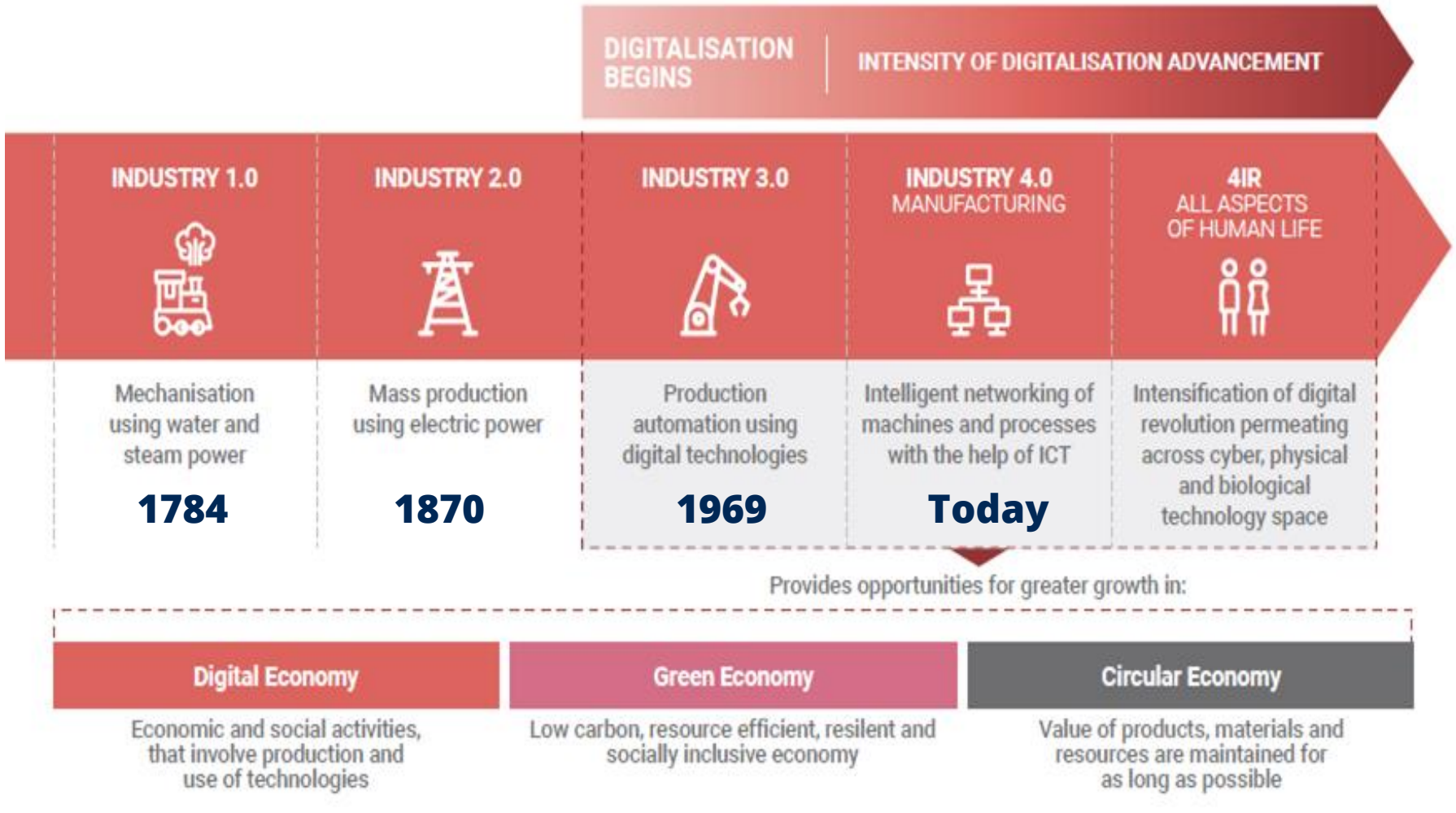
UNIT PEMODENAN TADBIRAN
DAN PERANCANGAN PENGURUSAN MALAYSIA
(MAMPU)

EMERGING TECHNOLOGIES

TS. DR. MOHAMED HAIRUL BIN OTHMAN

BAHAGIAN PERUNDINGAN ICT
MAMPU, JPM.

INDUSTRIAL REVOLUTIONS

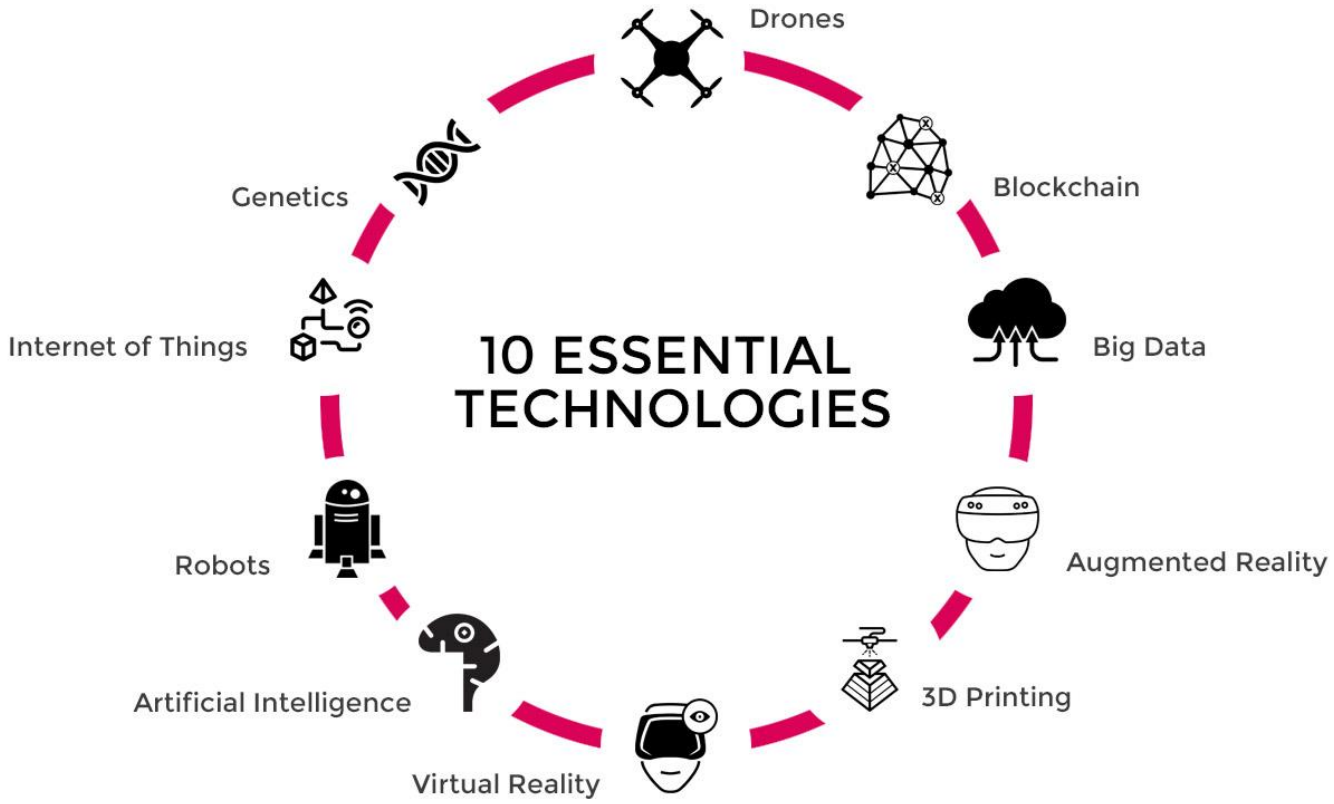


MyDIGITAL

EMERGING TECHNOLOGY

Analytics Insight has published a new report
“Reinventing Businesses with Disruptive Technologies” which features market size of six disruptive technologies by Segment, Application, Industry, Region from 2019-2023 covering:

- Big Data
- Artificial Intelligence (AI)
- Robotics
- IoT
- Cybersecurity
- AR and VR
- Blockchain
- Cloud Computing



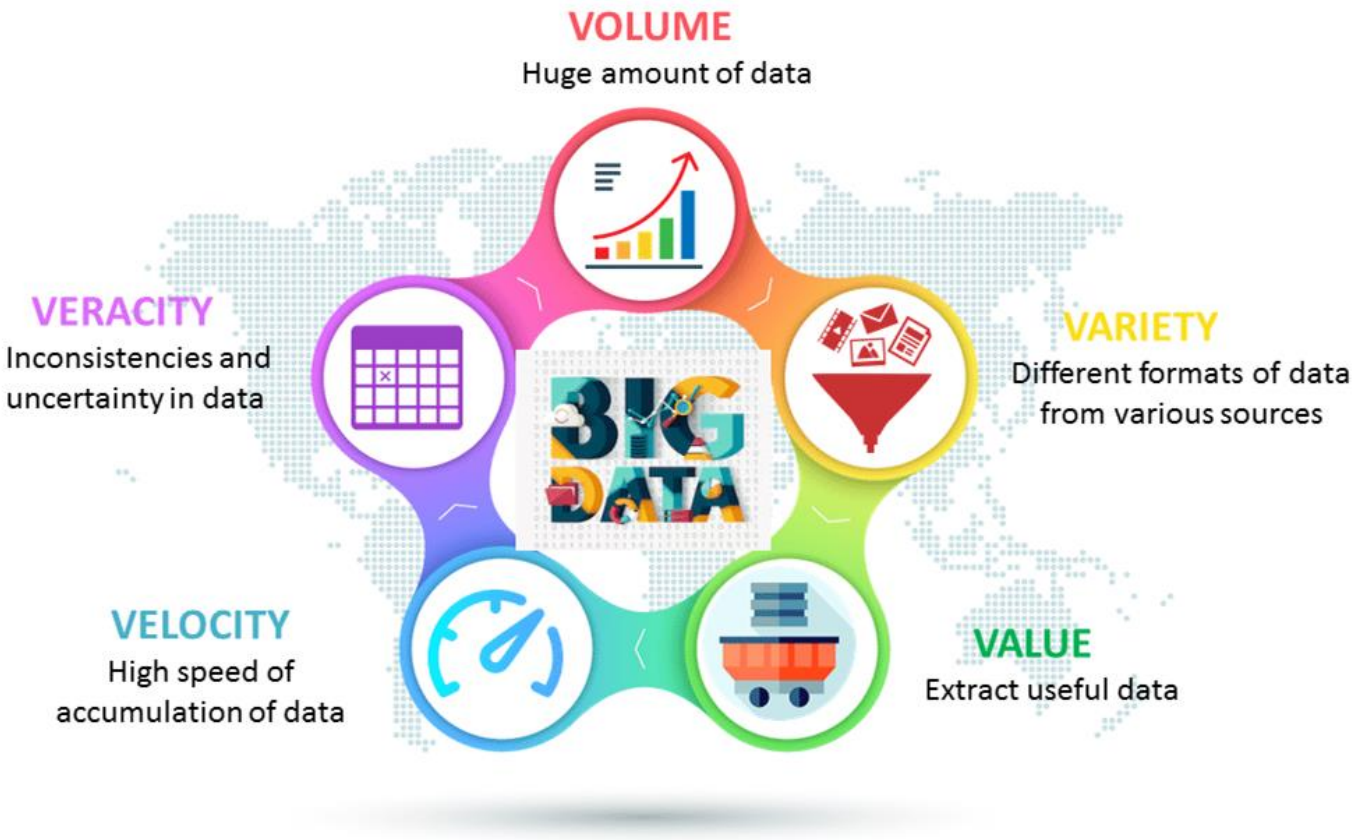
BIG DATA

Oracle

The definition of big data is data that contains greater variety, arriving in increasing volumes and with more velocity. This is also known as the three Vs.

