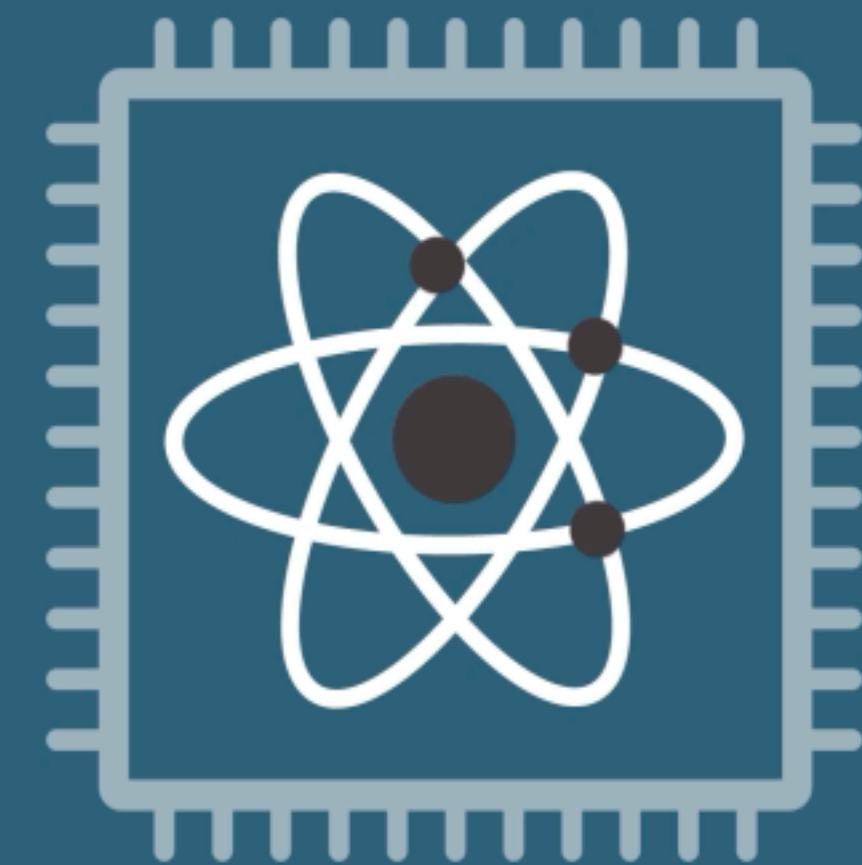
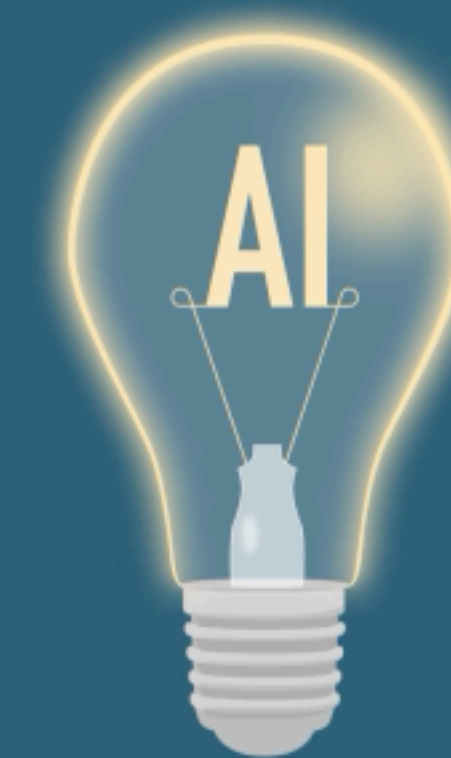
