

Advance IoT & AI Integrations



Co-Founder & President



President



Co-Founder & CEO



Founder & President



I'm Joshua Opoku Agyemang & I'm Unstoppable!

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 Joshua Opoku Agyemang

Four Industrial Revolutions



1765

1st revolution

MECHANIZATION

led by the steam engine



1870

2nd revolution

**MASS
PRODUCTION**

driven by electricity
and oil-based power



1969

3rd revolution

**AUTOMATED
PRODUCTION**

supported by electronics
and information
technologies



Today

4th revolution

**NEW
TECHNOLOGIES**

Internet of Things (IoT),
Artificial Intelligence (AI);
Big Data, Cloud,
Cyber-Physical Systems...

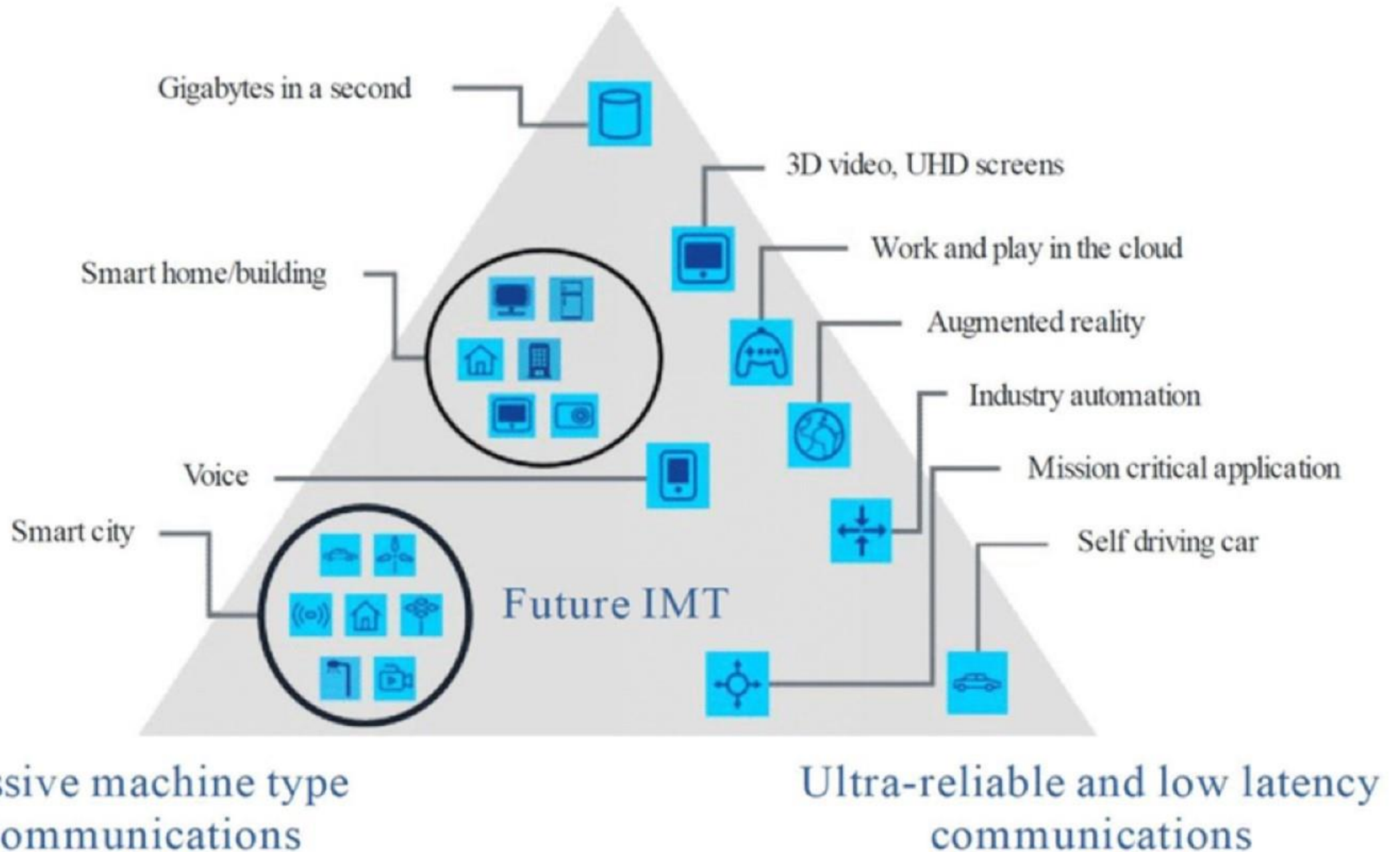
The Fourth Industrial Revolution(4IR) is a way of describing the blurring of boundaries between the **Physical, Digital, and Biological** worlds.

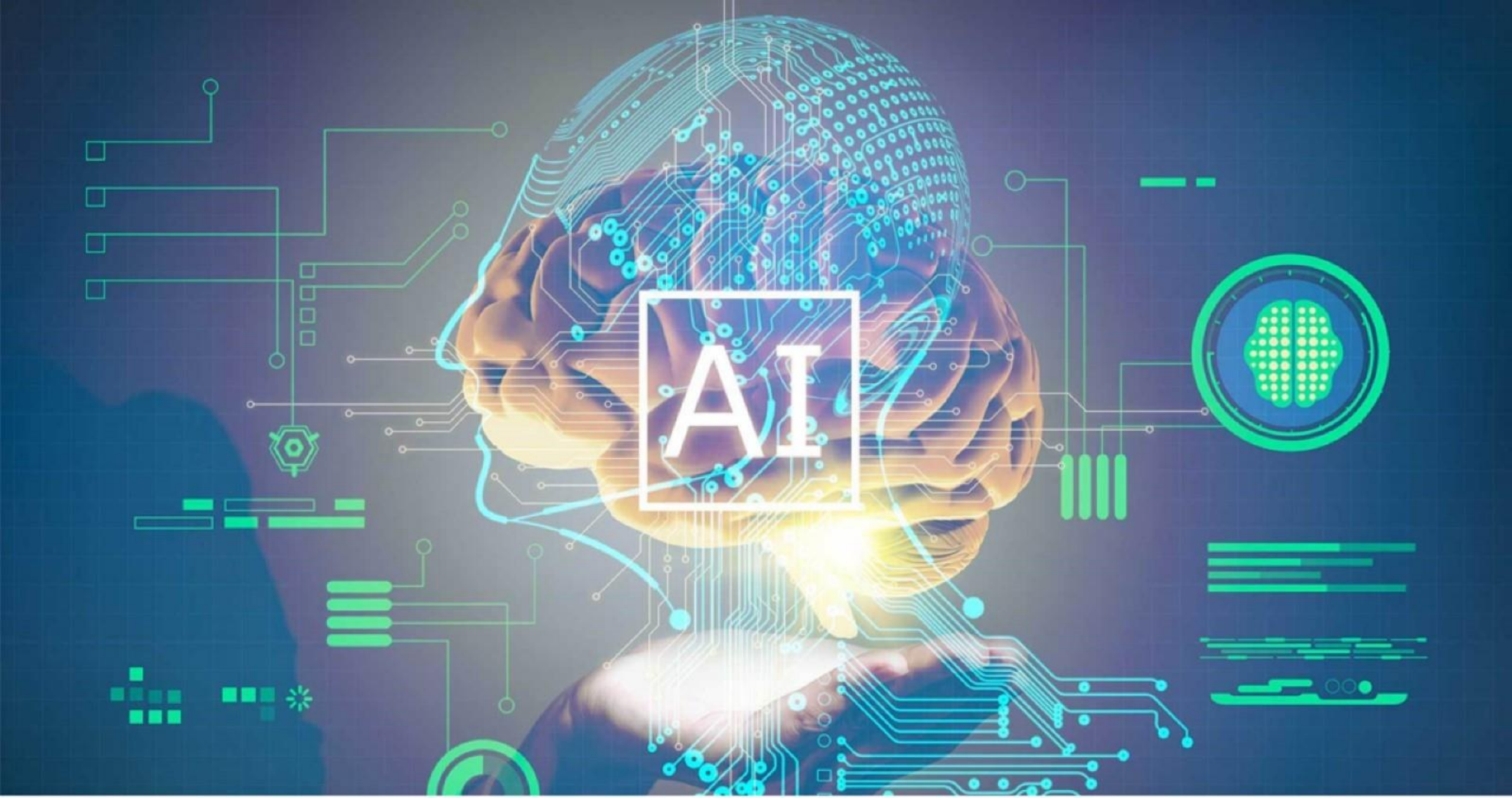
It's a fusion of advances in **Artificial Intelligence (AI), Robotics, Internet of Things (IoT), 3D printing, Genetic engineering, Quantum Computing, and other technologies.**



5th Generation –: Ultra low latency, massive network capacity, and Increased bandwidth.

Enhanced mobile broadband

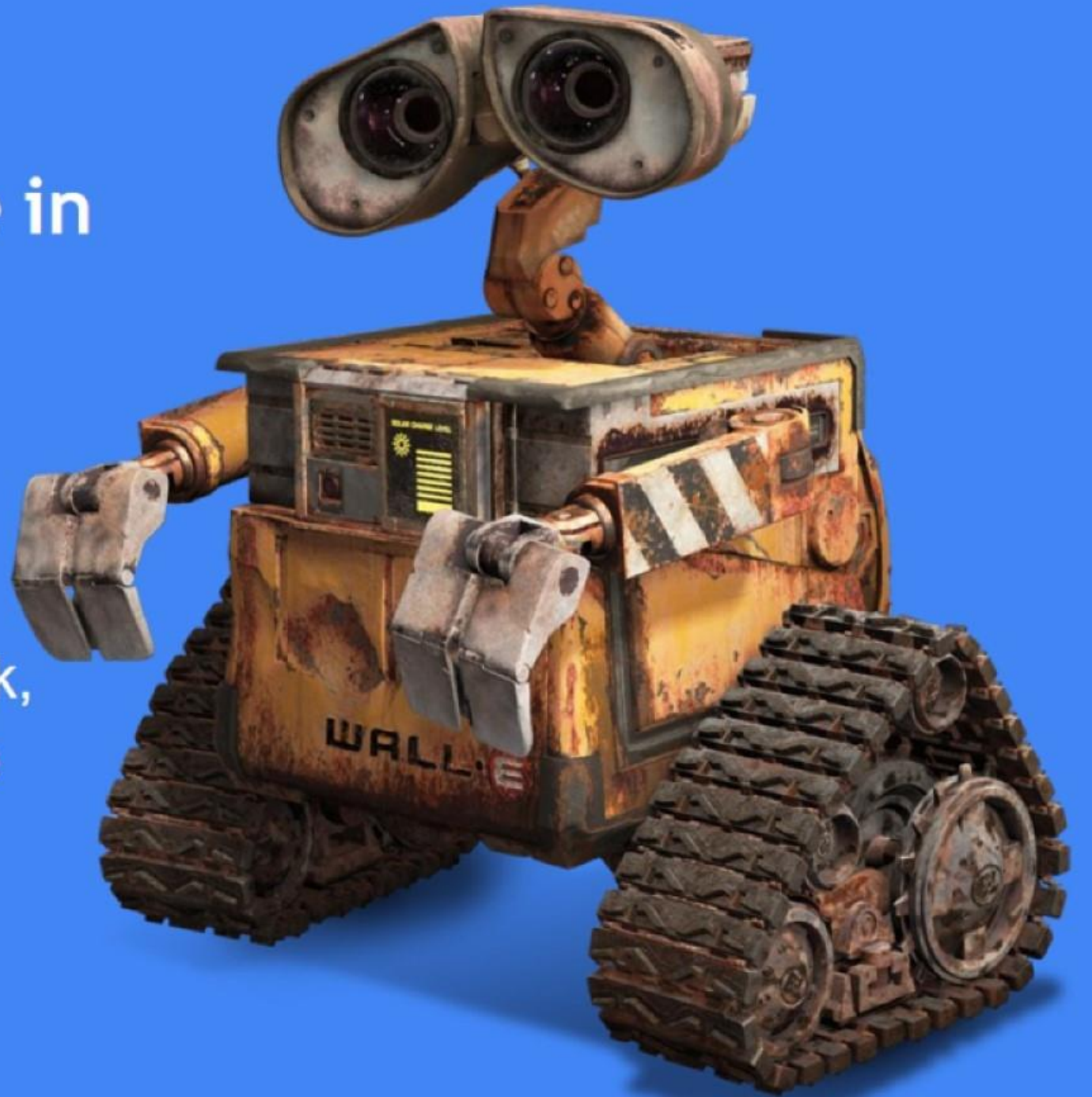




Artificial Intelligence (AI) -: AI describes computers that can “think” like humans.