Gartner

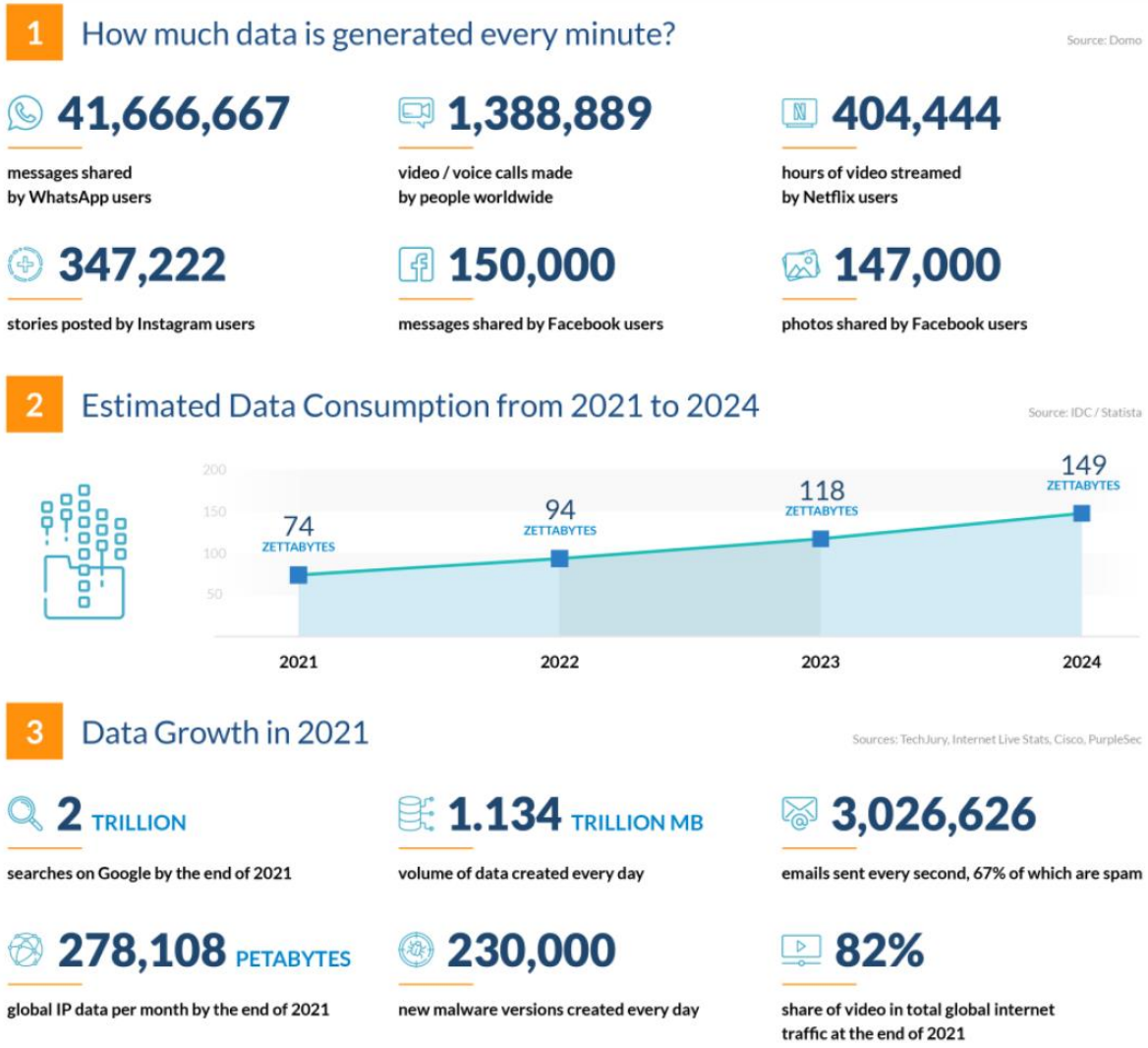
“Big data” is high-volume, -velocity and -variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight, decision making and process automation.



HOW BIG DATA IS BIG

In 2017, NodeGraph reported that there was there was **2.7 Zettabytes (ZB) of data in our digital universe**. PwC believe that this reached **4.4 ZB in 2019**, and Statista estimate we will reach **120ZB of data in 2023**. In fact, IDC predicts the world's data will grow to **175 ZB by 2025**!

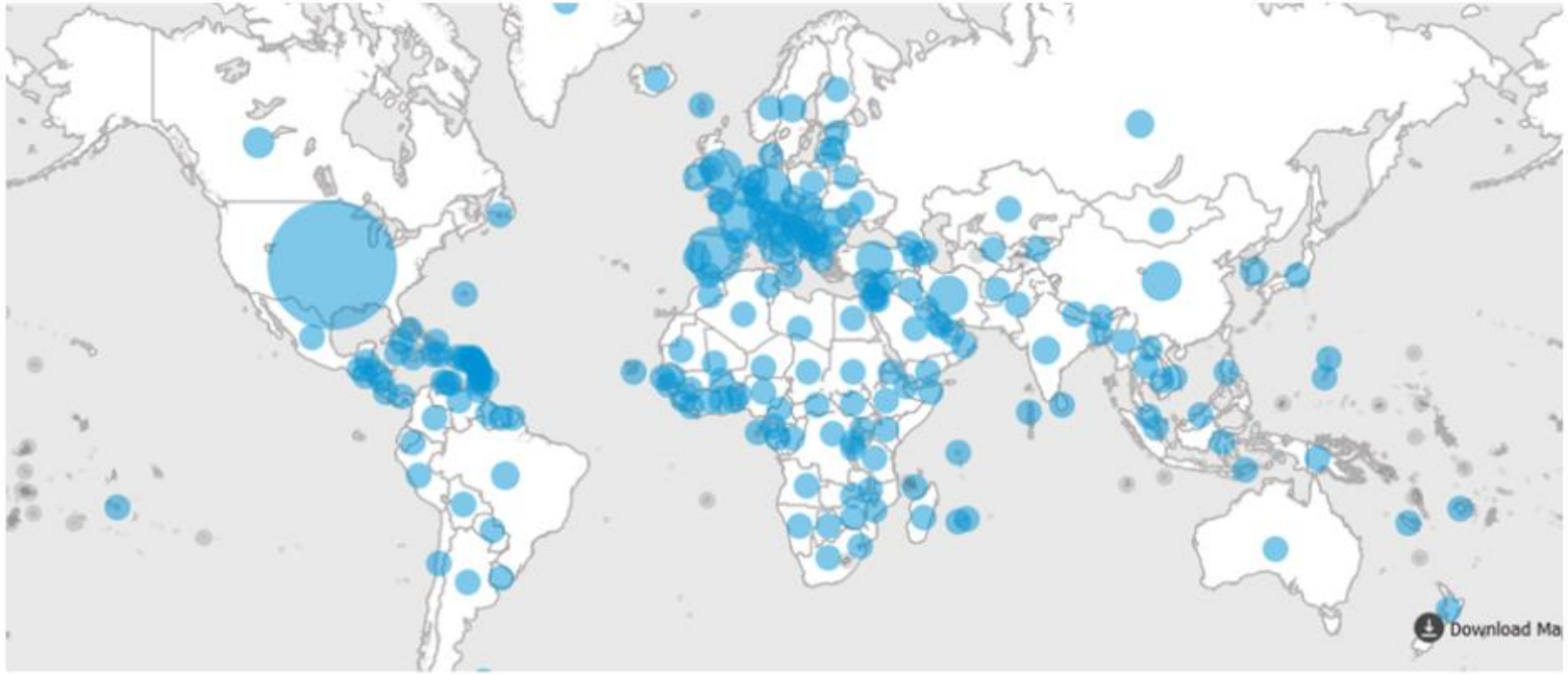
The Global Big Data Analytics In Healthcare Market report provides a holistic evaluation of the market. Big Data Analytics In Healthcare Market size was valued at **USD 29.30 Billion in 2020 and is projected to reach USD 59.10 Billion by 2028**, growing at a CAGR of 9.12% from 2021 to 2028.