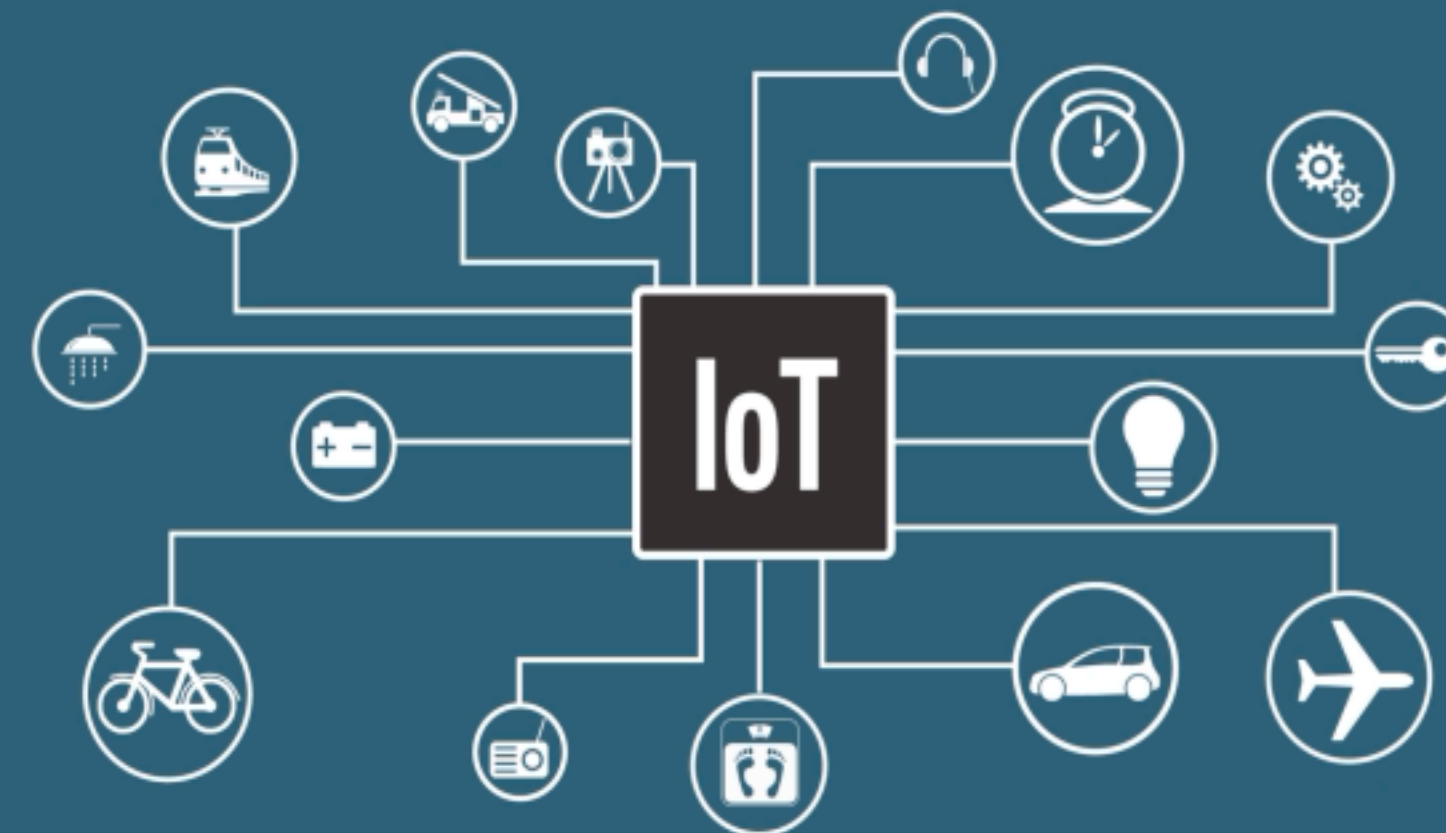
PASSION