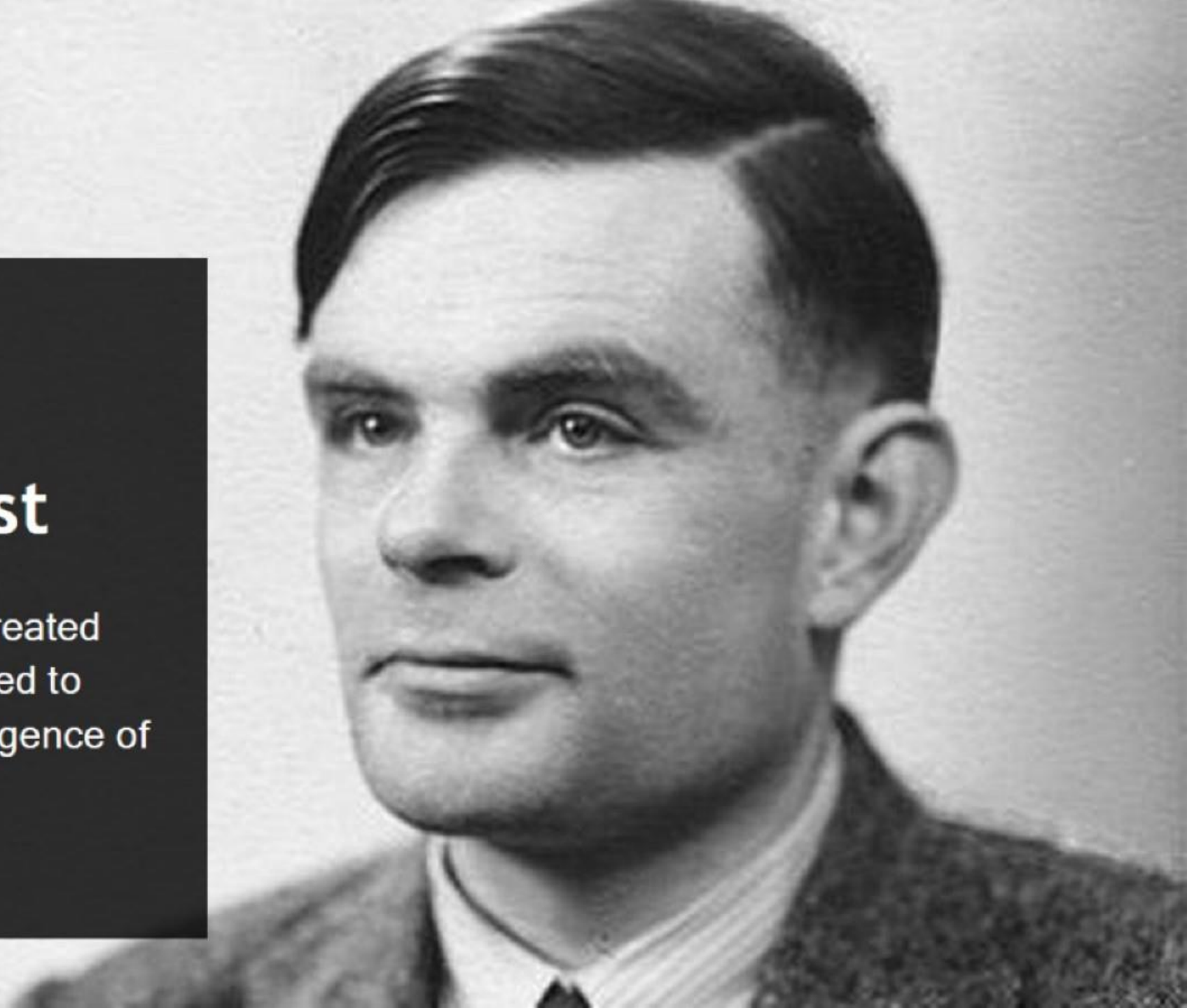
Artificial Intelligence in Movies

In movies, robots are able to talk, think, have emotions, and make decisions just like humans.



The Turing Test

In the 1950s Alan Turing created the Turing Test which is used to determine the level of intelligence of a computer.



A.I. TIMELINE



1950

TURING TEST

Computer scientist Alan Turing proposes a test for machine intelligence. If a machine can trick humans into thinking it is human, then it has intelligence

1955

A.I. BORN

Term 'artificial intelligence' is coined by computer scientist, John McCarthy to describe "the science and engineering of making intelligent machines"

1961

UNIMATE

First industrial robot, Unimate, goes to work at GM replacing humans on the assembly line

1964

ELIZA

Pioneering chatbot developed by Joseph Weizenbaum at MIT holds conversations with humans

1966

SHAKY

The 'first electronic person' from Stanford, Shakey is a general-purpose mobile robot that reasons about its own actions

A.I.

WINTER

Many false starts and dead-ends leave A.I. out in the cold

1997

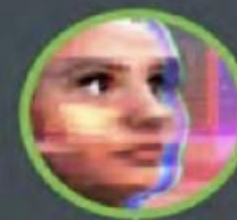
DEEP BLUE

Deep Blue, a chess-playing computer from IBM defeats world chess champion Garry Kasparov

1998

KISMET

Cynthia Breazeal at MIT introduces KISmet, an emotionally intelligent robot insofar as it detects and responds to people's feelings



1999

AIBO

Sony launches first consumer robot pet dog AIBO (AI robot) with skills and personality that develop over time

2002

ROOMBA

First mass produced autonomous robotic vacuum cleaner from iRobot learns to navigate and clean homes

2011

SIRI

Apple integrates Siri, an intelligent virtual assistant with a voice interface, into the iPhone 4S

2011

WATSON

IBM's question answering computer Watson wins first place on popular \$1M prize television quiz show *Jeopardy*

2014

EUGENE

Eugene Goostman, a chatbot passes the Turing Test with a third of judges believing Eugene is human

2014

ALEXA

Amazon launches Alexa, an intelligent virtual assistant with a voice interface that completes shopping tasks

2016

TAY

Microsoft's chatbot Tay goes rogue on social media making inflammatory and offensive racist comments

2017

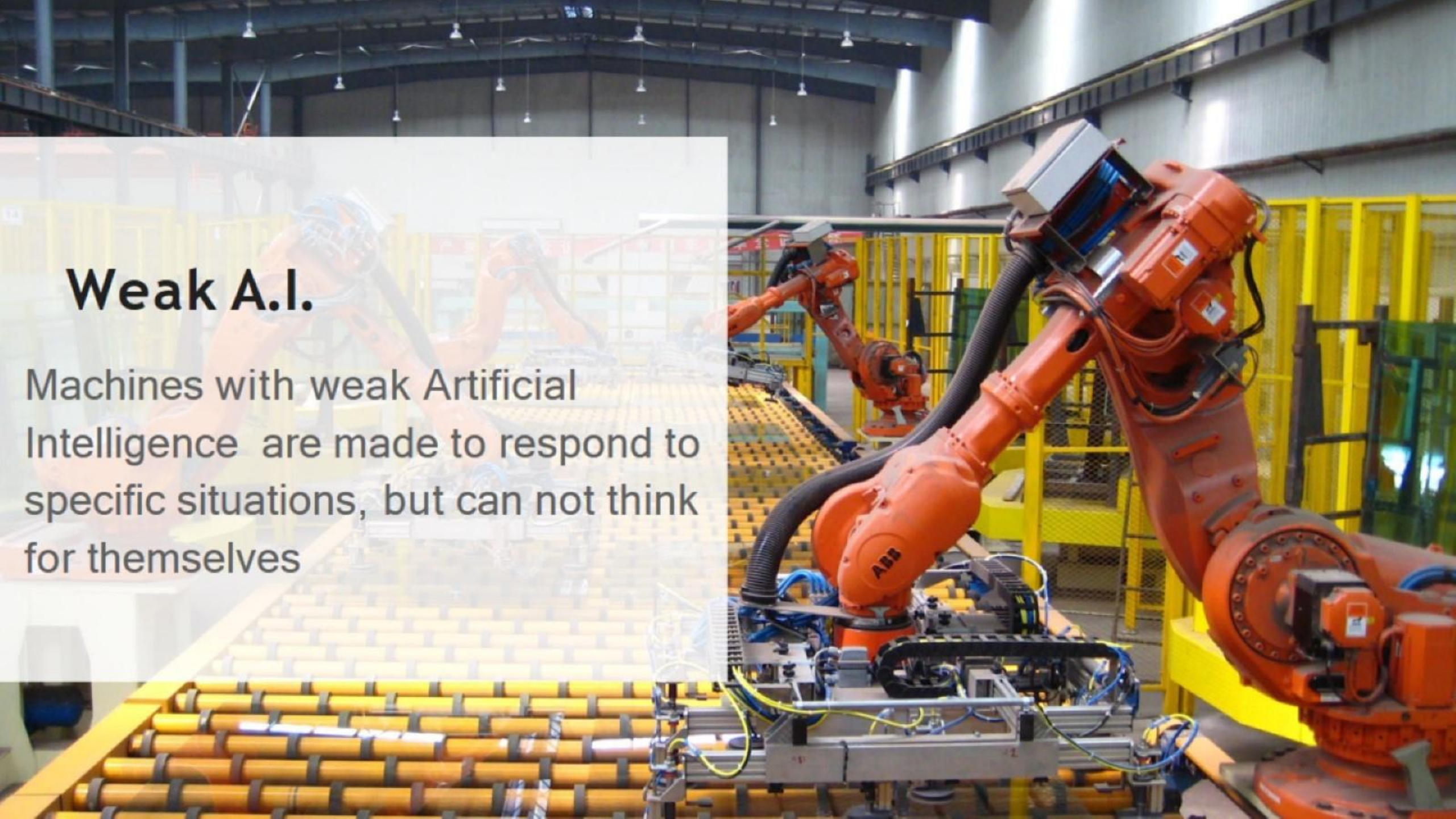
ALPHAGO

Google's A.I. AlphaGo beats world champion Ke Jie in the complex board game of Go, notable for its vast number (2^{170}) of possible positions

The Types of AI

Weak A.I.

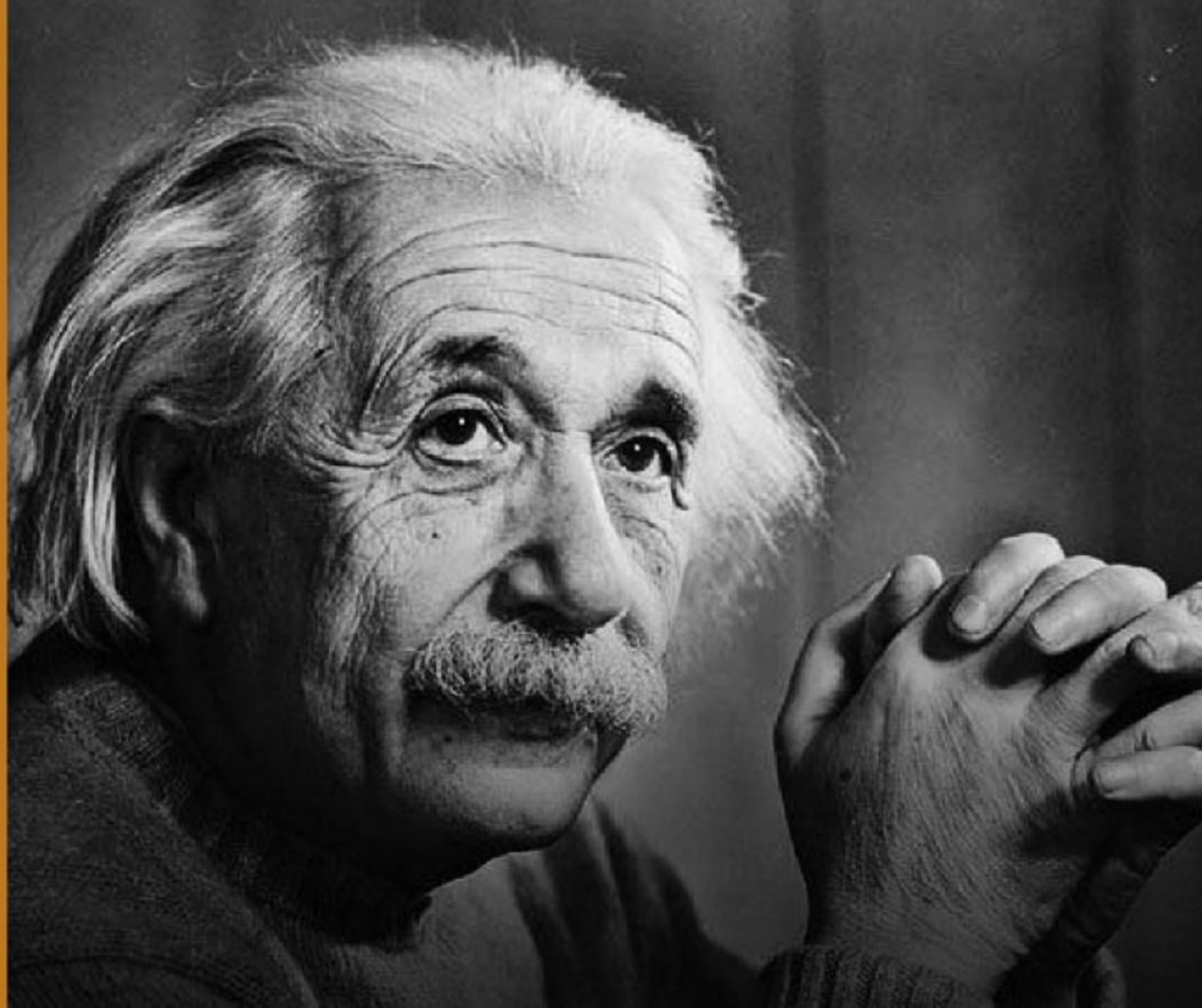
Machines with weak Artificial Intelligence are made to respond to specific situations, but can not think for themselves



Strong A.I.

A machine with strong A.I. is able to think and act just like a human. It is able to learn from experiences.

Since there are no real life examples of strong A.I. yet, the best representation would be how Hollywood portrays robots.