BIG DATA IN HEALTHCARE

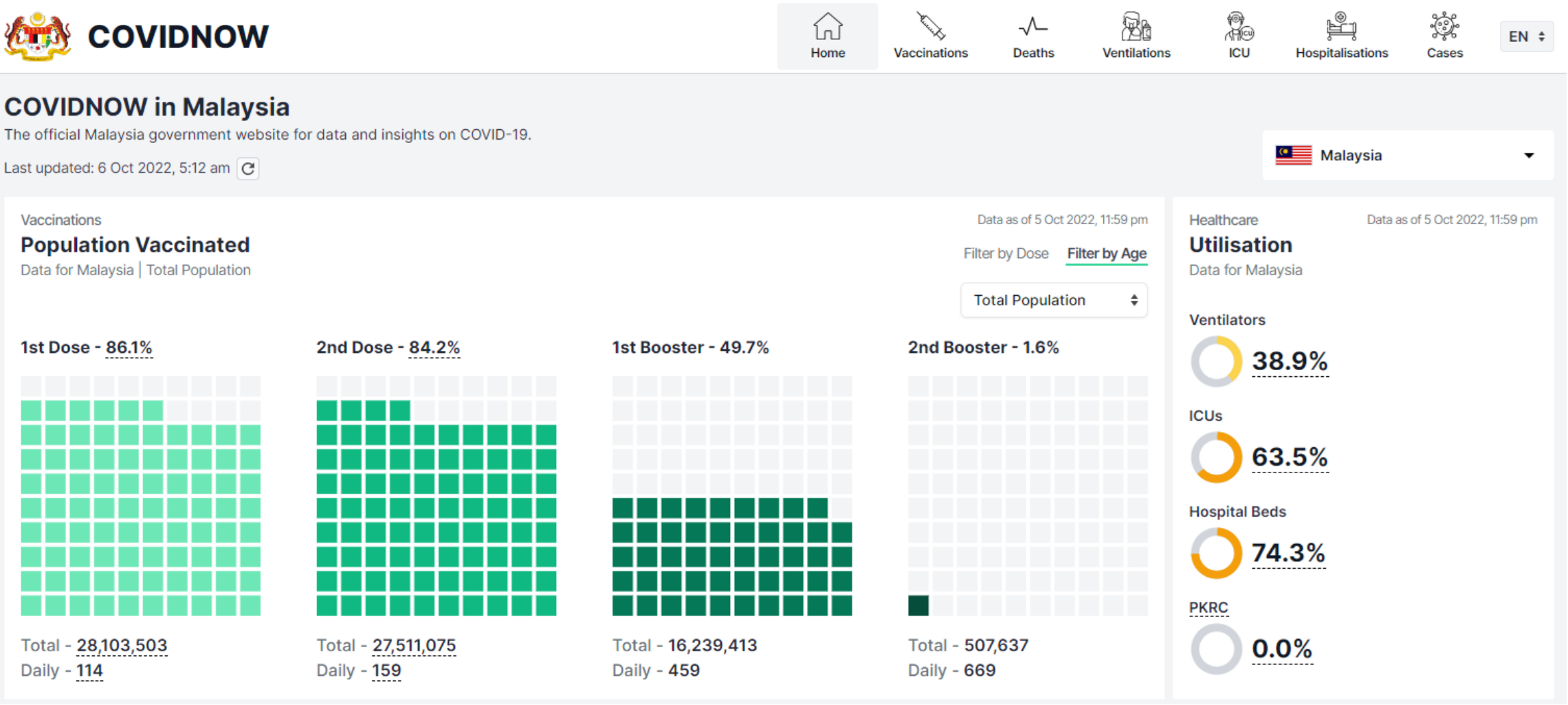
WHO has released a substantial update to its **COVID-19 information dashboard**. It allows access to current and reliable data on COVID-19 cases submitted directly to WHO by countries.

World Health Organization



WHO updates COVID-19 dashboard with better data visualization

BIG DATA IN HEALTHCARE



https://covidnow.moh.gov.my/

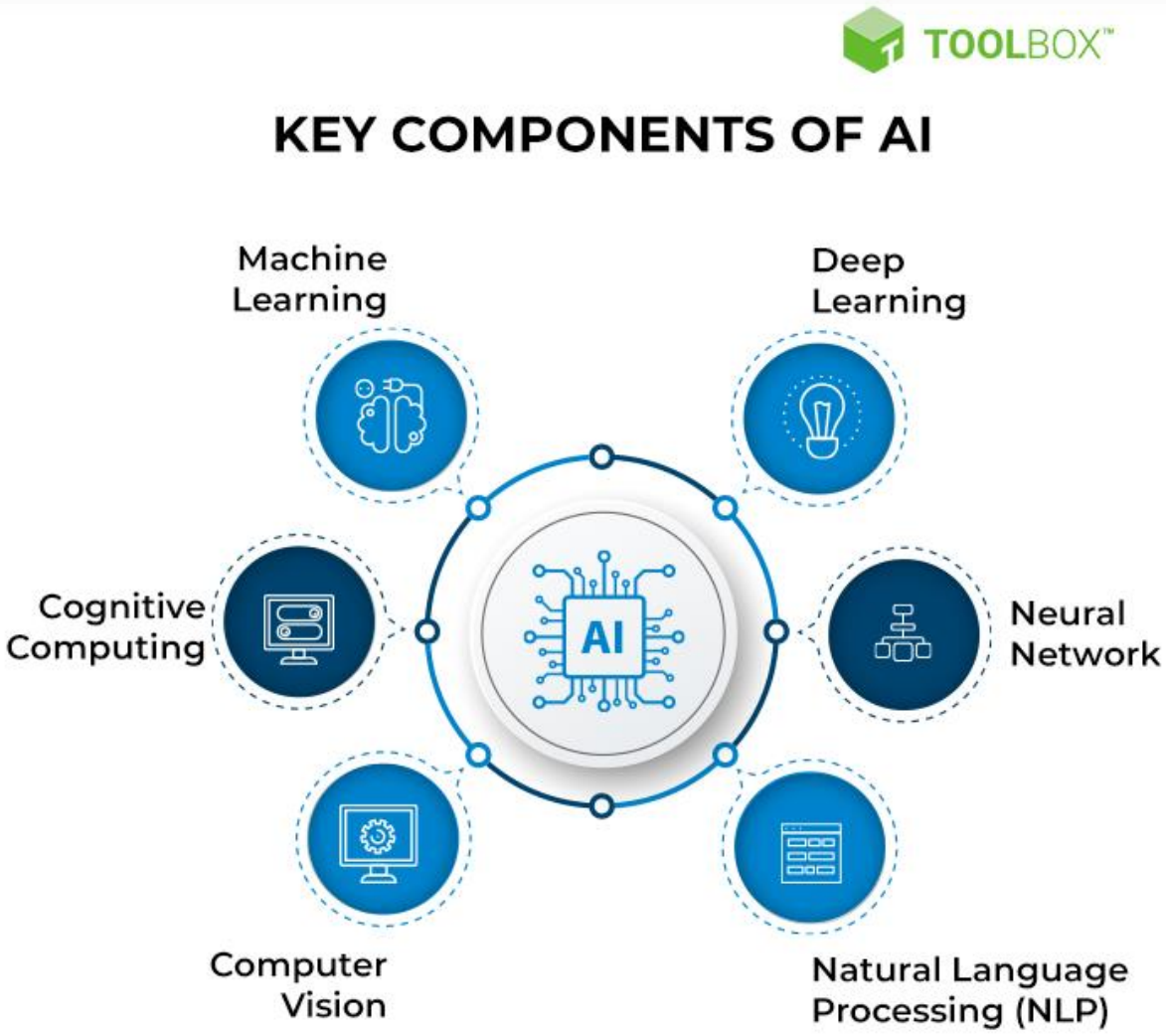
ARTIFICIAL INTELLIGENCE (AI)

TechTarget

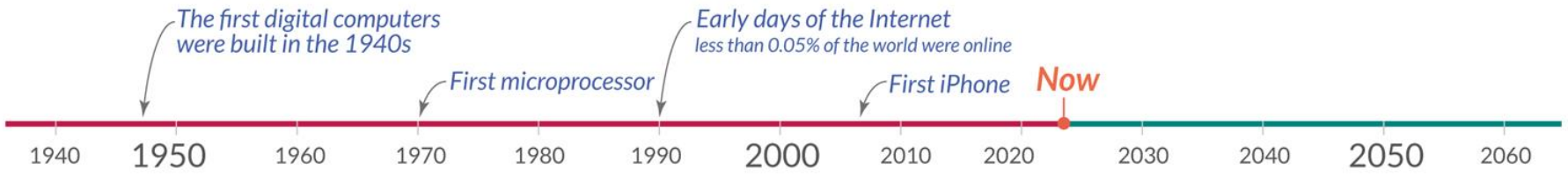
The simulation of human intelligence processes by machines, especially computer systems. I.E: Siri, Alexa, Autonomous Vehicle (Computer Vision, Deep Learning & Image Recognition)

IBM

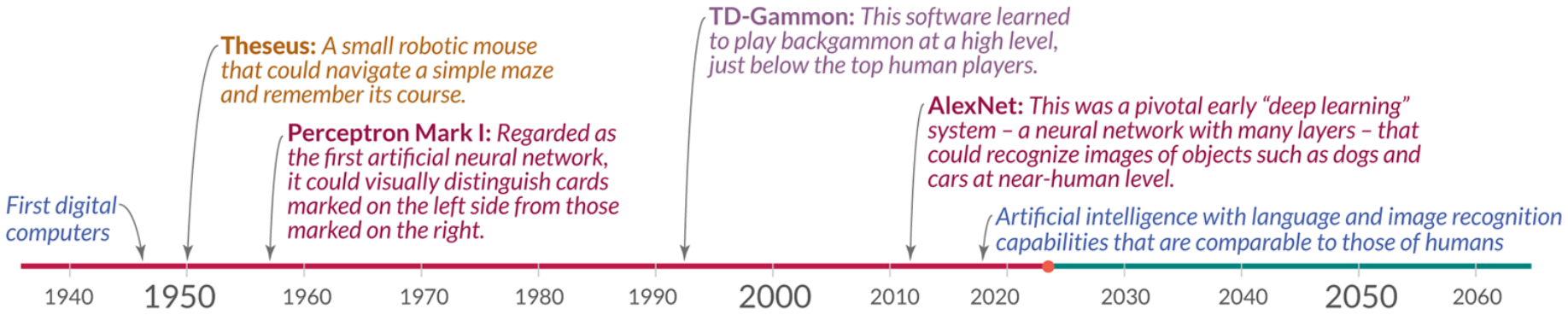
Artificial intelligence is a field, which combines computer science and robust datasets, to enable problem-solving. It also encompasses sub-fields of machine learning and deep learning, which are frequently mentioned in conjunction with artificial intelligence.