CURIOSITY

IMAGINATION

FORESIGHT

CRITICAL THINKING

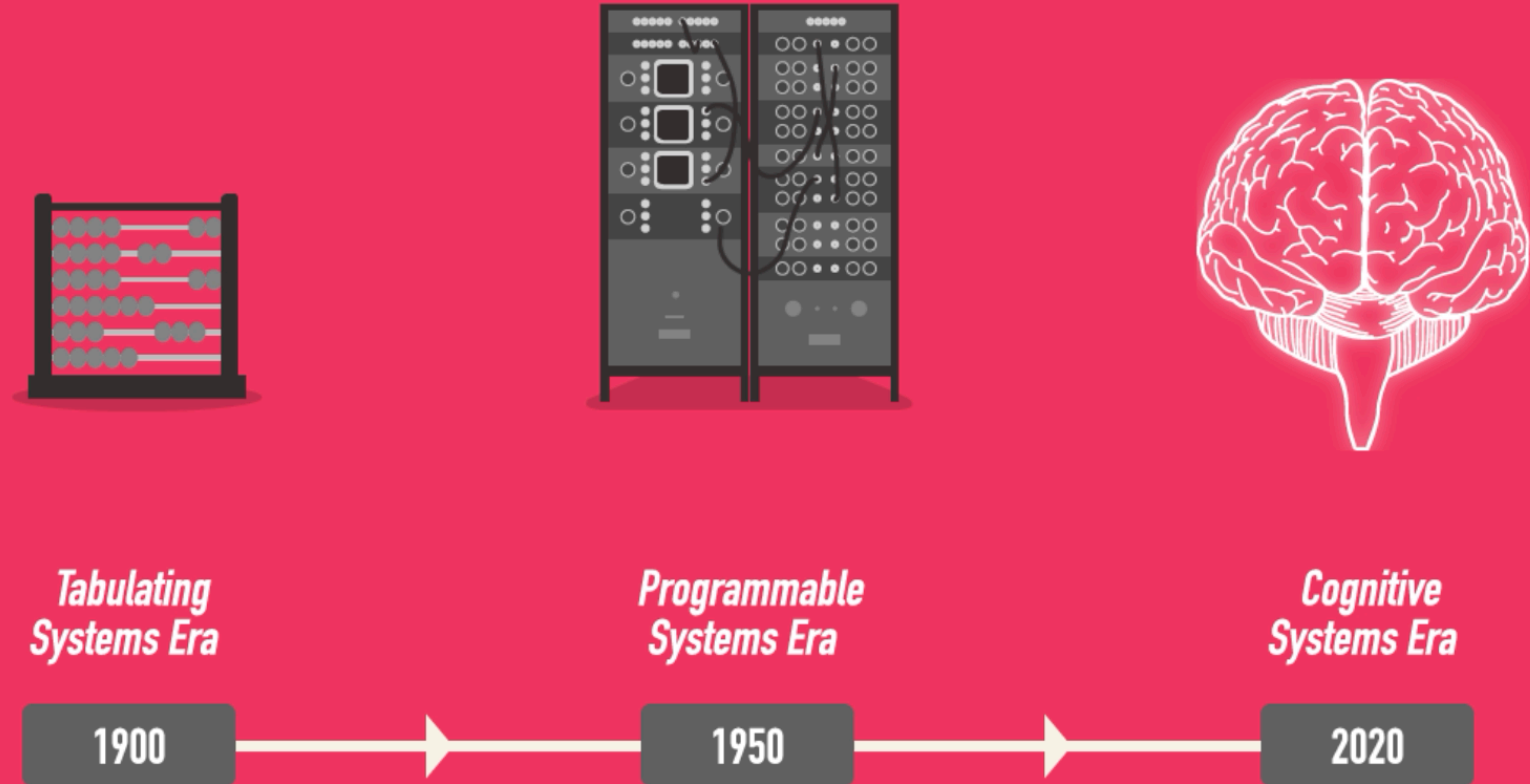


“Artificial Intelligence”: Ignore Hollywood