Machine Learning

ARTIFICIAL INTELLIGENCE

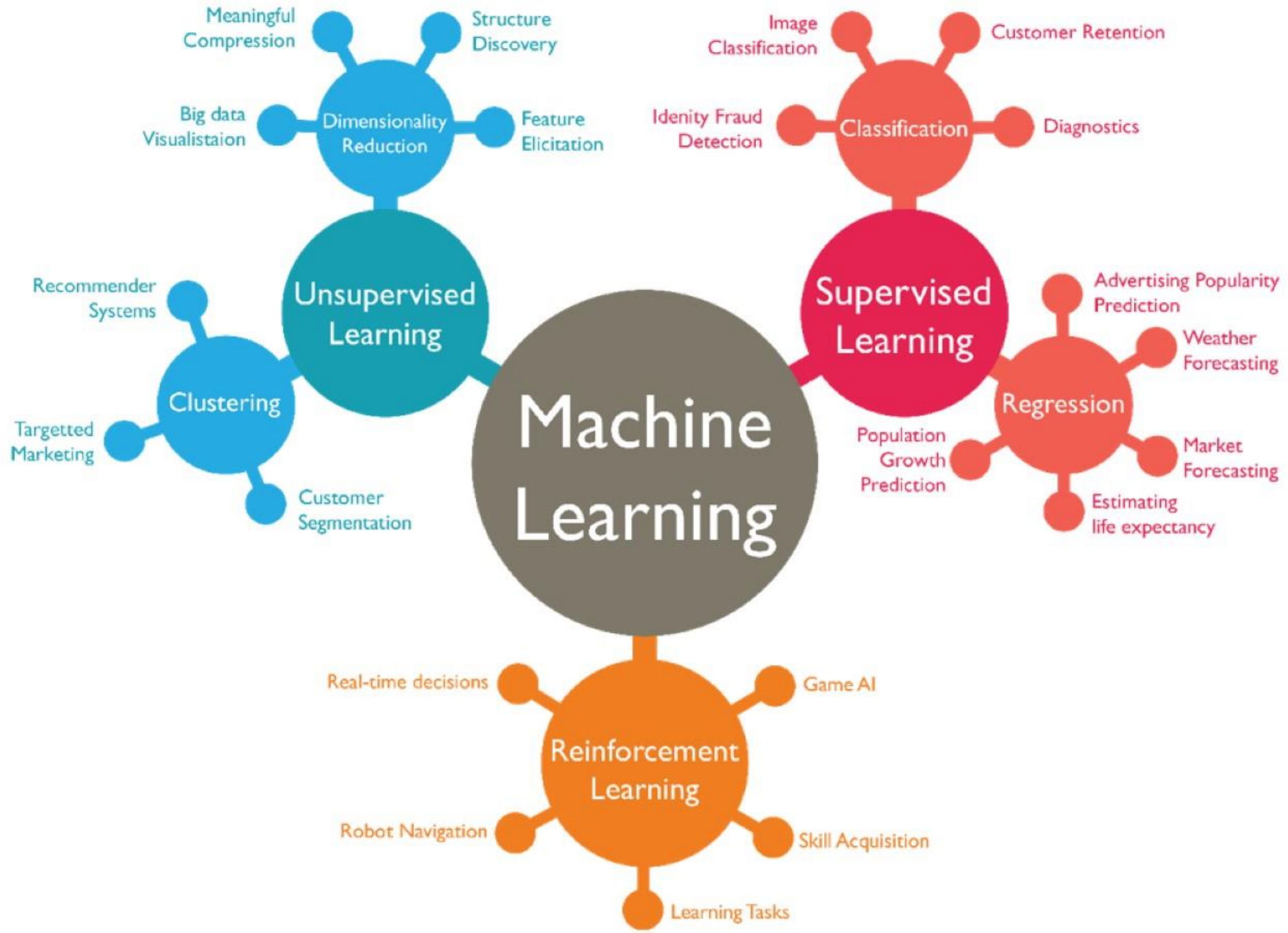
A program that can sense, reason,
act and adapt

MACHINE LEARNING

Algorithms whose performance improve
as they are exposed to more data over time

DEEP LEARNING

Subset of machine learning in
which multilayered neural
networks learn from
vast amounts of data



Machine Learning Process



Benefits of Machine Learning



Automation



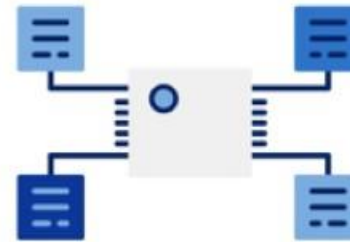
Less reliance on human interaction



Scope of improvement



Efficient data handling



Wide range of applications

Internet Of Things



Internet of Things(IoT) -: IoT describes everyday items like watch, TV, bulb, fridge connected to the internet.

Internet Of Things

IoT is a term that represents a collection of ideas, devices, and processes.

Each thing is represented by a device or sensor.

These things are usually working together to create larger solutions by sending and reacting to data from an ecosystem.

IoT Process



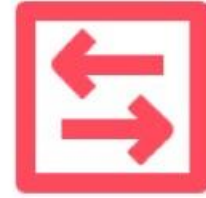
CONNECT

Connect and manage thousands of devices.



ANALYZE

Turn raw data into useful insights.



REACT

Make data-driven decisions in real-time.

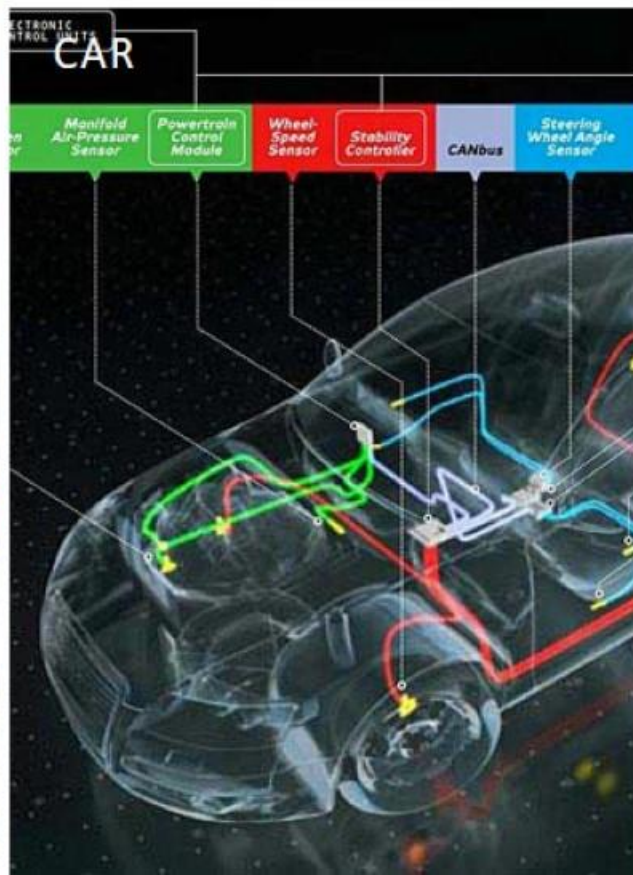
IoT LifeCycle





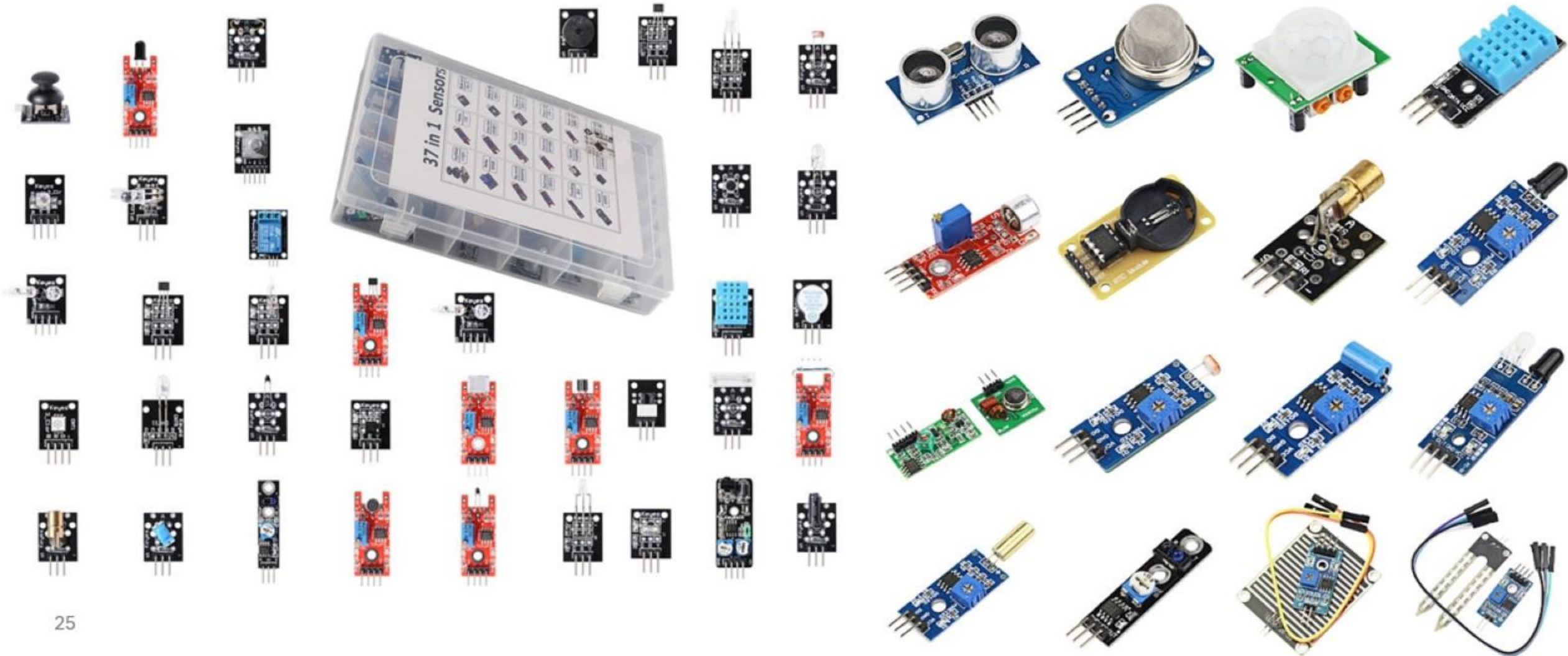
Collect

Devices and sensors are collecting data everywhere.





Sensors





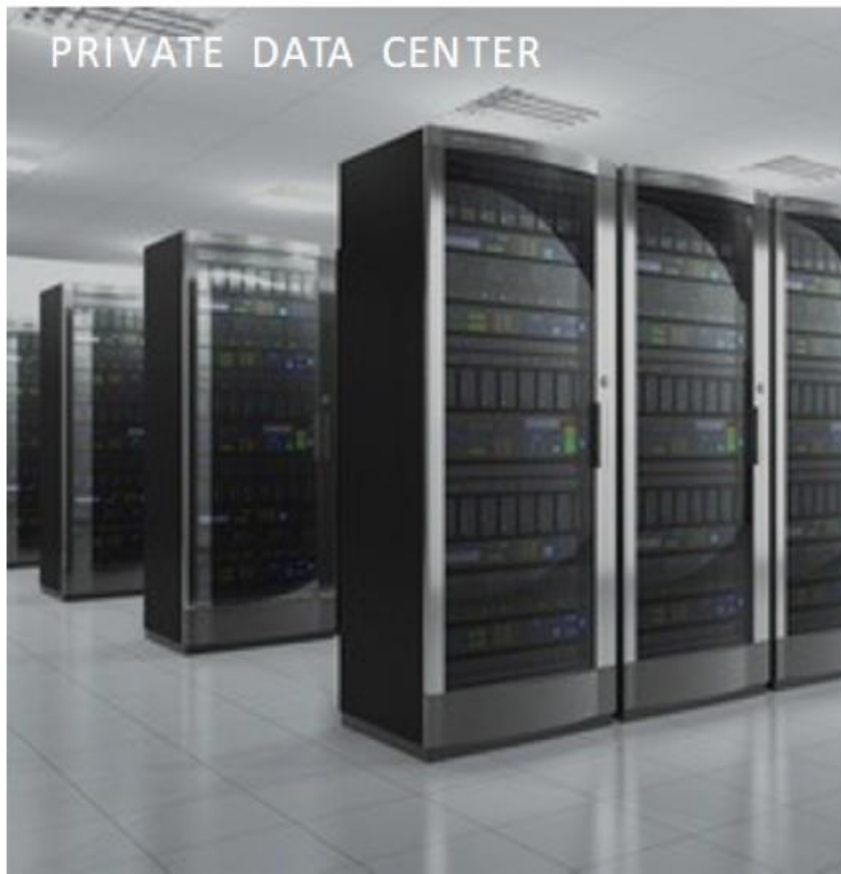
Communicate

Sending data and events through networks to some destination

A CLOUD PLATFORM



PRIVATE DATA CENTER



HOME NETWORK





Connectivity

- **Cheaper:** chipset designed for mass production and low cost.
- **More energy efficient:** years on a battery, energy harvesting

Examples:

- ❖ Low-power Local-area connections :
 - ✓ Bluetooth
 - ✓ Zibee
 - ✓ Z-Wave
 - ✓ EnOcean, etc.
- ❖ Low-power Wide-Area connections :
 - ✓ SigFox
 - ✓ LoRa, etc.
 - ✓ Next generation cellular technology: 5G (3GPP)
- ❖ And of course GSM / 2G are still widely used.