ARTIFICIAL INTELLIGENCE (AI)

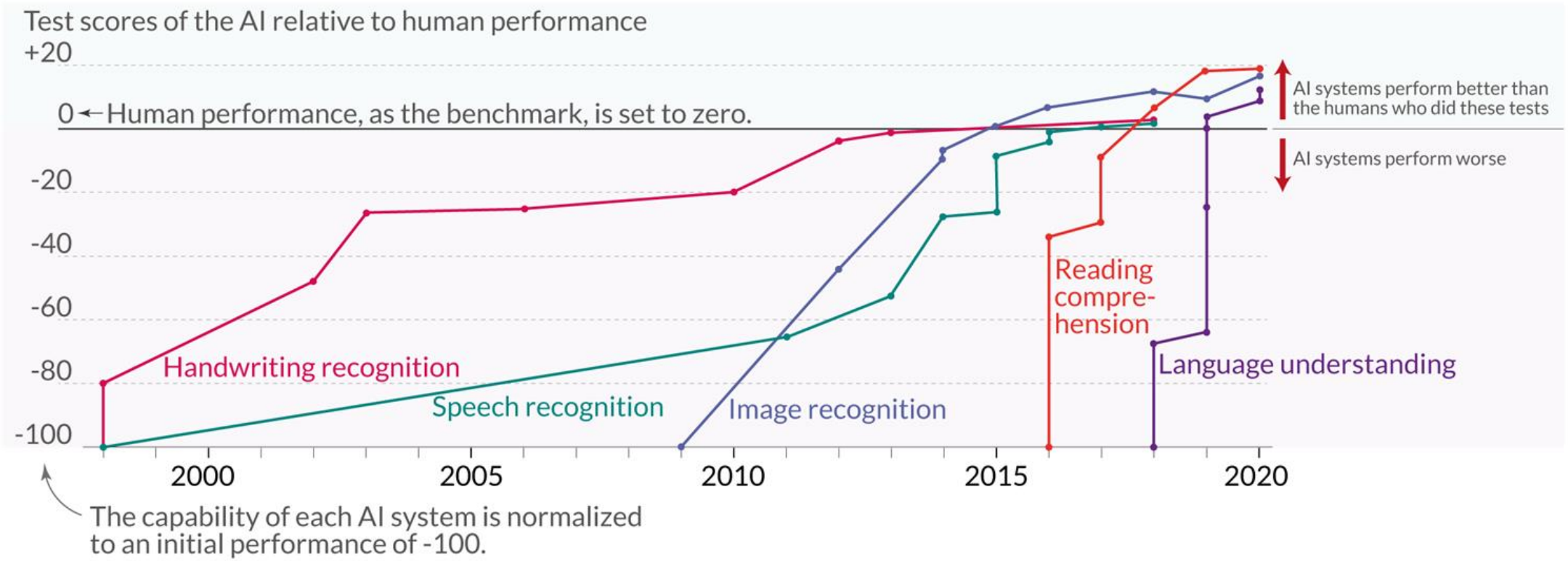


A timeline of notable artificial intelligence systems



Sumber: https://ourworldindata.org/brief-history-of-ai

Language and image recognition capabilities of AI systems have improved rapidly



Data source: Kiela et al. (2021) – Dynabench: Rethinking Benchmarking in NLP
OurWorldinData.org – Research and data to make progress against the world's largest problems.

Sumber: https://ourworldindata.org/brief-history-of-ai

Timeline of images generated by artificial intelligence

Our World in Data

These people don't exist. All images were generated by artificial intelligence.

2014

Goodfellow et al. (2014) – Generative Adversarial Networks

2015

Radford, Metz, and Chintala (2015) – Unsupervised Representation Learning with Deep Convolutional GANs

2016

Liu and Tuzel (2016) – Coupled GANs

2017

Karras et al. (2017) – Progressive Growing of GANs for Improved Quality, Stability, and Variation

2018

Karras, Laine, and Aila (2018) – A Style-Based Generator Architecture for Generative Adversarial Networks

2019

Karras et al. (2019) – Analyzing and Improving the Image Quality of StyleGAN

2020

Ho, Jain, & Abbeel (2020) – Denoising Diffusion Probabilistic Models

2021 Image generated with the prompt: *"a couple of people are sitting on a wood bench"*

Ramesh et al. (2021) – Zero-Shot Text-to-Image Generation (OpenAI's DALL·E 1)

2022 Image generated with the prompt: *"A Pomeranian is sitting on the King's throne wearing a crown. Two tiger soldiers are standing next to the throne."*

Saharia et al. (2022) – Photorealistic Text-to-Image Diffusion Models with Deep Language Understanding (Google's Imagen)

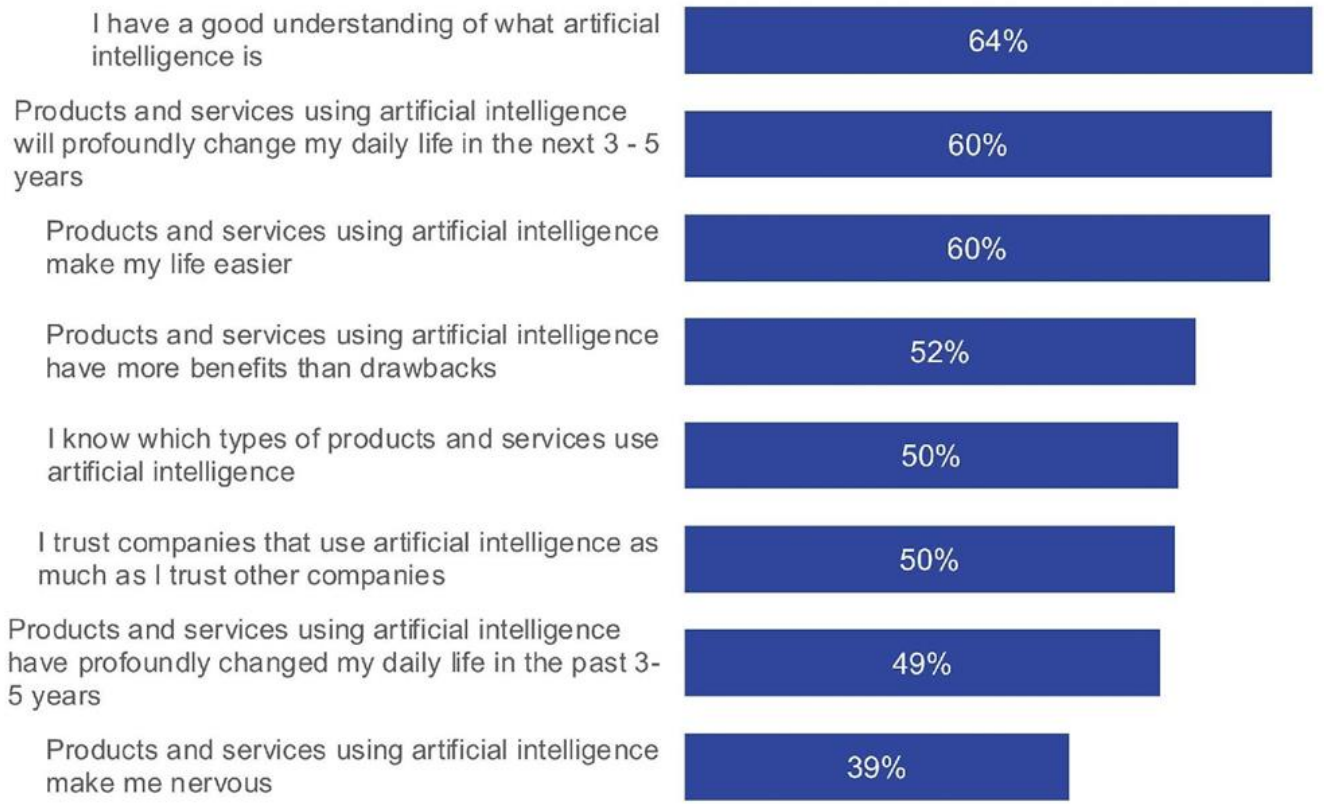
OurWorldinData.org – Research and data to make progress against the world's largest problems. Licensed under CC-BY by the authors Charlie Giattino and Max Roser

ARTIFICIAL INTELLIGENCE (AI)

OPINIONS ABOUT ARTIFICIAL INTELLIGENCE (GLOBAL COUNTRY AVERAGE)

Q. Let's now talk about products and services using artificial intelligence (AI). Artificial intelligence refers to computers and robots doing things that traditionally require using human intelligence. How much do you agree or disagree with the following?

% "Agree"



Base: 19,504 online adults aged 16-74 across 28 countries, Nov.–Dec. 2021 Online samples in Brazil, Chile, mainland China, Colombia, India, Malaysia, Mexico, Peru, Russia, Saudi Arabia, South Africa, and Turkey tend to be more urban, educated, and/or affluent than the general population. The "Global Country Average" reflects the average result for all the countries and markets where the survey was conducted. It has not been adjusted to the population size of each country or market and is not intended to suggest a total result.

ARTIFICIAL INTELLIGENCE (AI)

TRUST IN A.I. IS CORRELATED WITH PERCEIVED UNDERSTANDING; BOTH ARE HIGHER IN EMERGING COUNTRIES THAN IN HIGH-INCOME COUNTRIES