AI: Computer systems that turn information and data into KNOWLEDGE

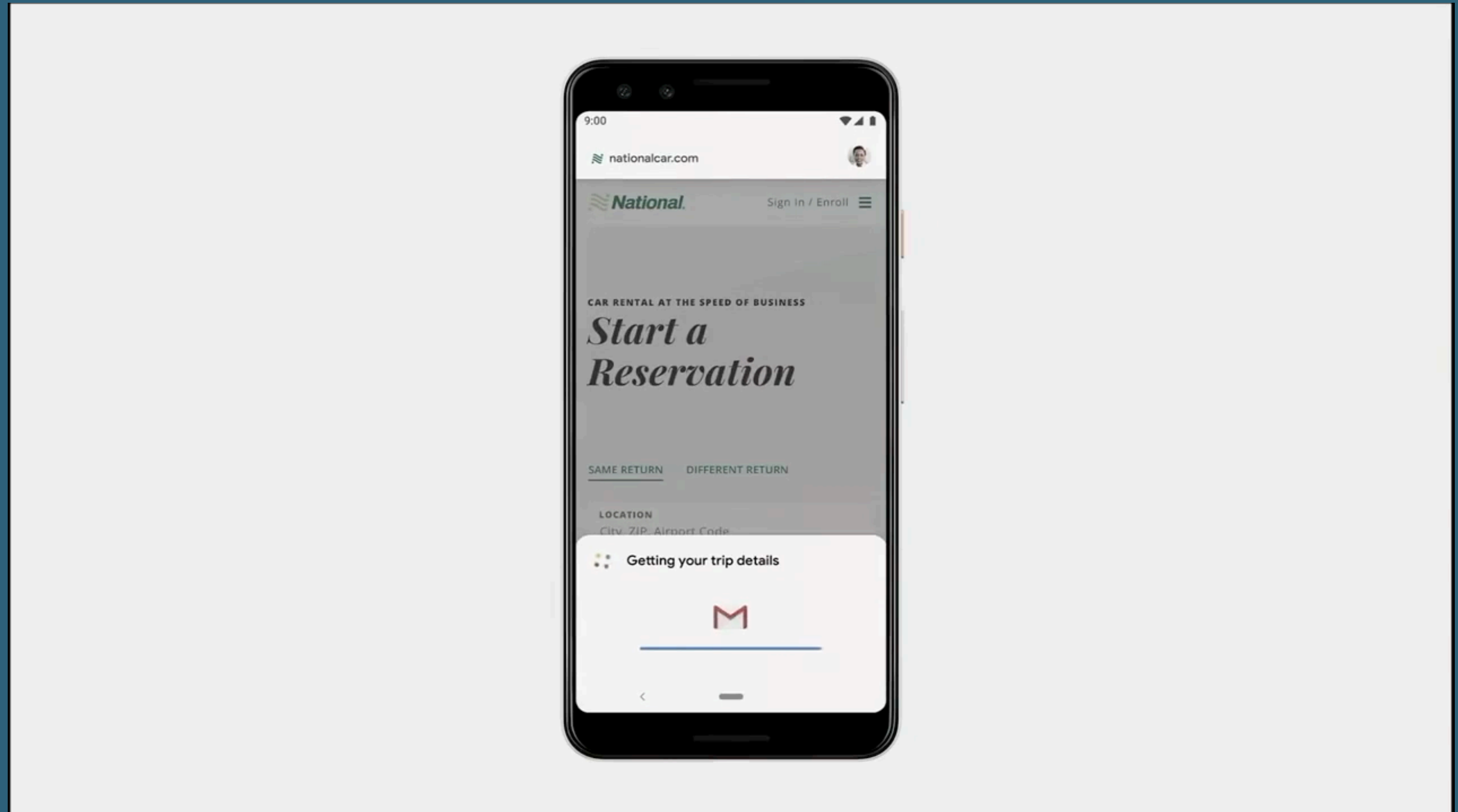
(Demis Hassabis, CEO, DeepMind)