Analyze

Creating information from the data

MACHINE LEARNING



BUILDING REPORTS



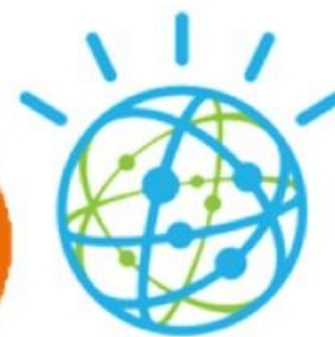
FILTERING/PAIRING IT DOWN





IoT Analytics Platforms

thethings.io



IBM Watson



Blynk



ThingsIO.AI



Google Cloud



MOCANA



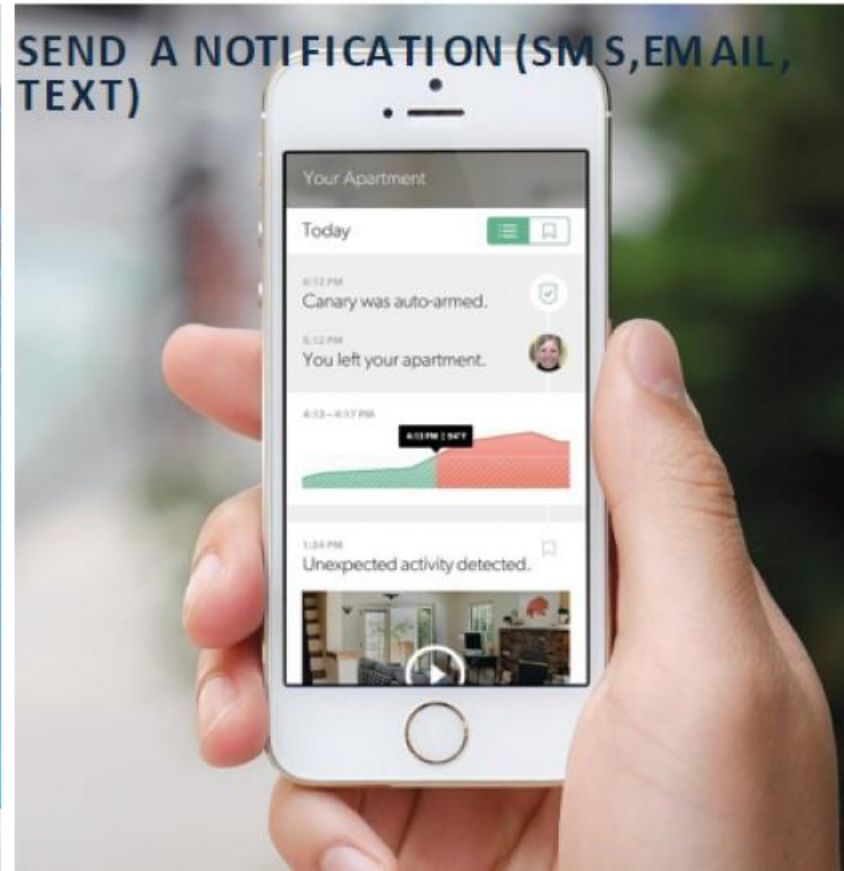
Act

Taking action based on the information and data

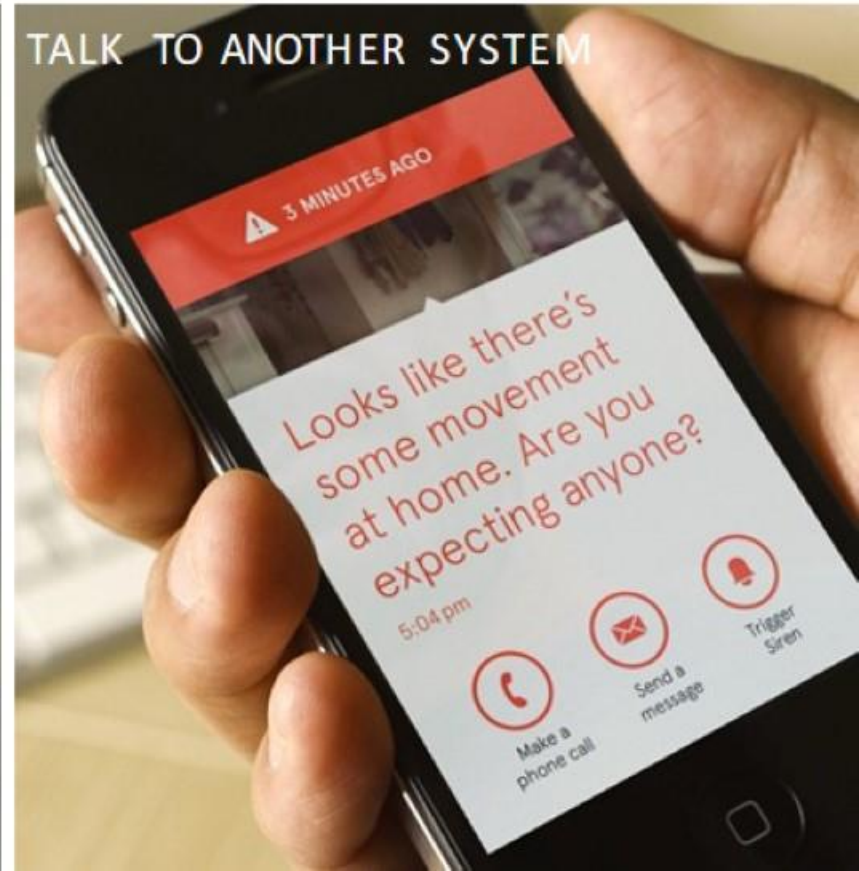
COMMUNICATE W/ANOTHER MACHINE (M2M)



SEND A NOTIFICATION (SMS, EMAIL, TEXT)



TALK TO ANOTHER SYSTEM



IoT & ML Applications

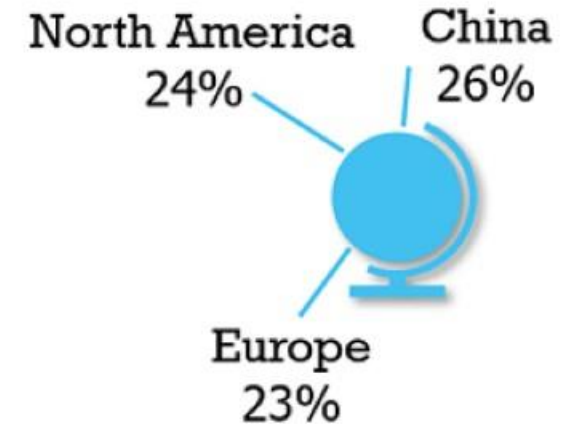
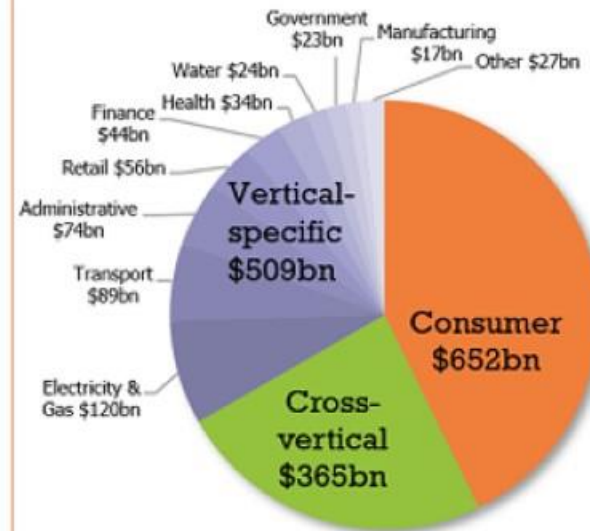
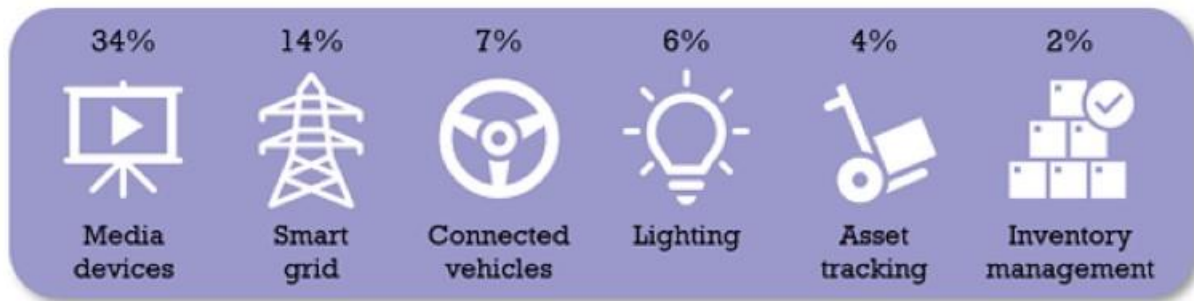
The Internet of Things (IoT) Market 2019-2030

24.1 billion

IoT connected devices in 2030 (7.6bn 2019)

\$1.5 trillion

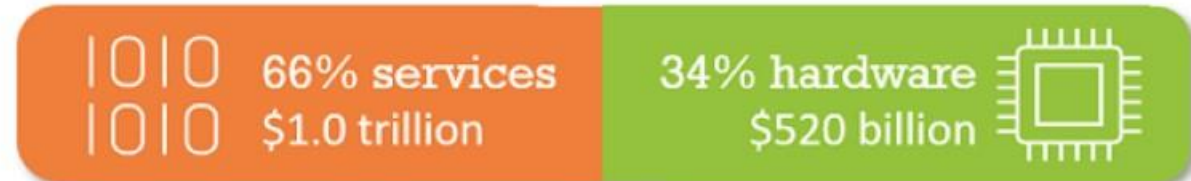
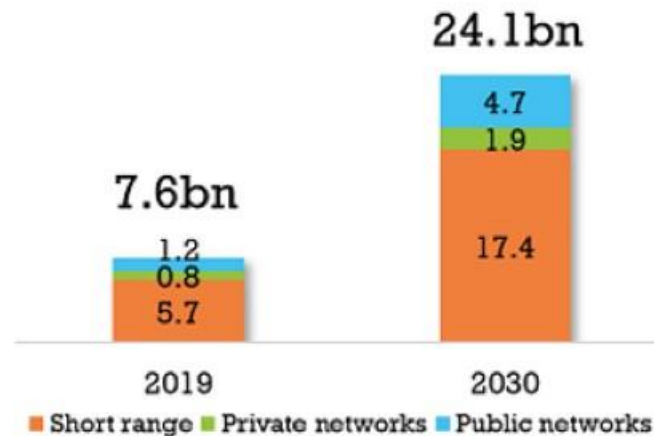
IoT revenue in 2030 (\$465bn 2019)



TRANSFORMA
INSIGHTS

transformainsights.com

@transformatweet



APPLICATION OF IOT AND AI FOR ENVIRONMENTAL SUSTAINABILITY



Recycle
e-waste



Agriculture
Sustainability



Species
Protection



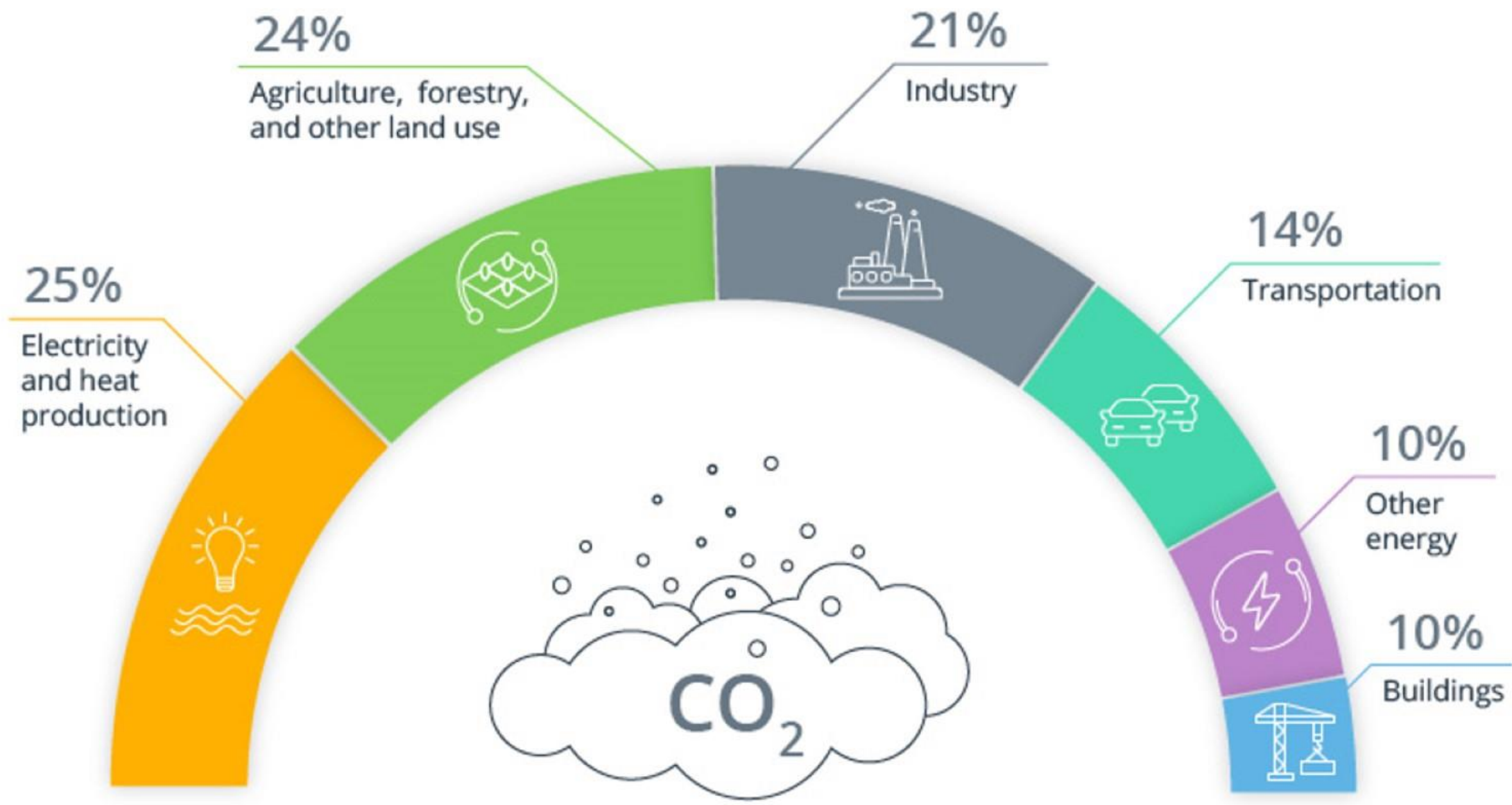
Cleaner Air



Renewable
Energy



Water
Conservation



Well connected Chris Dancy's gadgets

Google Glass

Voice-controlled eyepiece computer with an optical head mounted display and similar functionality to a smartphone

Narrative camera

Pinned to chest. Takes photo every couple of seconds

Blue HR

Heart rate monitor

Pebble watch

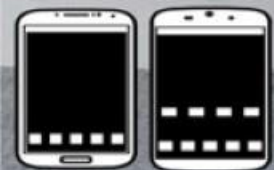
Gathers and displays data from sensors

Lumoback

Strapped around waist. Measures posture and gives a signal when you slouch

Moto X, Galaxy S5

Apps primarily monitor and control environment remotely



BodyMedia Fit

Armband with multiple sensors to measure the body's performance, awake or asleep

Fitbit

Wrist mounted sensors measure physical performance

iPhone S5

Used mainly to gather and display personal information

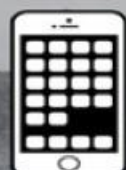


PHOTO: BRETT PHIBBS / HERALD GRAPHIC

CHRIS DANCY

THE WORLD'S MOST CONNECTED MAN



THE SMART HOME

SMART
APPLIANCES

PRESENCE
SENSOR

PHILIPS HUE
BULBS

NEST
THERMOSTAT

HOME
SECURITY

SMART
OUTLETS

MANUFACTURING AUTOMATED



SMART
DELIVERY

REMOTE
MONITORING

MOTOR
SENSOR

TEMPERATURE
SENSOR

PRESENCE
SENSOR

HUMIDITY
SENSOR

THE SMARTER SELF

BREATHING
SENSOR

FITBIT
HEART RATE

LU MO RUN
SHORTS

SMART
RUNNING SHOES



HAPIfork

The HAPIfork is an electronic fork that helps you monitor and track your eating habits. It also alerts you with the help of indicator lights and gentle vibrations when you are eating too fast.