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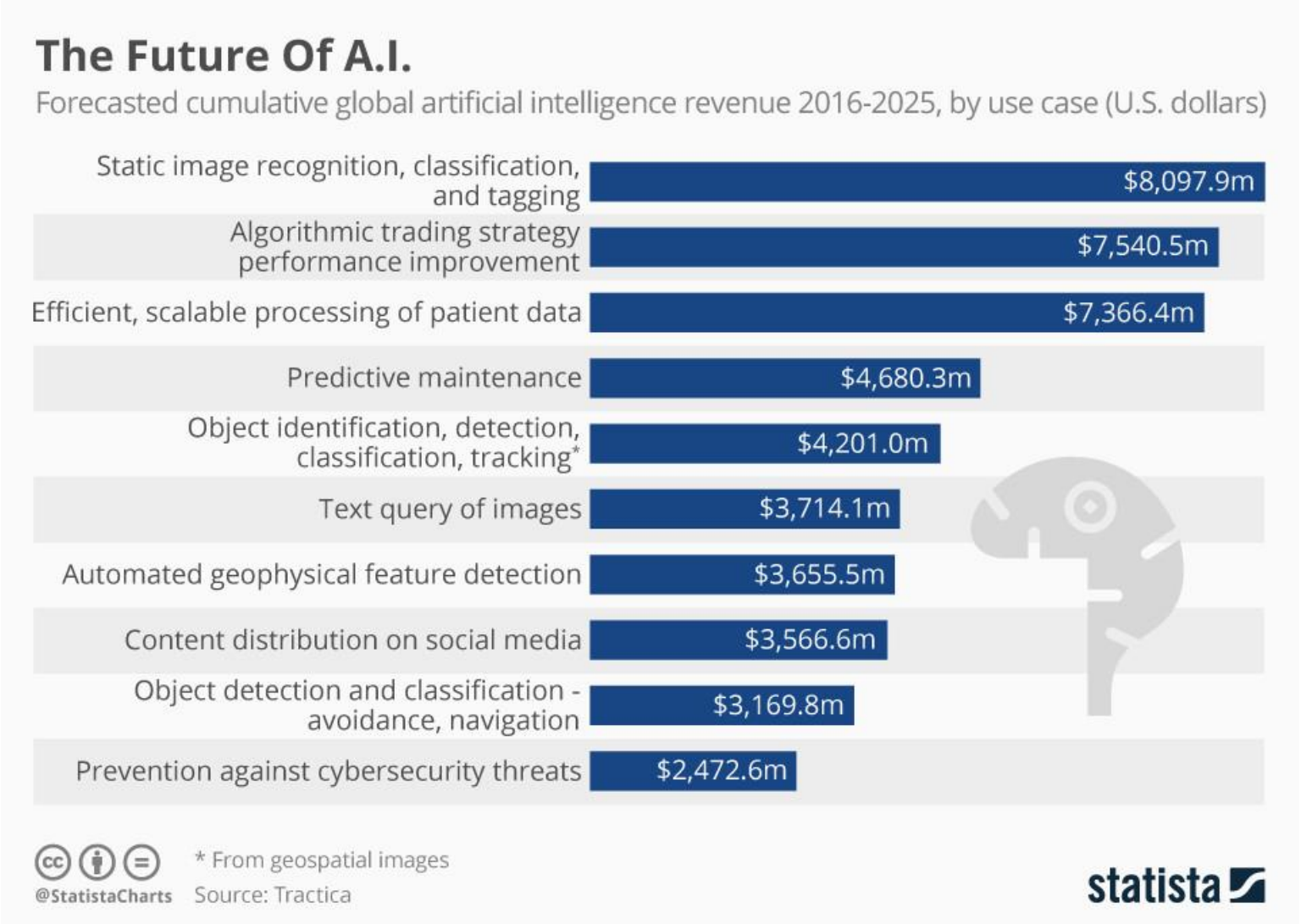
ARTIFICIAL INTELLIGENCE (AI)



ARTIFICIAL INTELLIGENCE (AI)

ChatGPT

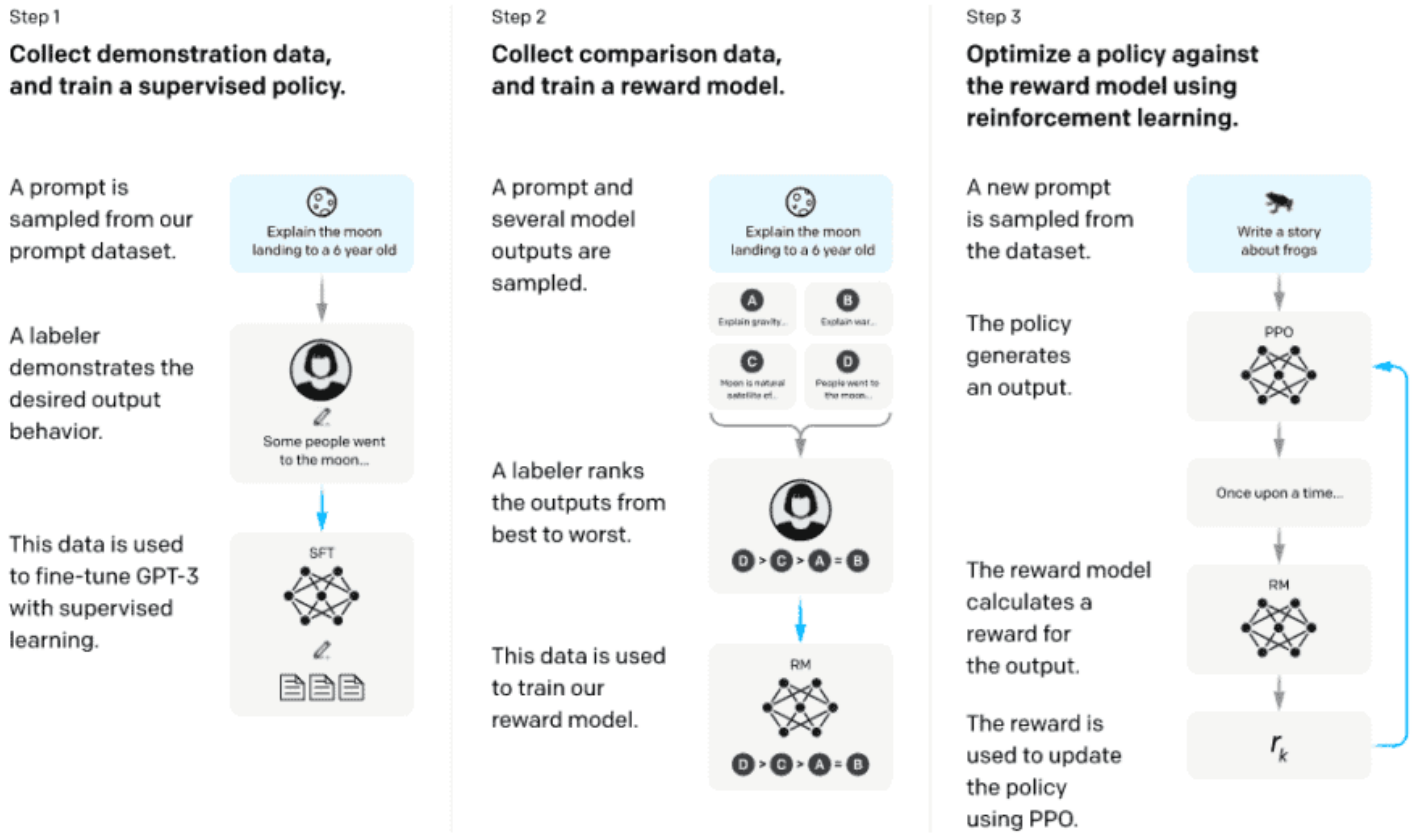
Using GPT **(Generative Pre-Trained Transformer)** models

OpenAI had developed GPT-3. It was a language model trained on **175 billion parameters** and could generate human-like text by supplying a prompt.

ChatGPT is a fine-tuned version of GPT 3.5. It is also trained using a special technique called **Reinforcement Learning from Human Feedback (RLHF).**

ChatGPT attempting to understand prompt and then spitting out strings of words that it predicts will best answer based on the data it was trained on.

According to some sources, it is true that **GPT-4 has 1.7 trillion parameters**.



Sumber https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

AI IN HEALTHCARE

Artificial intelligence better than humans at spotting lung cancer

Researchers have used a deep-learning algorithm to detect lung cancer accurately from computed tomography scans. The results of the study indicate that artificial intelligence can outperform human evaluation of these scans.

New research suggests that a computer algorithm may be better than radiologists at detecting lung cancer.

A.I. can help improve patient outcomes

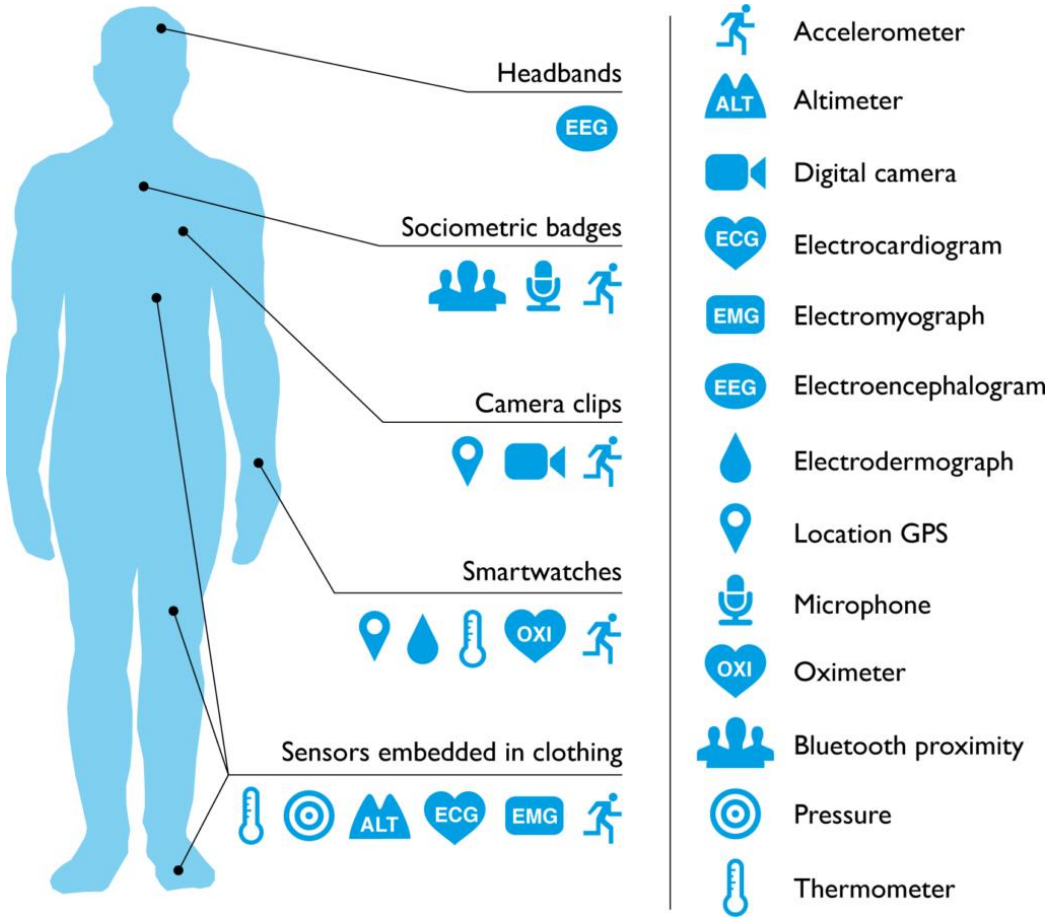
Artificial intelligence could take on some hospital tasks and free doctors to focus on surgery and other important work. REUTERS

INTERNET OF THINGS (IOT)

1. IOT combined with data and analytics, provides new products innovation and services, as well as to increase the efficiency of operations.