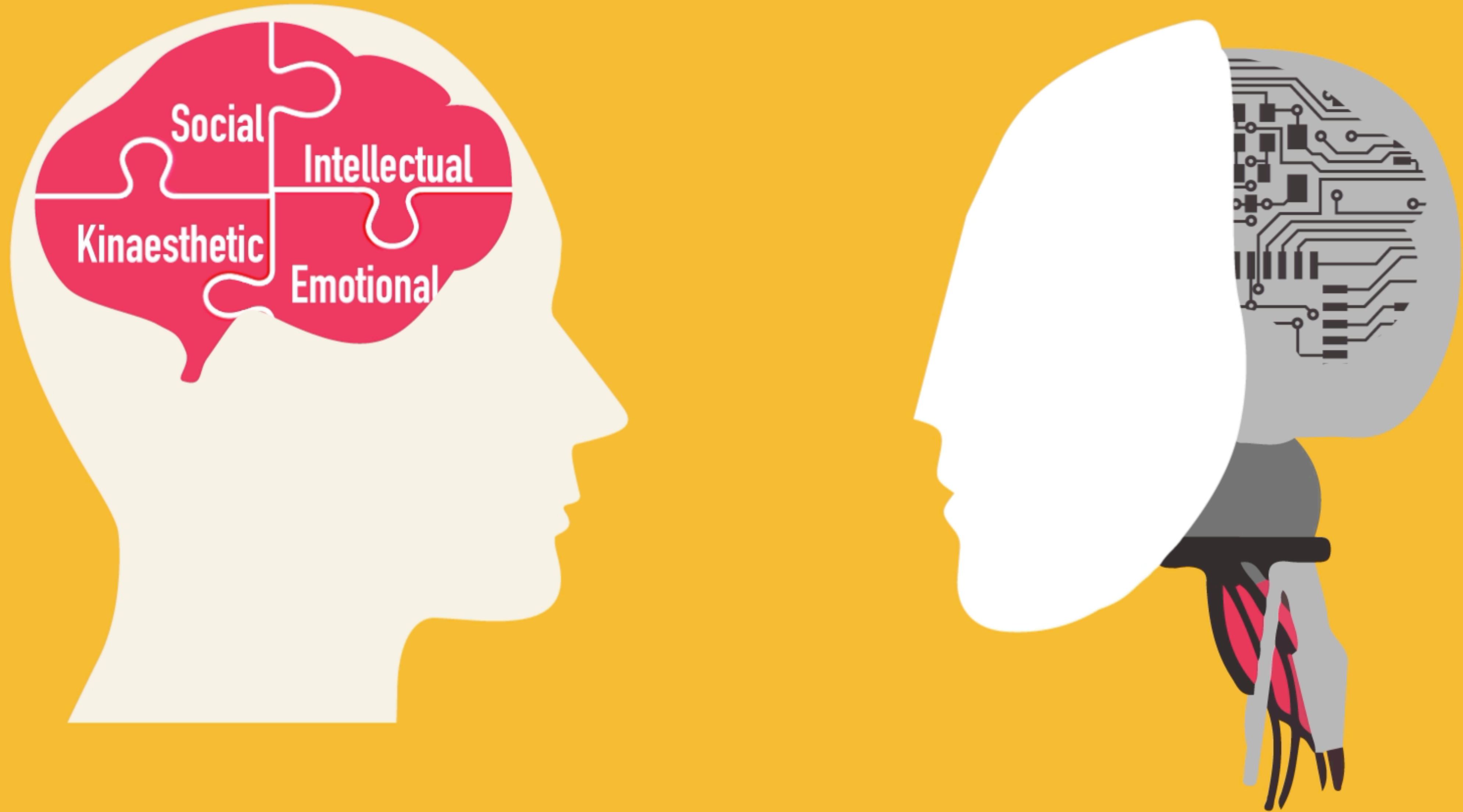
“Machine learning is the science of giving computers the ability to learn and find insights without explicitly programming the machines on what to do”



For the next 5 years, it's all about IA (Intelligent Assistance) rather than AI



Machine Smartness \neq Human Intelligence (but it's still very useful)



The future is a MINDSET, not a time-frame!



Assume less, discover more



Predictive Maintenance

Will this innovation area disrupt the industry?