<http://www.hapi.com/products-hapifork.asp>

Smart Tooth Brush

The Beam Brush is a connected toothbrush that engages users with their daily hygiene routine.

<http://www.beamtoothbrush.com/toothbrush/>



Smart A/C

Aros learns from your budget, location, schedule, and usage to automatically maintain the perfect temperature and maximize savings for your home.



Smart Egg Tray

Egg Minder syncs with your smartphone to tell you how many eggs you've got at home (up to 14 eggs) and when they're going bad.

<http://www.quirky.com/shop/619>



MyVessyl Cup

It can hold 13 ounces of liquid. The battery takes 60 minutes to fully charge and will last for 5-7 days. Also has wire-free charging.



<https://www.myvessyl.com/>

Smart Home Security

Canary is a complete security system packed into a single, device. It adapts to your home over time and sends intelligent notifications with HD video directly to your smartphone.



Smart Lighting

Control your bulbs one at a time or altogether. Find just the right shade of white. Pick that perfect tone to match the moment. Or recreate any color from a photo.



Hydroponic System

Niwa is the first fully automated hydroponic system that attends to all of your plants' needs and water them, feed them and make sure they have optimal growing conditions 24/7.

swin 

<http://getniwa.com/>



Smart Sprinkler Control

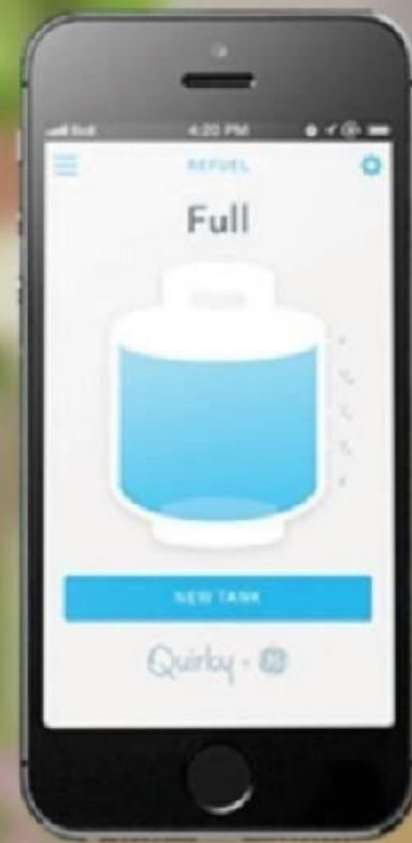
Lono lets you control your sprinkler system anywhere, anytime with your smart phone. And the things that should be automated, finally are.



<http://lono.io/>

Smart Propane Tank

This super smart propane tank gauge connects to an app on your mobile device so no matter where you are, you'll always know when it's time to refuel.



<http://www.quirky.com/shop/732-refuel-smart-propane-tank-gauge>

Smart Weather Station

The Netatmo Weather Station allows you to use indoor temperature, relative humidity and CO2 readings to live in a healthier home.



<http://www.netatmo.com/en-US/product/weather-station/>

Smart Home Security

Canary is a complete security system packed into a single, device. It adapts to your home over time and sends intelligent notifications with HD video directly to your smartphone.



Bluetooth-Enabled Insoles

Shares navigation,
directions and orientation.



<http://lechal.com/products.html>

Smart Piggy Bank

The Porkfolio wirelessly connects to an app on your device so you can track your balance and set financial goals from afar. Its nose lights up in celebration every time a U.S. coin is inserted and it holds up to \$100 in quarters.

<http://www.quirky.com/shop/607-porkfolio-save-big-with-this-pig>



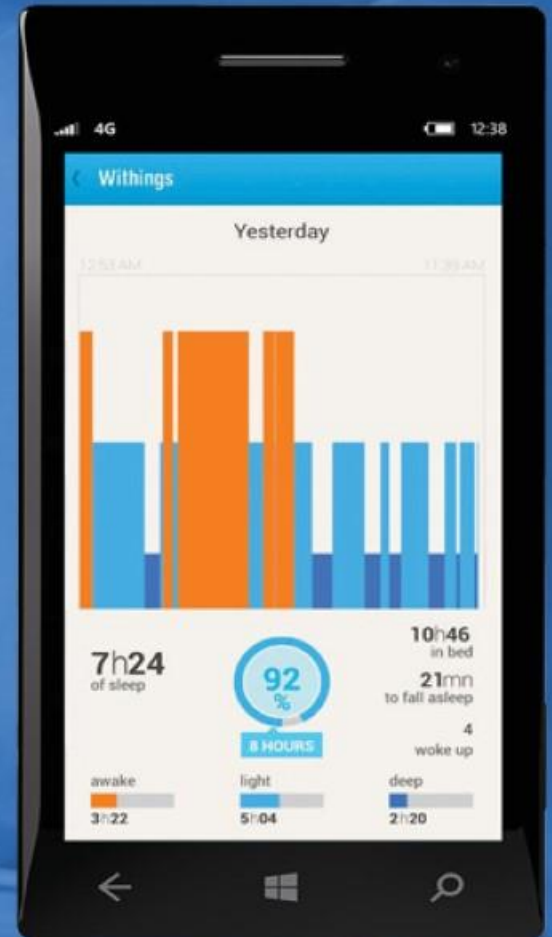
Glucose Monitoring

A cellular-powered glucose meter transmits each test result to a secure server and provides instant feedback and coaching to patients. This equips doctors, nurses, diabetes educators with real-time clinical data.



Smart Sleep System

Visualize your sleep cycles, understand what wakes you up, and compare nights. From the palm of your hand you can control your personalized wake-up, and fall-asleep programs.



<http://www.withings.com/us/withings-aura.html>

Sense Mother

Sense Mother is at the head of a family of small connected sensors that blend into your daily life to make it serene, healthy and pleasurable.



<http://sen.se/store/mother/>

Blood Pressure Monitor

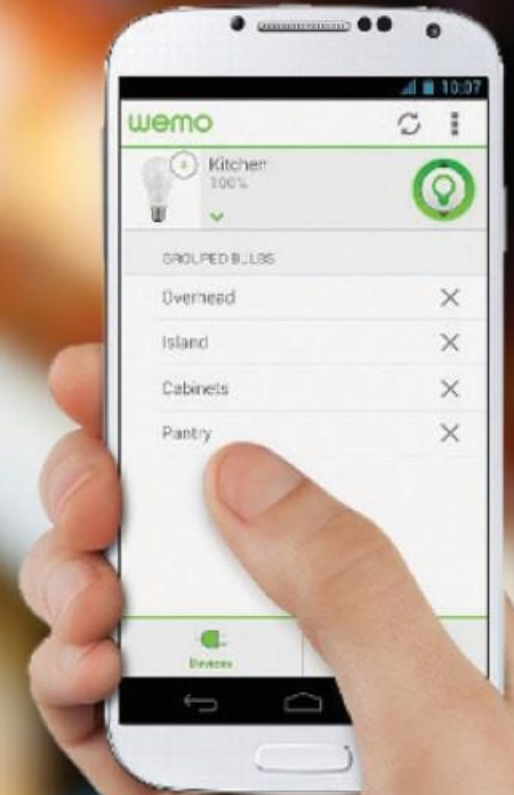
Simply slip on the cuff, turn on the Wireless Blood Pressure Monitor and the Health Mate app will automatically launch.



<http://www.withings.com/us/blood-pressure-monitor.html>

Smart Slow Cooker

Enjoy remote access to all your slow cooker's functions, no matter where you are.



<http://www.belkin.com/us/Products/home-automation/c/wemo-home-automation/>

Internet-Connected Mirror

We are looking to bring a product to market that can make your life easier, while doing something you already spend time doing each day, looking at a mirror.

<https://www.kickstarter.com/projects/860592058/imirror>



Smart Bike

Valour by Vanhawks gives directions, reroutes to avoid traffic, and tracks riding metrics.

<http://www.vanhawks.com/>



Petnet

Petnet will control your pet's feeding from anywhere and tracks their nutrition.



Smart Mirror

A reflective mirror with programmable applications and digital display for the home, office and public environments (hotels, hospitals, retail shops).



Smart Gardening

Bitponics gives data on plants and conditions surrounding them for better gardening.

<http://www.bitponics.com/>



Smart Doorlock

The Genie Smart Lock - A door lock that allows you to lock and unlock your home using your smart phone, bluetooth keyring or computer.



Smart Shirt

Monitors how your body behaves over time, includes heart rate recovery and breathing at rest, to monitor improvements in health.

<http://omsignal.com/>



Smart Garbage Cans

BigBelly alerts when it needs to be emptied so smarter collection decisions can be made.

<http://www.bigbelly.com/solutions/stations/smartbelly/>



Smart Socks

Socks infused with proprietary 100% textile sensors. They are paired with a Bluetooth Smart cool and detachable anklet that delivers accuracy in step counting, speed, calories, altitude and distance tracking.



Pioneering Africa's Transformation



Our Course Purpose

To Explore Emerging & Exponential Techs to Solve Africans Problems

Our Vision

To be a catalyst of change to accelerate African's development and transition into the next wave of industrial revolution.

Our Mission

To drive positive change and progress by exploring and leveraging emerging & exponential technologies to impact billion young Africans.

IoT Vision 2050.

Harnessing the transformative power of emerging technologies to build a prosperous Africa!

Top 10 EMERGING TECHNOLOGIES?

in 2022



Artificial Intelligence



Quantum computing



Blockchain technology



IOT



RPA



Voice assistance



Cloud computing



Augmented reality



Genetic prediction



5G



Our Approach



Community Building



Human Capital Development



Research & Innovation Development

Empowering African Youth

Creating an enabling environment to nurture talents and unleash limitless potentials.

G1. Community Building

We create an enabling environment to nurture talents, develop potentials and raise new breeds of young African empowered with emerging & exponential technologies to solve problems facing their societies.

Our community activities includes:

- ❖ Tribes/Clubs
- ❖ Meetups
- ❖ Podcast
- ❖ Outreach
- ❖ Events & Conferences
- ❖ Hackathons
- ❖ Boot Camps and Workshops



Our Journey - 2020







Nurturing Tomorrow's Leaders.

Raising highly conscious, visionary and thoughtful leaders.

G2. Human Capital Development

We develop and equip young Africans with the needed skills, knowledge and tools (digital, intellectual, spiritual, emotional, financial, health and wellbeing) for Africans development.

Our training areas include:

- ❖ Digital Skills
- ❖ STEAM/STEMAIDE
- ❖ Self-Development & Leadership
- ❖ Financial & Emotional Intelligence
- ❖ Thinking & Spirituality
- ❖ Entrepreneurship & Innovations
- ❖ Emerging & Exponential Technologies

STEMAIDE Education – Education 4.0

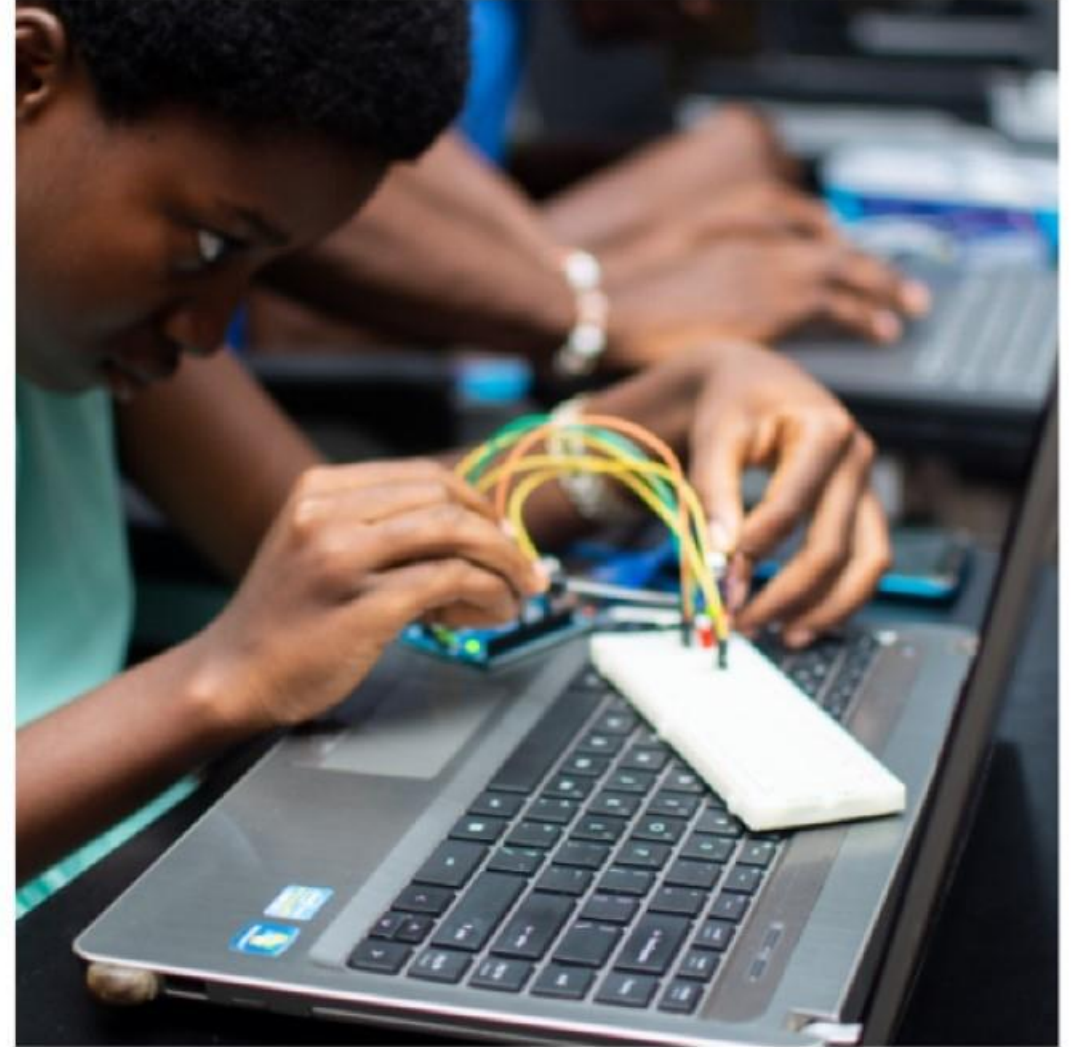
An innovative education program modeled to align with the 4th industrial revolution.