1. **By 2030, IoT usage could amount to up to $12.5 trillion globally.** That includes the value captured by consumers and customers of IoT products and services.

1. IoT in medicine could be a gold mine for tech investors in the future. According to GlobeNewswire, the global IoT healthcare market was **valued at $99 billion in 2022 and is projected to reach $486 billion by 2031**.



IOT IN HEALTHCARE

THE INTERNET OF THINGS IS DRIVING THE 'CONSUMERIZATION' OF HEALTHCARE

The arrival of the IoT in the healthcare sector means that consumers will now have the power to take control of their own health in a much more personalized way through technology.

'The Internet of Health Things (IoHT) already provides quantifiable savings, but it is essential to continue investing in order to advance the digital economy and ensure long-term business survival.' – Accenture Digital

INNOVATION

Let's Build An Internet Of Health

Hatem Zeine Forbes Councils Member
Forbes Technology Council COUNCIL POST | Membership (Fee-Based)

POST WRITTEN BY
Hatem Zeine

Founder and CTO of **Ossia**. Wireless power pioneer. Physicist. Inventor. Disruptor.

Nov 27, 2017, 08:30am EST

Digital technology seems to have lowered costs in every U.S. industry *besides* healthcare. Americans spent $3.35 trillion on healthcare ($10,345 per person) in 2016. Washington D.C. fights over who should pay for care, not how to improve it. I believe the internet of things (IoT) -- a system of internet-connected sensors, devices and applications -- has the potential to solve our crisis.

IOT IN A SMART CITY

Big Brother is watching: China has one surveillance camera for every 2 citizens!

In December last year, China abruptly relaxed its stringent zero-Covid policy. Several people who were stuck, returned to Beijing and found cameras fixed right outside their apartment doors

Umang Sharma | Last Updated:March 30, 2023 19:29:51 IST

A man wearing a face mask walks past surveillance cameras in Shanghai, China. Reuters.

Beijing: Xi Jinping is watching you. You read it right. Wherever you are in China, you are under constant camera surveillance. The country has over 700 million surveillance cameras, which means there is one lens for every two citizens.

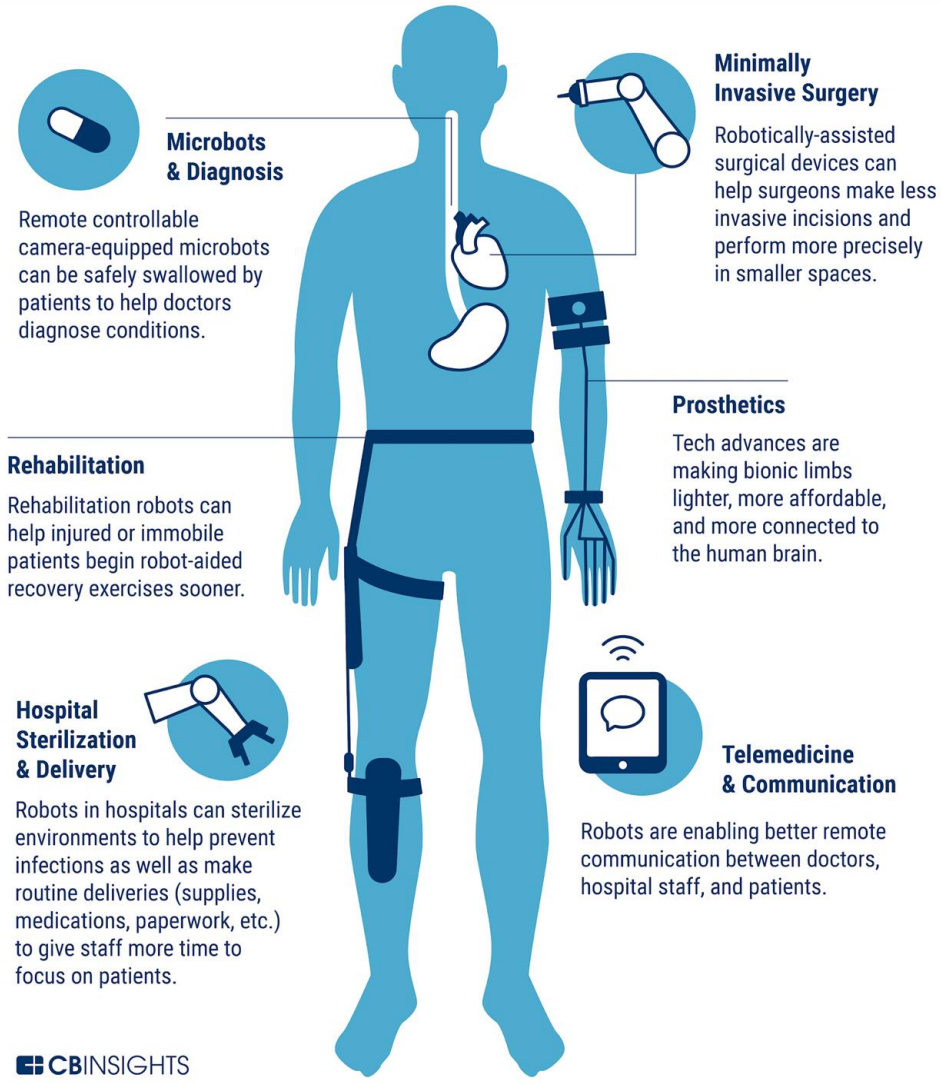
ROBOTICS

AI Business

Robotics involves the creation of robots to perform tasks without further intervention, while AI is how systems emulate the human mind to make decisions and 'learn.'

Techopedia

Robotics is the engineering and operation of machines that can autonomously or semi-autonomously perform physical tasks on behalf of a human. Typically robots perform tasks that are either highly repetitive or too dangerous for a human to carry out safely.



ROBOTICS IN MALAYSIA

Perkenalkan ADAM, robot Humanoid versi Malaysia

Bernama
Julai 19, 2019 15:50 MYT

Dr Hanafiah Yussof bergambar bersama robot humanoid bernama ADAM pada sidang kemuncak Beyond Paradigm Summit. - Gambar BERNAMA

Robot bersih lantai pertama ciptaan Malaysia diguna di hospital

Februari 19, 2022 @ 11:04pm

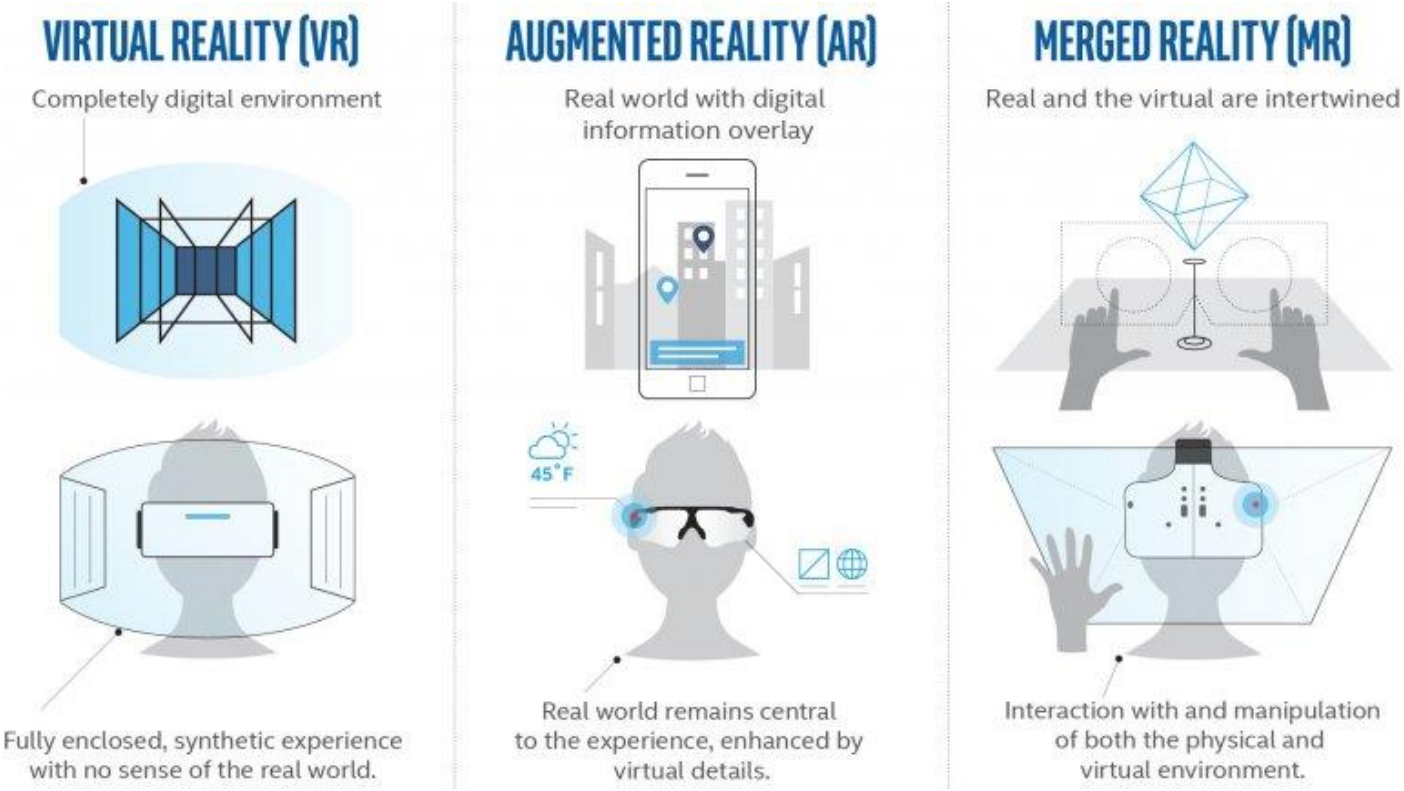
Ketua Pegawai Eksekutif Medivest Sdn Bhd, Muhammad Firdaus Ishak (kanan) bertanya sesuatu kepada Ketua Pegawai Eksekutif Ideasparq Robotics Sdn Bhd, Asyraf Abdul Rahman (kiri) mengenai penggunaan sebuah robot pembersih lantai yang akan digunakan di Hospital Tampin hari ini. - Foto BERNAMA

Pasaran Robotik Malaysia diunjurkan mencecah **RM103.1 bilion menjelang 2023**, melepasi jumlah sasaran Pelan Hala Tuju Robotik Negara 2021-2030 - MOSTI

METAVERSE, AR & VR

1. Business Wire reported, Augmented reality (AR) and virtual reality (VR) market in healthcare is poised to **reach nearly $9.7 billion in worth in the next 5 years**. This specific niche is currently worth close to $2.7 billion, indicating that it will grow approximately 3.5 times by 2027.