Absolutely

Longshot

Real-time information gathering and monitoring lead to **cost reduction as well as improved efficiency and safety**, which are only a few reasons predictive maintenance is implemented increasingly throughout the rail industry.

Sensors along with **monitoring software** provide information of bearings, wheels, and bogies. The continuous inspection and diagnosis support operators in intervening quickly to patch up or replace equipment. What is more, operators can not only react to malfunctions but also **anticipate potential failure and act before it occurs**. Minimizing interruption, promoting safety and avoiding costly delays are all benefits that come with predictive maintenance.

The software developed by Dutch [Semiotic Labs](#) predicts technical failures. The startup's solution supplies instructions in the form of algorithms to **convert data into information about when and why a system fails**. Using this information, operators are able to take to prevent or to solve problems.

Source: StartUs Insights

Assume less, discover more



Cloud Computing

Will this innovation area disrupt the industry?

Absolutely

Longshot

Today's trains run on a number of applications that all generate a vast amount of data. The storage of this data along with the accurate presentation analysis of it is a challenge to the rail industry.

Cloud-based technology grants the storage of data collected in real-time while simultaneously providing absolute accessibility and saving substantial cost. Furthermore, **cloud services can easily connect to other software for the analysis of collected data** and provide operators with all necessary information to make a decision.

Nexiot develops cloud solutions for smart freight rail sensors. The Swiss startup's servers and databases provide a secure undistributed repository for rapid access and big data analytics. Their **cloud infrastructure is tailor-made and provides all things required to connect assets**, including device management tools to Nexiot's smart sensor as well as other IP based third-party devices through standard protocols.

Assume less, discover more



Drones

Will this innovation area disrupt the industry?

Absolutely

Longshot

Drone technology is expected to have a significant impact on the rail industry as they are used for infrastructure monitoring, capable of **collecting detailed data in remote and difficult to access areas**. Making use of drones significantly reduces the risk, time, and cost of accessing these areas with the workforce.

Furthermore, the gathered data such as visual, thermal, and multispectral data, allow for intelligent management thus **increasing the resilience and lifespan of an asset**.

[RailPod](#)'s aim is to make global rail infrastructure safer and more cost effective to maintain, operate and monitor through the use of **automated 'inspection' drones**. The startup's drones increase the frequency and quality of day-to-day railroad track inspections through advanced sensing technologies and data as a service (DaaS).

Assume less, discover more



Internet of Trains

Will this innovation area disrupt the industry?