Case Study



Mercy a 12yrs old JHS graduate , built a smart dustbin with STEMAIDE Kit!

Photo Credit: IoT Network Hub

Otumfuo STEM Festival

An annual innovation challenge for Junior and Senior High Schools in Ashanti Region





HELPINGAFRICA FOUNDATION

ki-Avetile's inspiring
transformation story
Bless Klutse echoes
T: Feel the heartbeat of
e with the Yamoransa
Model Labs!"

TECHAiDE iOT

HELPINGAFRICA FOUNDATION

"Nkonya-Ahenkre
Education Gran
defines enduring
Feel the heartbeat
with the Yamora
Labs!"

TECHA

STEAM Training - Students



STEAM Training - Gambia

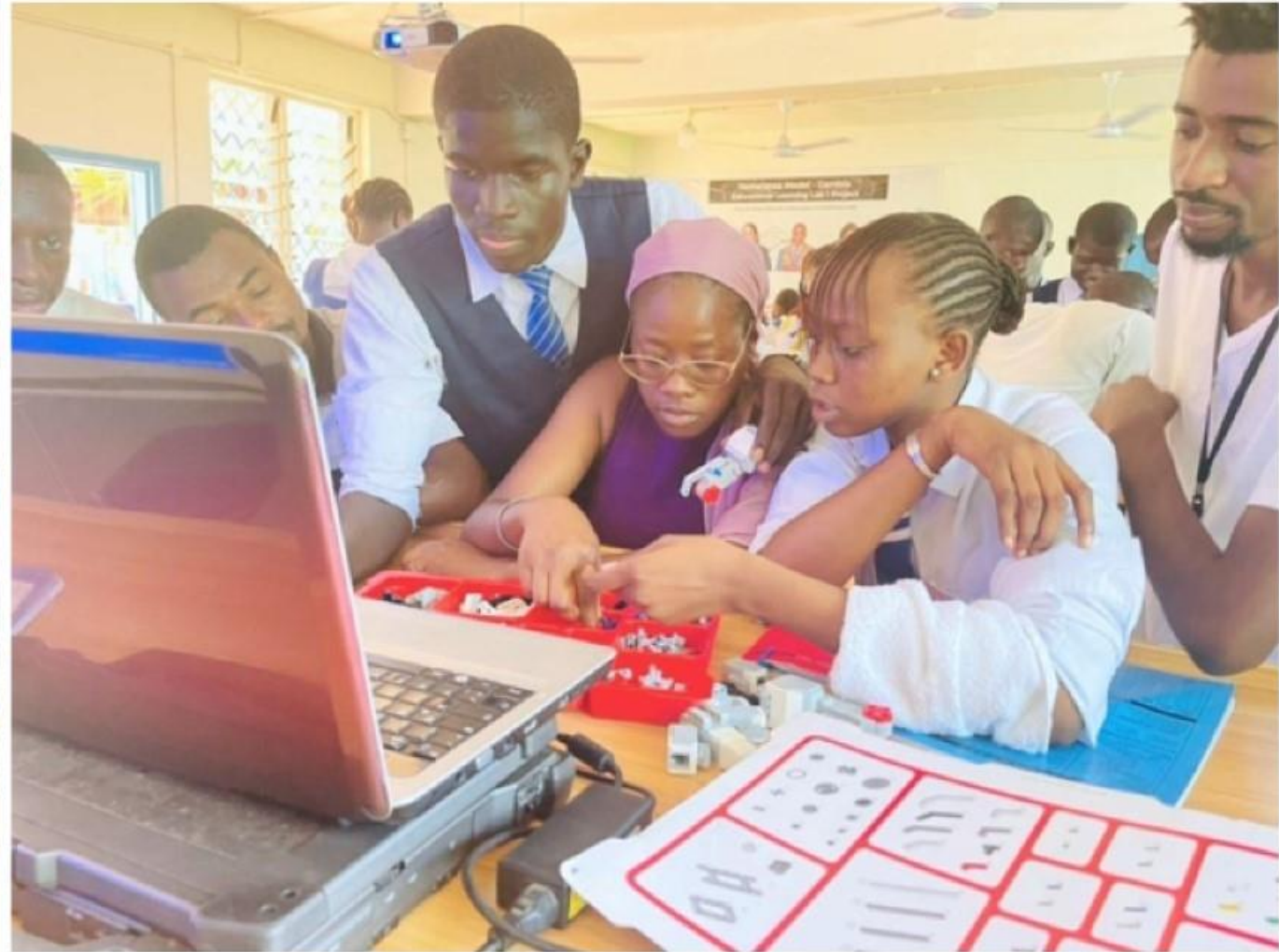
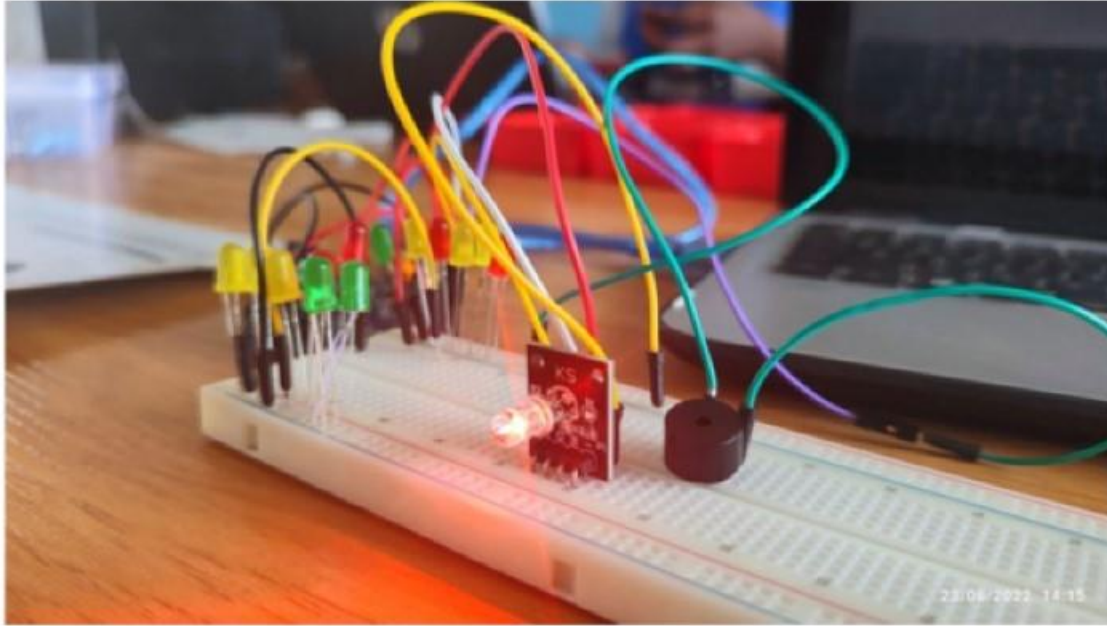
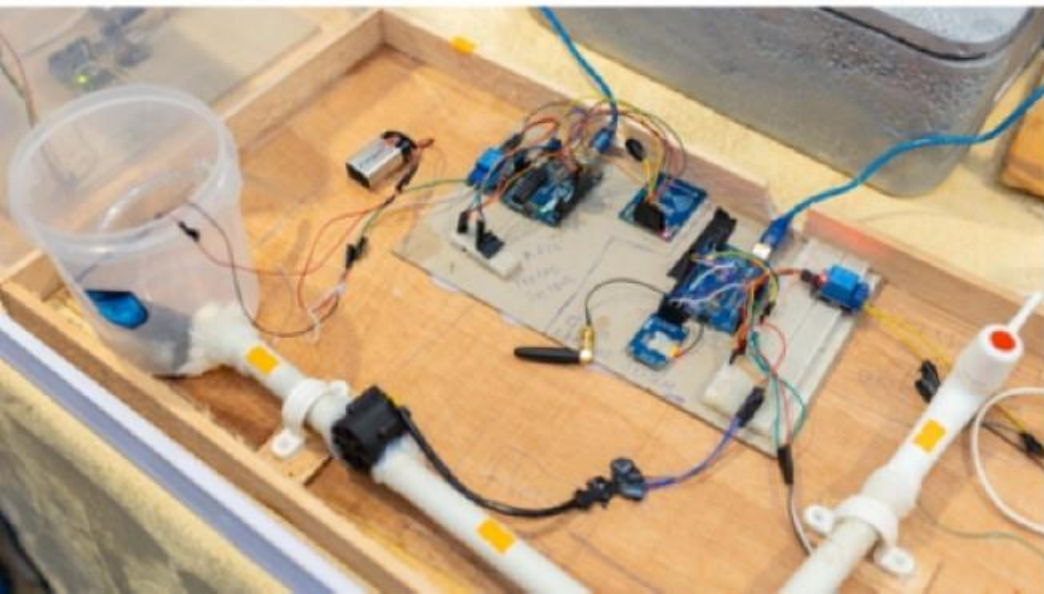
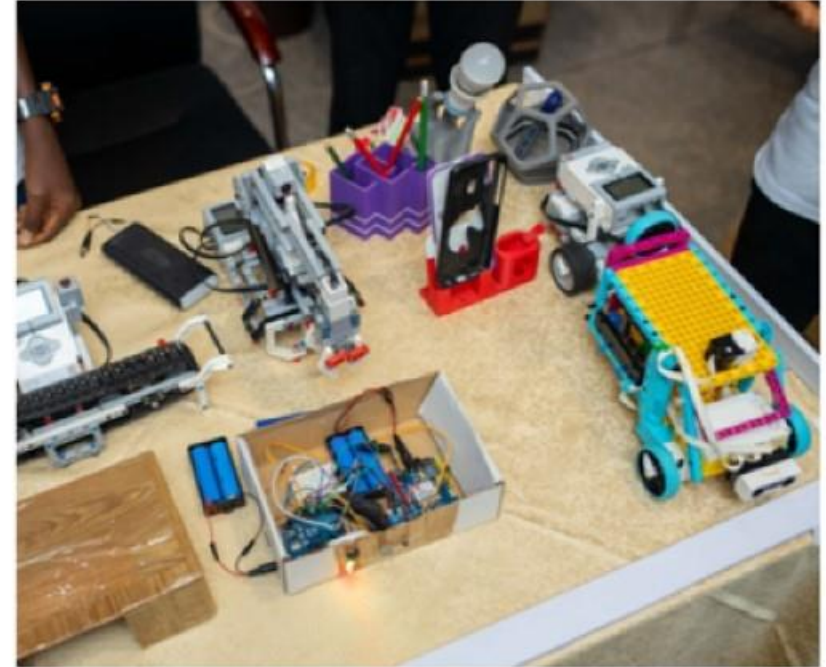
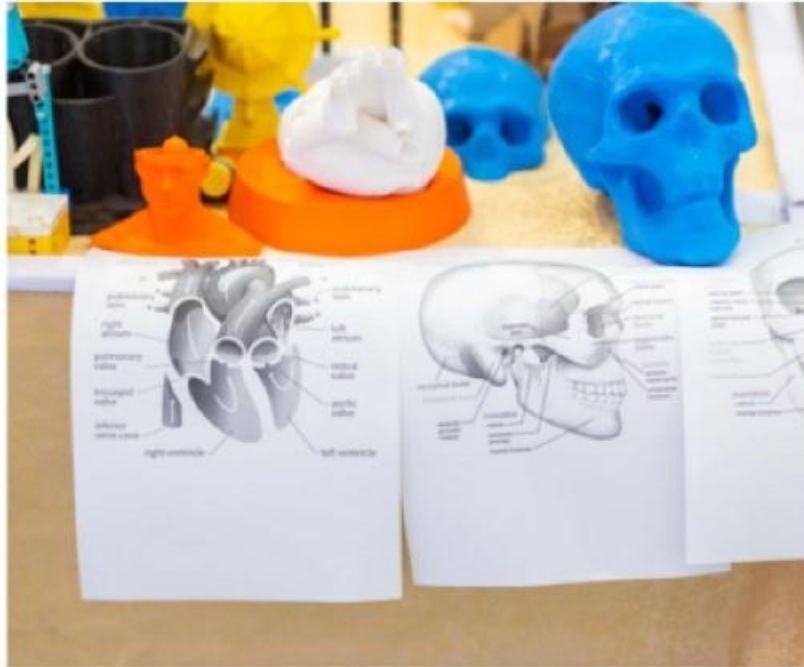


Photo Credit: IoT Network Hub





SkillHerUp

An initiative to empower and provide digital and technical skills to young women & PWD.