1. AR and VR have the potential to **enable a variety of new modalities in healthcare**, ranging from how physicians and other medical professionals are trained, to augmenting their ability to practice medicine via telehealth and telemedicine.



BLOCKCHAIN

Figure 1. Blockchain in the public sector, as of March 2017

Blockchain experiments in the public sector are accelerating globally, with a concentration in the US and Europe.

Source: Deloitte analysis in conjunction with the Fletcher School at Tufts University

BLOCKCHAIN

1 Blockchain Market Outlook

Sources: MarketsandMarkets Research, Business Wire, Blockchain.com, IDC, PwC

46.40%
global blockchain spend CAGR by 2024

46.00%
North America's contribution to the global growth of blockchain market

10.27%
growth rate of the blockchain market in 2020

620.37 MILLION
total blockchain transactions as of February 2021

$1.76 TRILLION
how much blockchain will boost global GDP by 2030

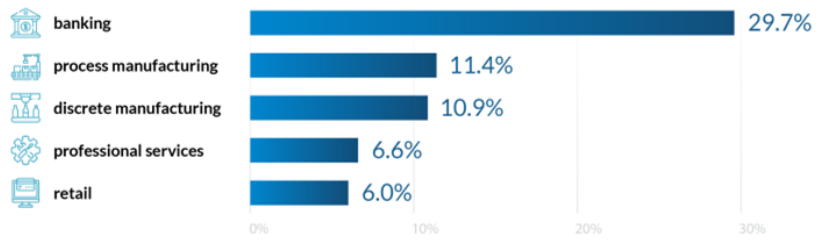
$39.7 BILLION
projected blockchain market value in 2025 from 3 billion in 2020

$17.9 BILLION
estimated global spend on blockchain solutions by 2024

2 Top Blockchain Spenders Worldwide

(by Industry)

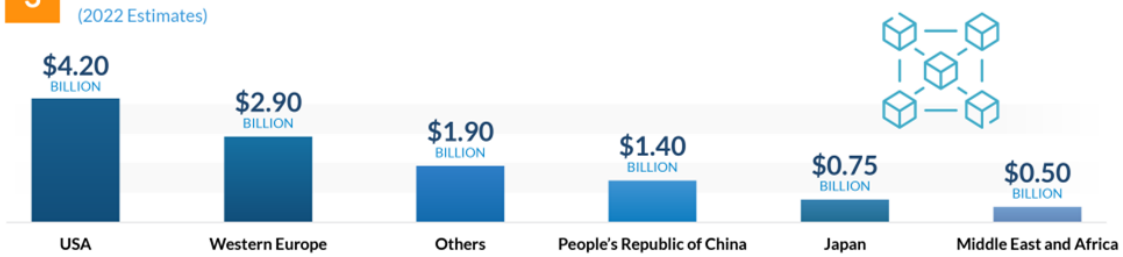
Source: IDC 2020



3 Top Blockchain Spenders by Country or Region

(2022 Estimates)

Source: Statista

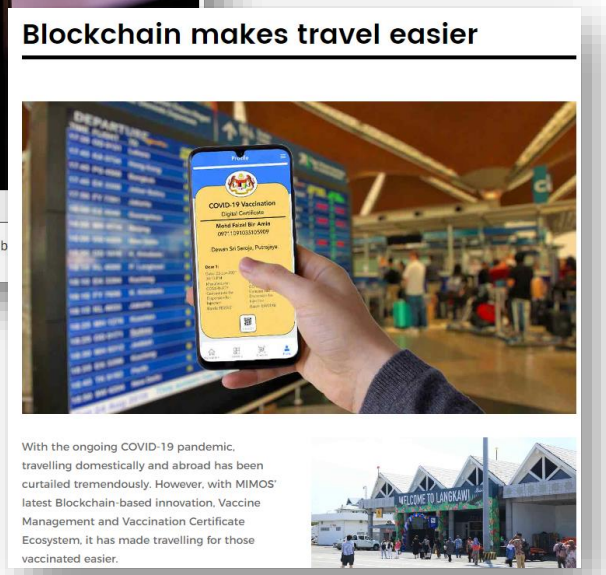


Sijil vaksin MySejahtera dilindungi teknologi 'blockchain'

Oleh Mahaizura Abd Malik - Januari 11, 2022 @ 6:12pm
bhnews@bh.com.my

Foto BERNAMA

KUALA LUMPUR: Sijil vaksinasi dalam MySejahtera tidak boleh dipalsukan b
teknologi blockchain yang tidak boleh disalin atau diulang cetak.



Blockchain makes travel easier

With the ongoing COVID-19 pandemic, travelling domestically and abroad has been curtailed tremendously. However, with MIMOS' latest Blockchain-based innovation, Vaccine Management and Vaccination Certificate Ecosystem, it has made travelling for those vaccinated easier.

DRONES

1. A drone is an unmanned aircraft. Drones are more formally known as **unmanned aerial vehicles (UAVs)** or **unmanned aircraft systems**.

1. the drone services market size is expected to grow to **$63.6 billion by 2025**.

1. Drone growth will occur across five main segments of the enterprise industry: **Agriculture, construction** and **mining, insurance, media** and **telecommunications, and law enforcement**.

DRONES IN REAL LIFE

PDRM guna dron pantau trafik di Lebuhraya Utara Selatan

Fareez Azman
Januari 21, 2023 14:12 MYT

Pasukan Dron PDRM telah tempatkan di sektor Utara, Timur dan Selatan dan fokus utamanya adalah membantu JSPT memantau keadaan lalu lintas di lokasi-lokasi hotspot. - PDRM

KUALA LUMPUR: Polis Diraja Malaysia (PDRM) menggunakan unit dron dalam memantau kelancaran lalu lintas di Lebuhraya Utara Selatan (PLUS) sepanjang Ops Selamat ke-19.

Guna dron pantau sungai

BERNAMA

GAMBAR hiasan. FOTO arkib NSTP

Rawang: Empat unit dron berteknologi tinggi model DJI Matrice 300 akan digunakan mulai bulan November bagi memantau sungai di Selangor sekali gus mencegah aktiviti pencemaran sumber air.

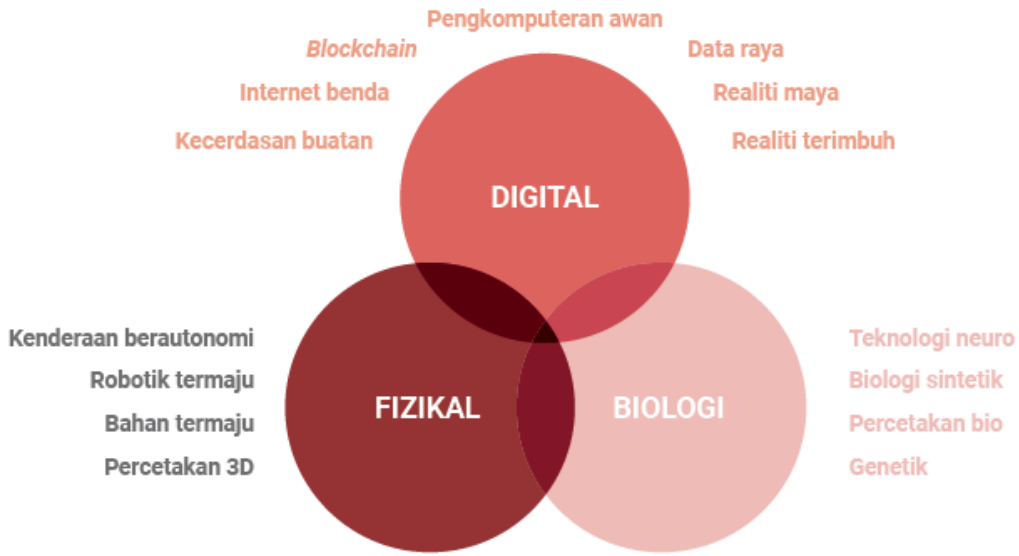
Exco Pelancongan Alam Sekitar dan Teknologi Hijau, Hal Ehwal Orang Asli dan Hal Ehwal selain Islam negeri, Hee Loy Sian berkata kerajaan negeri memperuntukkan sebanyak RM2 juta bagi empat unit dron itu yang akan diuruskan Lembaga Urus Air Selangor (LUAS) melalui Skuad Pantas LUAS.

ET RELATED POLICY

MYDIGITAL ECONOMY BLUEPRINT

MyDIGITAL telah menetapkan hala tuju ekonomi digital dan membina asas untuk mendorong pendigitalan di seluruh negara. Bagi mencapai aspirasi MyDIGITAL, Rangka Tindakan (Blueprint) Ekonomi Digital Malaysia telah dirangka sebagai pelan tindakan yang menggariskan usaha dan inisiatif yang akan dilaksanakan sehingga tahun 2030

Paparan 1-2: Domain teknologi 4IR



ET RELATED POLICY

NATIONAL 4IR POLICY

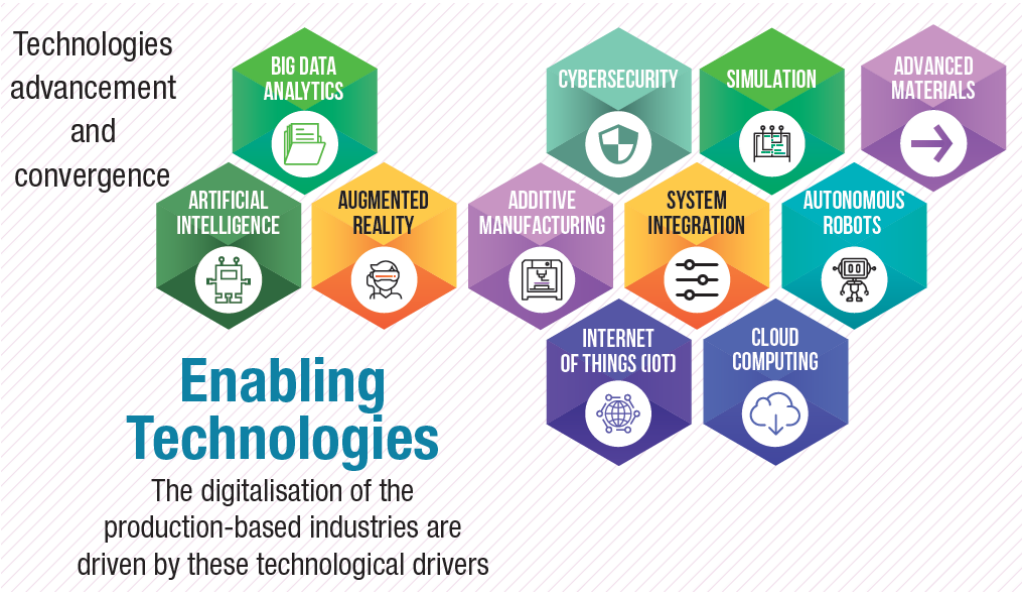
Transforming the socioeconomic development of the country through ethical use of 4IR technologies. It supports national development policies such as the Twelfth Malaysia Plan (RMKe-12) and *Wawasan Kemakmuran Bersama* 2030 (WKB 2030)[2].