Absolutely

Longshot

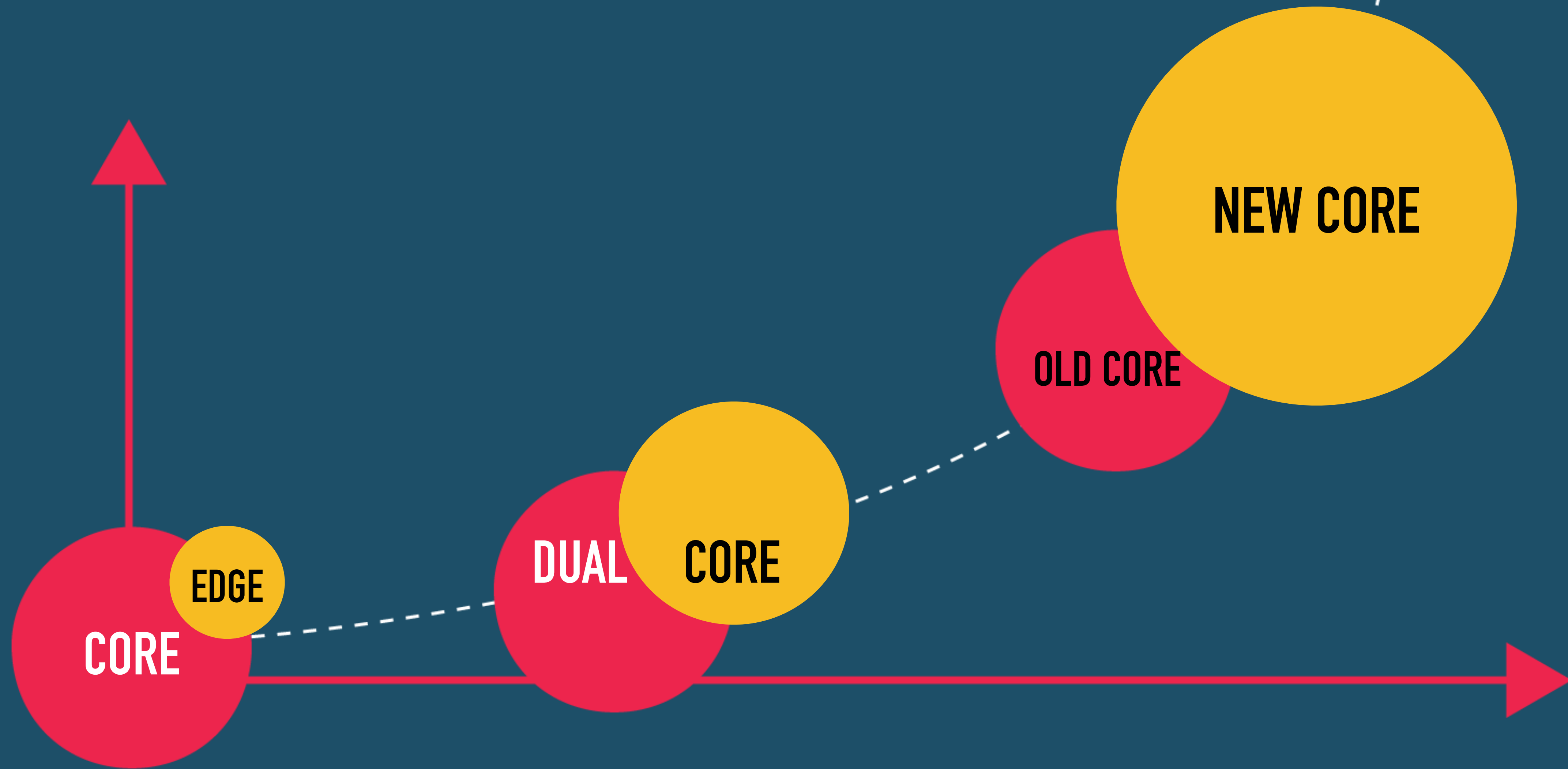
The Internet of Things (IoT) already led to various improvements in the railroad industry among which are **smart ticketing**, **rail analytics**, **dynamic route scheduling** as well as train and capacity planning. The application for the Internet of Trains, however, goes much further.

It enables rolling stocks, signals, rails, and stations to work cooperatively through the use of **intelligent onboard devices**. Monitors that are connected to cloud-based applications capture and storage vital data in real-time. As a result, operators are skilled to analyze this information and optimize schedules as well as passenger comfort, to name only two application areas.

[Perpetuum](#) improves the efficiency, safety, and quality of fleet management and services through wireless condition monitoring. The startup directly delivers data on assets to **improve end-user experience and plan ahead to make rolling stock available to meet customer demands**, maximizing the overall safety and efficiency.

Source: StartUs Insights

Hybrid thinking: focus on what is, AND explore what might be



To navigate the game changers, hyper-collaborate, build new ecosystems TOGETHER



Hyper-collaboration, not hyper-competition (share your data, promote standards)



A satellite image of Europe at night, showing city lights and geographical features. Overlaid on the map is a circle of twelve yellow stars, similar to the European Union flag. The text "UNITED STATES OF EUROPE" is centered in white, bold, sans-serif capital letters.

UNITED STATES OF EUROPE



Connected
Sustainable
Collaborative
Smart / Intelligent
Seamless / Fluid
Scaleable
Automated*
Autonomous*
Human-Centric



**“The future belongs
to those who
can hear it coming”
David Bowie**



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FOR YOUR TIME

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