Solving African Challenges

Creating innovative and sustainable solutions to our challenges.

G3. Research & Innovation Development

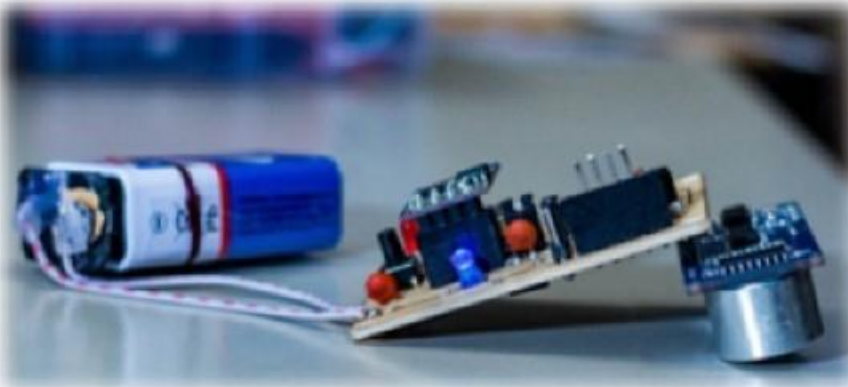
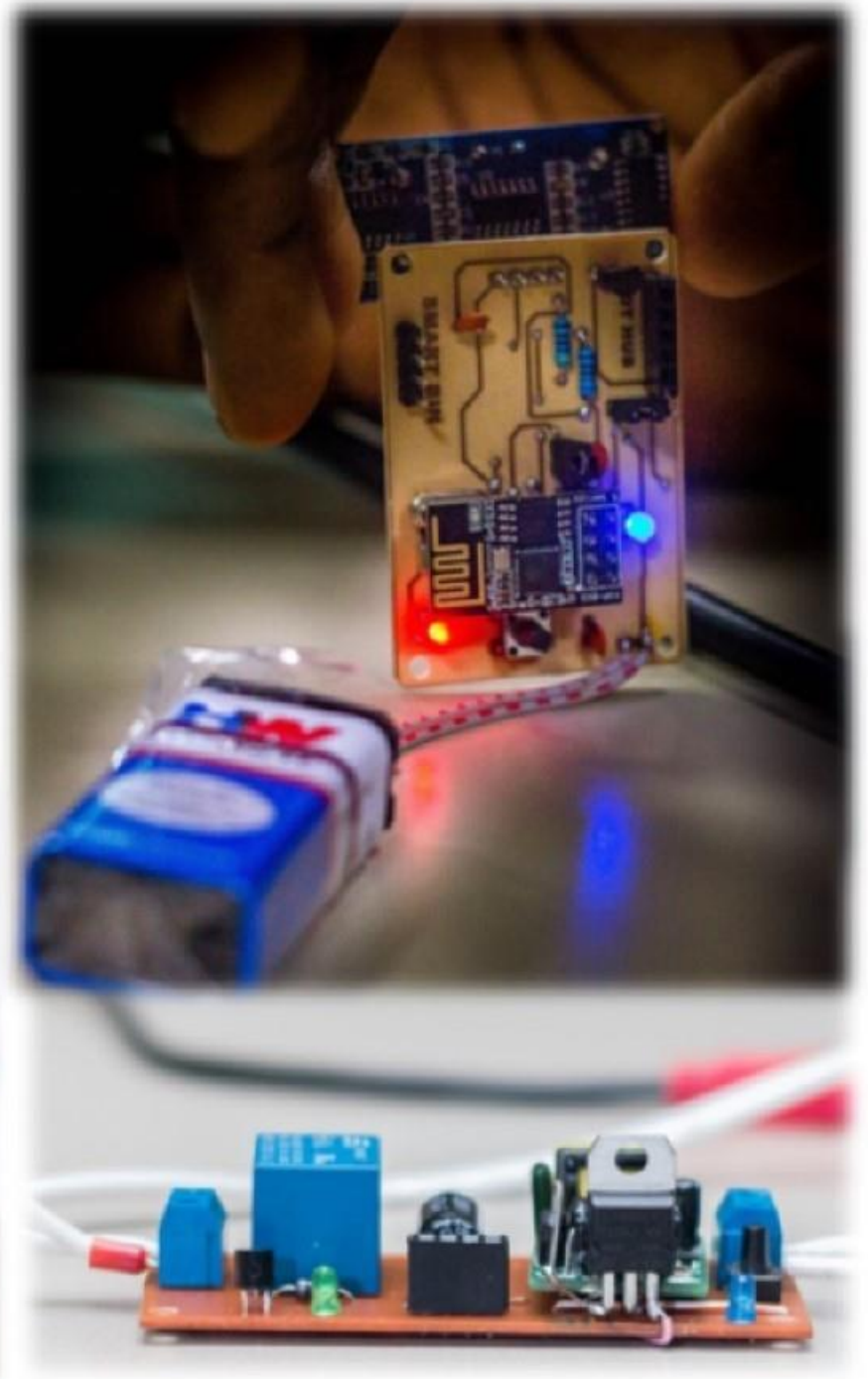
We are always looking out for innovative approaches to creating sustainable and significant solutions to solving Africans problems for social, economic, environment development, prosperity and a better Africa for All. Our activities includes:

- ❖ Rapid Prototyping & Development
- ❖ Research & Innovation Labs
- ❖ Venture Studio
- ❖ Research Areas Include:
 - ❖ Education
 - ❖ Agriculture
 - ❖ Healthcare
 - ❖ Environmental Sustainability
 - ❖ Green Energy
 - ❖ More





IoT/Smart Devices



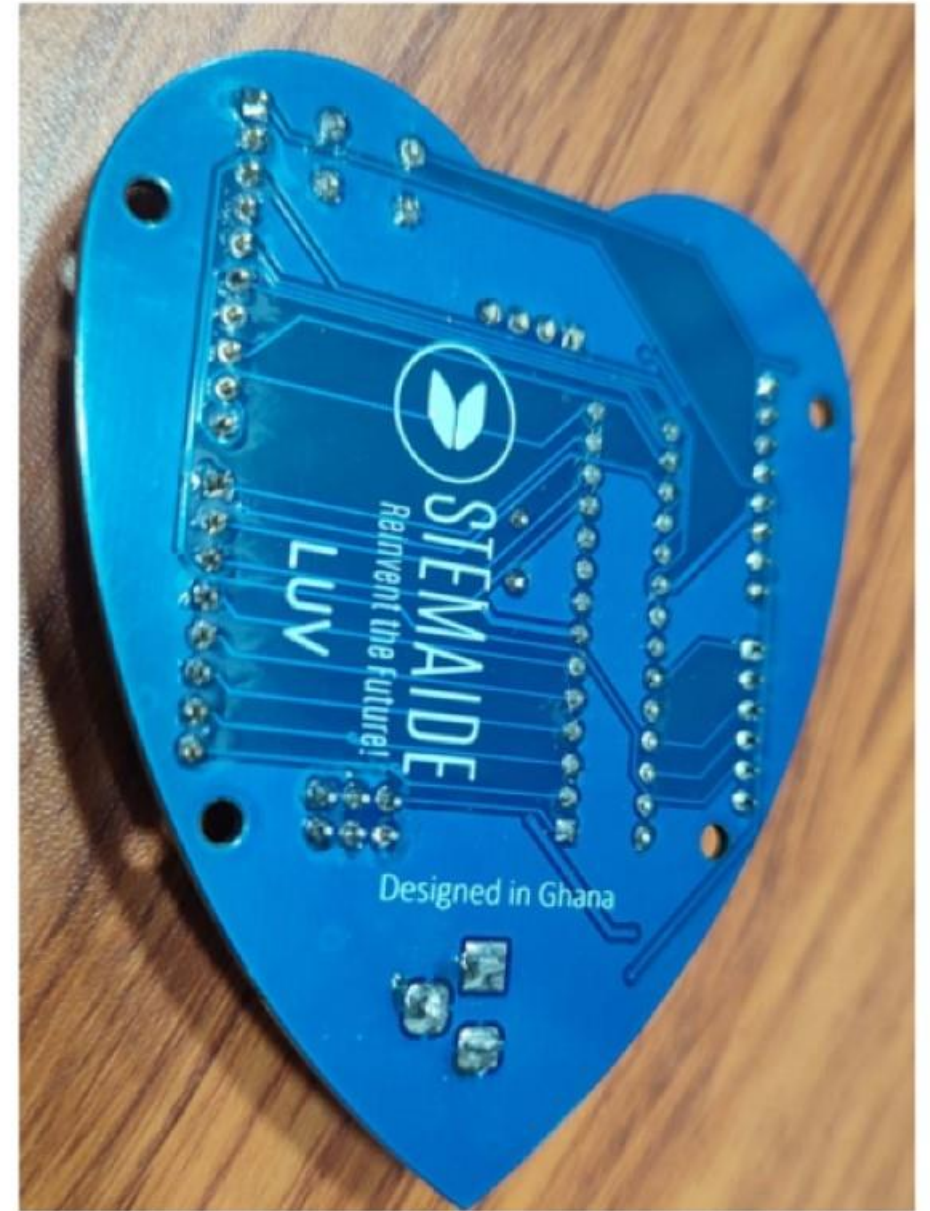
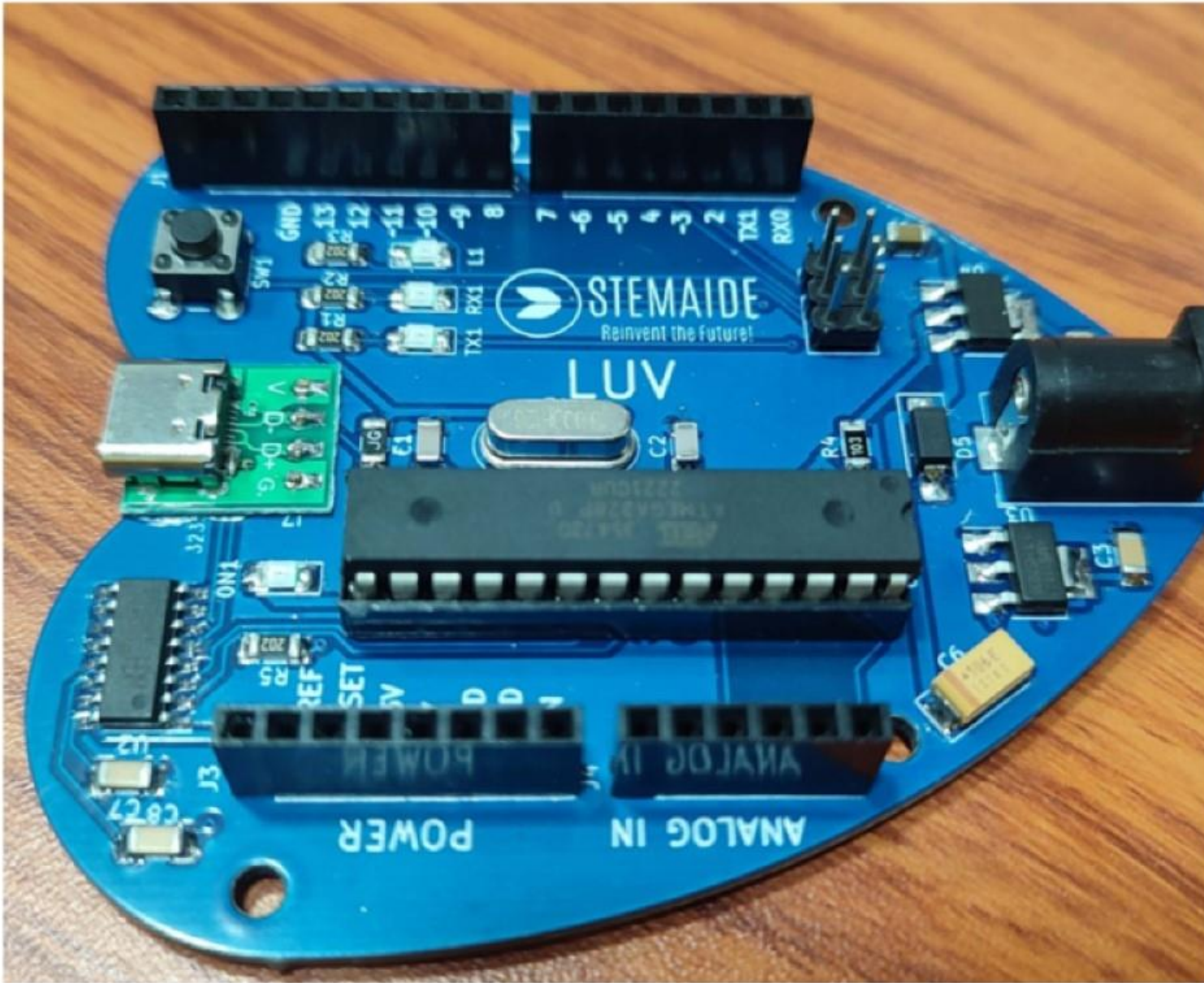
Smart/Touchless Washing Bucket