1. **A central R&D lab to accelerate the government's capabilities** to evaluate digital-centric solutions based on 4IR technologies that can be implemented to further enhance government service delivery through digital and 4IR solutions.
2. Provides an ecosystem of **talent, environment and solutions** to help government agencies to test possible use cases of applying 4IR technologies and future digital capabilities.
3. Implementation will be based on **strategic partnership between public and private sectors** to spur collaboration and sharing of resources.

ET RELATED POLICY

INDUSTRY 4WRD

This Policy, in essence, outlines 13 broad strategies for Malaysia to embark on a journey that will transform the manufacturing industry landscape over the next decade through three shift factors namely People, Process and Technology.



ET RELATED POLICY

NATIONAL BLOCKCHAIN ROADMAP

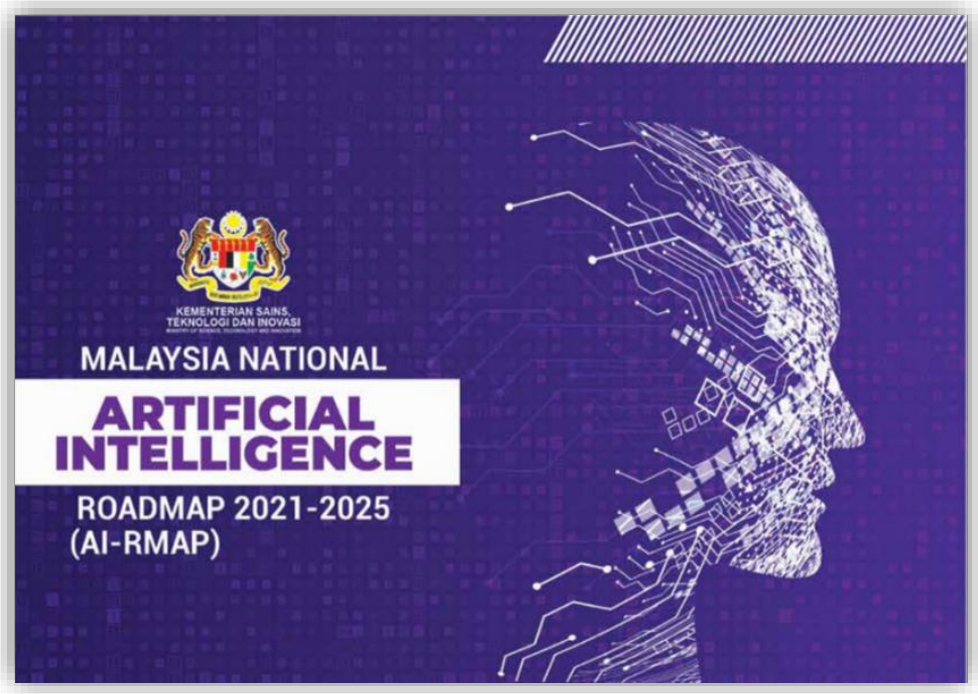
The National Blockchain Roadmap is at the helm to steer Malaysia to embrace the Blockchain 2.0, i.e. beyond the crypto-currency, and angle at solution to business issues ranging from fraud management to supply-chain monitoring to identity verification, that can potentially increase efficiency and reduce costs.

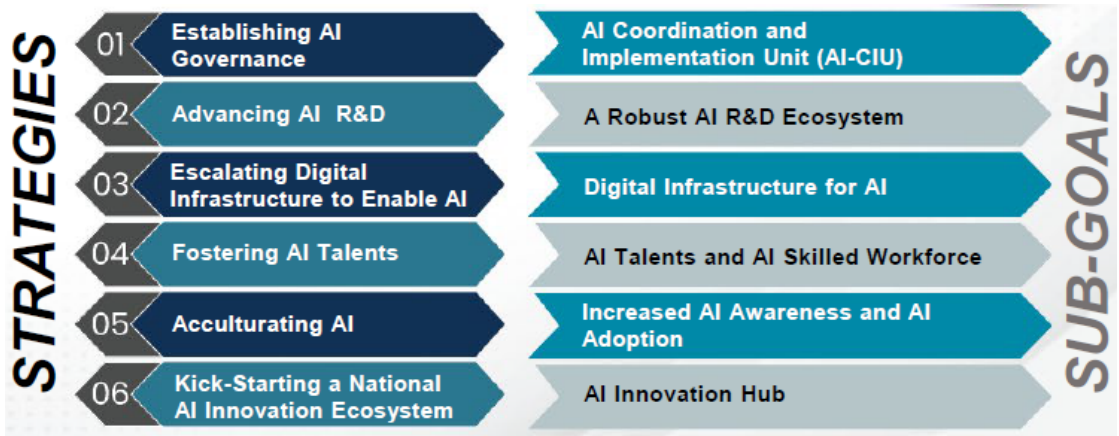
Figure 5.1 : Blockchain ecosystem building blocks

ET RELATED POLICY

MALAYSIA NATIONAL ARTIFICIAL INTELLIGENCE (AI) ROADMAP 2021-2025

This roadmap urges all AI stakeholders to take a proactive stance in this new paradigm, actively co-designing the appropriate environment and ecosystem to support responsible AI design, development, and use in Malaysia.





Medical & Healthcare Projects:

1. Autonomous Vaccine Distribution and Management System
2. Personalized Proactive Healthcare
3. Autonomous A-eye System
4. AI-Nasoalveolar(AI-Na) System

ET RELATED POLICY

NATIONAL ROBOTICS ROADMAP 2021-2030

The direction set forth by the National Robotics Roadmap (NRR) 2021-2030 will guide and assist stakeholders in building up a vibrant and dynamic robotics ecosystem; bringing Malaysia closer towards its aspiration in becoming a progressive, prosperous, and high-tech nation.

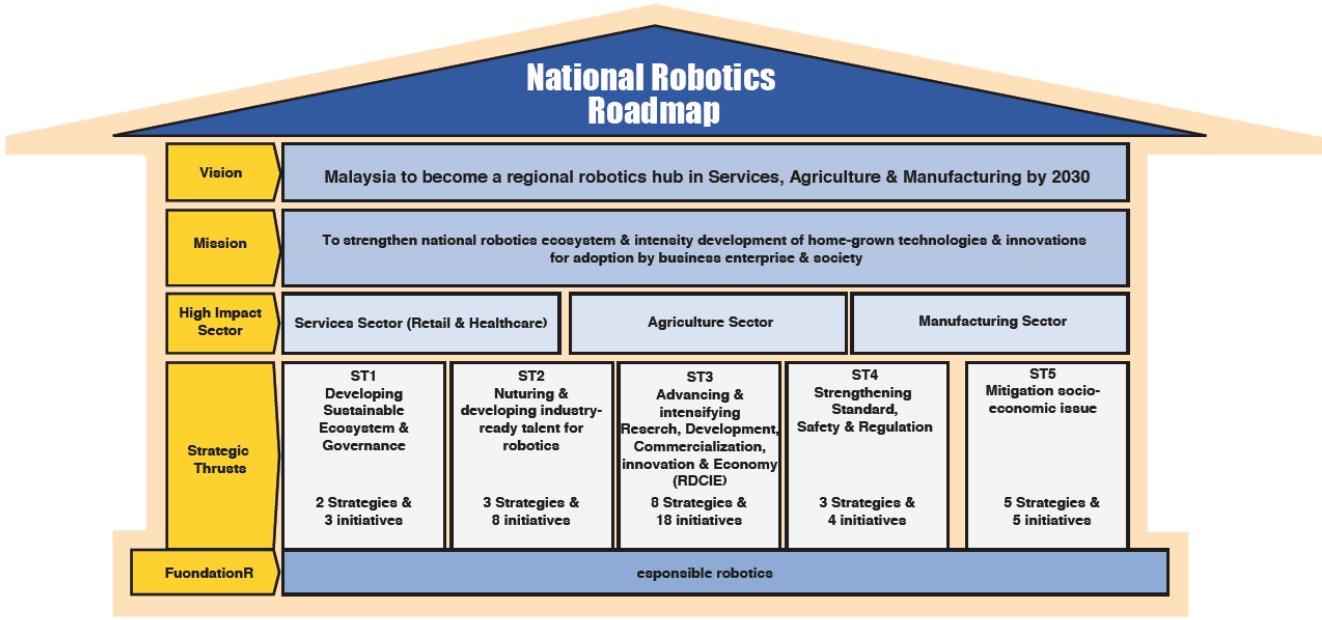


Figure 2 The National Robotics Roadmap

ET RELATED POLICY

PELAN STRATEGIK PENDIGITALAN SEKTOR AWAM (PSPA) 2021-2025

Menggariskan hala tuju strategik pelaksanaan pendigitalan Sektor Awam untuk tempoh 5 tahun yang akan menjadi panduan kepada agensi Sektor Awam bagi memacu agenda Kerajaan Digital yang Mampan JKDM arah membentuk masyarakat digital.

1. Menyokong aspirasi Kerajaan untuk menggapai **Sustainable Development Goal 2023, Wawasan Kemakmuran Bersama 2030, Rangka Tindakan Ekonomi Digital Malaysia (MyDigital)** dan **RMK-12**

1. Menjajarkan **penerimagunaan kemunculan teknologi baharu *(emerging technologies)*** seiring dengan transformasi digital Sektor Awam

1. **Menyumbang kepada ekonomi digital** menerusi adaptasi/eksploitasi *emerging technologies*.

TERIMA KASIH