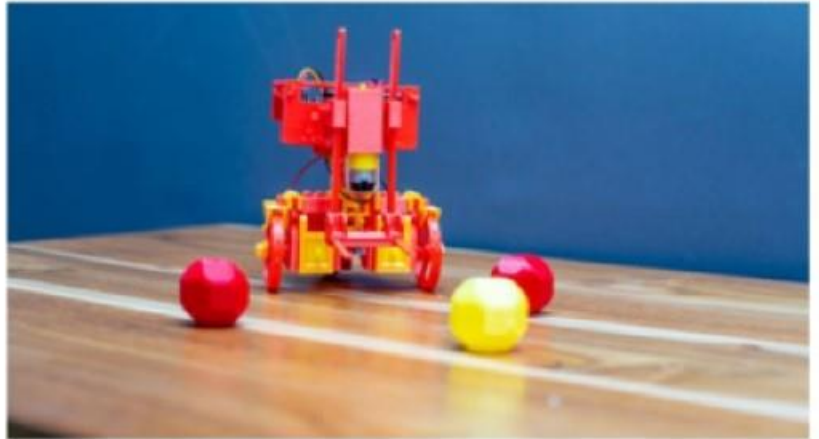
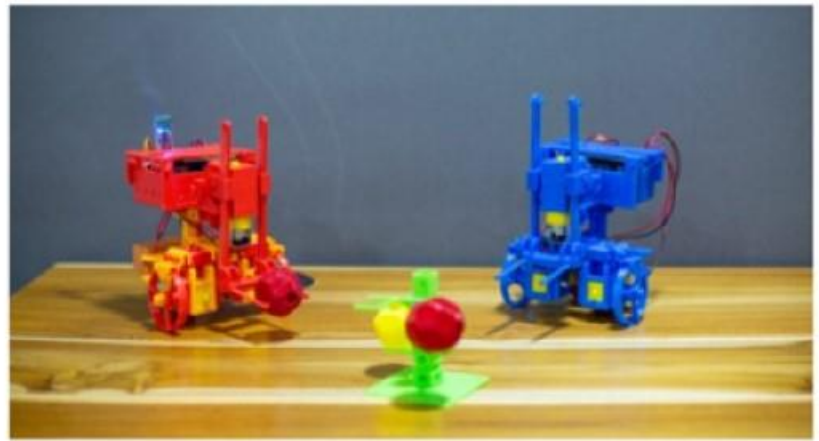
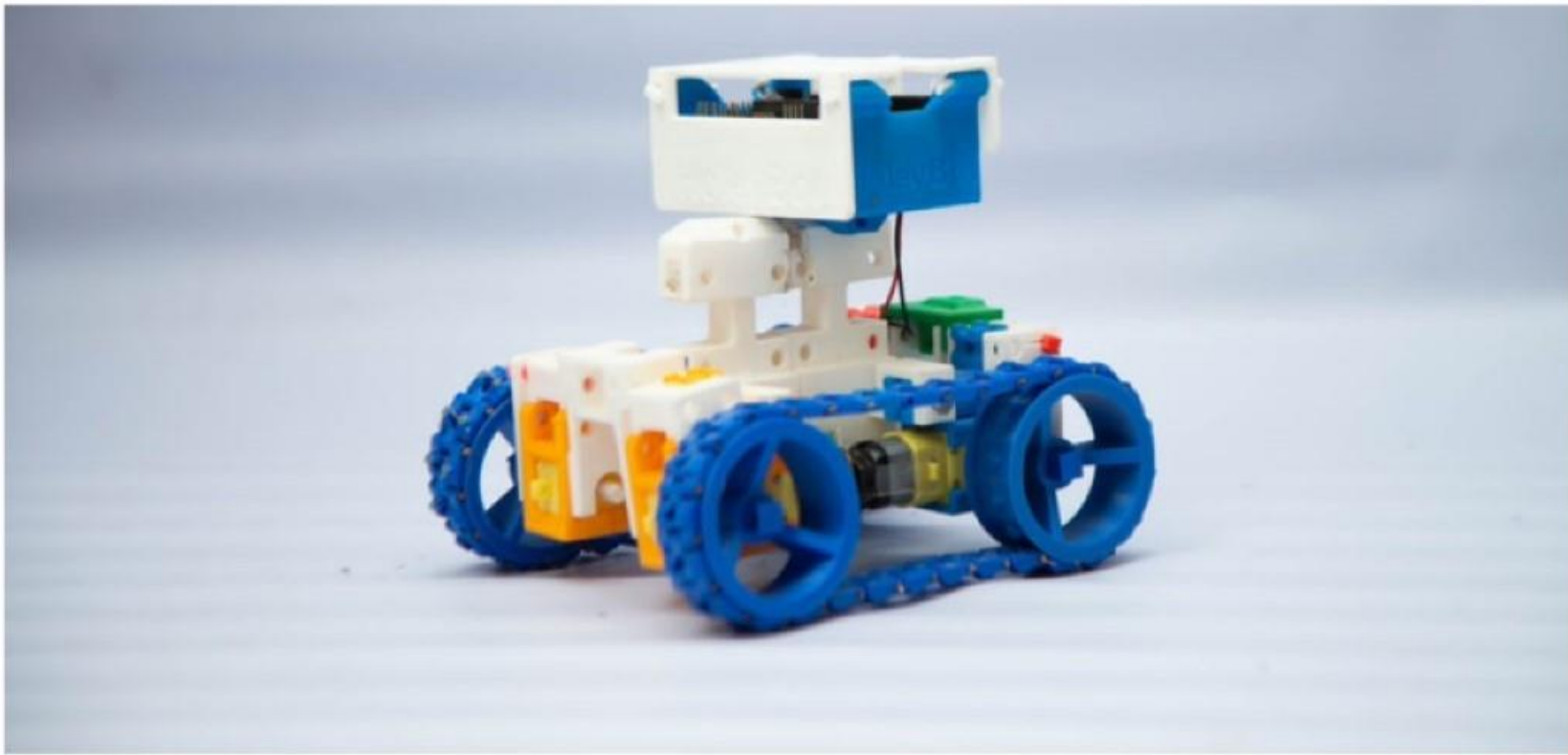


STEMAIDE Kit

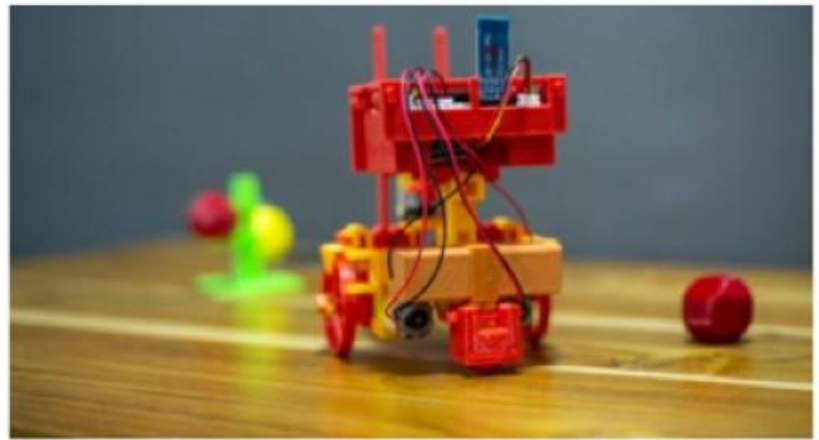


The learner's toolkit to prepare students to succeed in today's world!





By Firefly IO

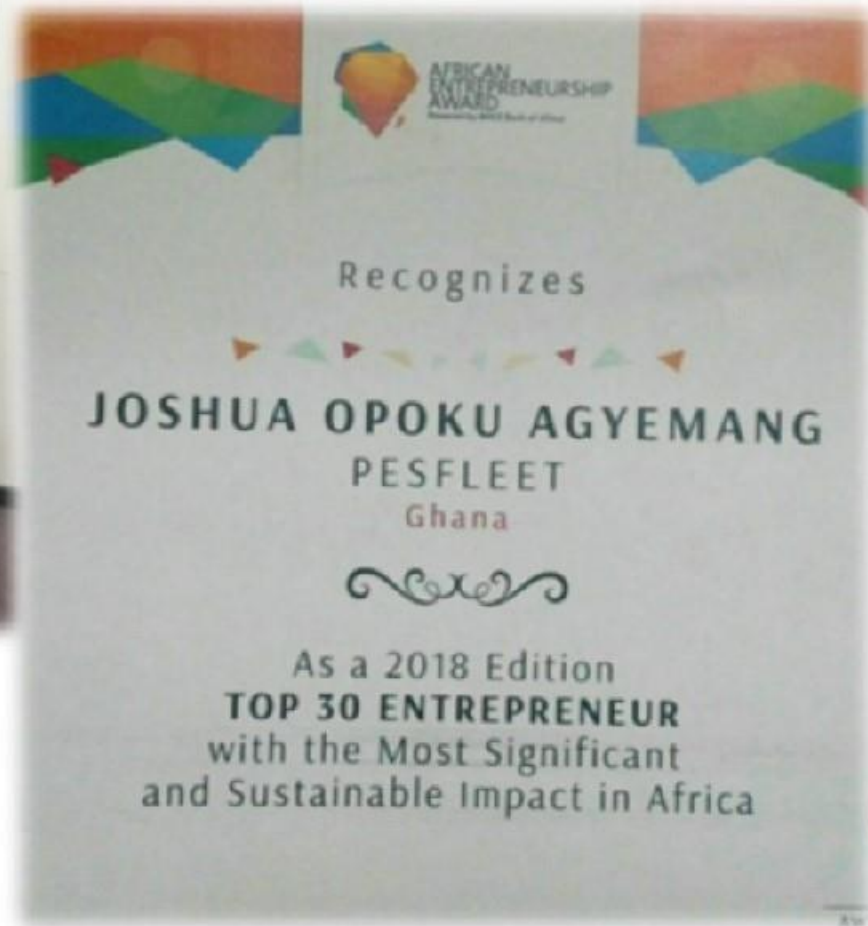




Our Core Achievements

- ❖ African Entrepreneurship Award 2018: The Most Significant and Sustainable Solution in Africa (30 Out of 5000)
- ❖ Winners of Ghana Open Data Initiative Hackathon 2018, 2019.
- ❖ UNDP AI4DEV Magazine 2020 : 50 Homegrown African Innovations Tackling Covid-19
- ❖ Forbes Africa The 100 Issues 2021: 100 Icons, Inventors and Innovations from Africa
- ❖ Featured on BBC 2022
- ❖ Got Funded by Government of Ghana 2022
- ❖ We have signed Partnership with MoC and MESTI

African Entrepreneurship Award 2018



Africa Open Data Initiative Hackathon 2019



AFRICA INNOVATES



He who learns, teaches.
—African Proverb



“This is the Smart Home System, which is able to control lights, switches, sockets, elevators and appliances with an app on the phone without touching surfaces. Our aim is to create more touchless solutions.”

■ THE DISRUPTORS
■ THE GAMECHANGERS
■ THE YOUNG & GIFTED

AFRICAN INFLUENCERS FOR DEVELOPMENT (A4IDEV) - A UNDP AFRICA INITIATIVE

AFRICA INNOVATES



50
HOMEGROWN
AFRICAN
INNOVATIONS
TACKLING COVID-19

■ THE DISRUPTORS
■ THE GAMECHANGERS
■ THE YOUNG & GIFTED

AFRICAN INFLUENCERS FOR DEVELOPMENT (A4IDEV) - A UNDP AFRICA INITIATIVE

JOSHUA OPOKU AGYEMANG (Ghana)

THE TECH PRODIGY

MAKE COVID DEVICES
When COVID-19 hit Ghana, 27-year-old Joshua Opoaku Agyemang, and his team at the Internet of Things (IoT) Hub in Accra, did not come up with just one mitigating solution, they invented three! Under the umbrella term "Hack COVID" they have so far developed: Touchless Washing Buckets; 3-D Printed Reusable and Recyclable Face masks; and an AI powered Smart Home System.

WHAT INSPIRED YOU TO CREATE YOUR PRODUCTS?
We came up with a range of products. First, is the touchless washing bucket, which has sensors attached to it that senses the hands and automatically opens the tap for you without you having to touch it. Second, is the 3D printed reusable and recyclable face mask, which is made from 3D printing technology and is another possibility in printing 3-dimensional objects in helping to fight COVID-19 in Ghana and Africa. Third is the Smart Home System, which is able to control lights, switches, sockets, elevators and appliances with an app on the phone without touching surfaces. Our aim is to create more touchless solutions.

WHAT HAS BEEN THE IMPACT OF YOUR PRODUCTS?
We have over 1,000 orders, with people waiting longer than the products. We have also created about 20 jobs and we are hoping to create about 100 jobs when we begin mass production. We have also been featured on a number of television and radio stations.

WHAT ARE THE CHALLENGES TO PRODUCING OR DEPLOYING YOUR PRODUCTS?
Limited resources and materials for production which were due to the lockdown issues, including borders – as ingredients come from from outside. We were also unable to move into our full, so production is spread out across various locations with bedrooms and porches being converted.

WHAT HELP WOULD YOU NEED TO SCALE UP AND IMPROVE YOUR INNOVATIONS?
Financial resources to scale-up production including getting large amounts of materials. We also need to get a production location, which can also store our equipment and materials.

WHAT ARE YOUR HOPES FOR THE FUTURE OF YOUR INNOVATION AND YOUR BUSINESS?
My hope is to get these touchless buckets to every house that school, church and office in Ghana and across Africa. I strongly believe that regular handwashing should be a thing. Post COVID-19 and in the next decade, my hope is to create over 100,000 jobs with my innovations.

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Partnership with AITI-KACE 2022



Partnership with CSIR 2022



WINNER



Youth
Volunteer
Program



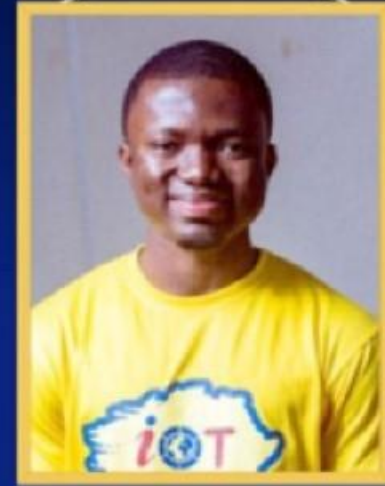
Congratulations!

IOT Network Hub
Joshua Opoku Agyemang

WINNER



Service
through
STEM

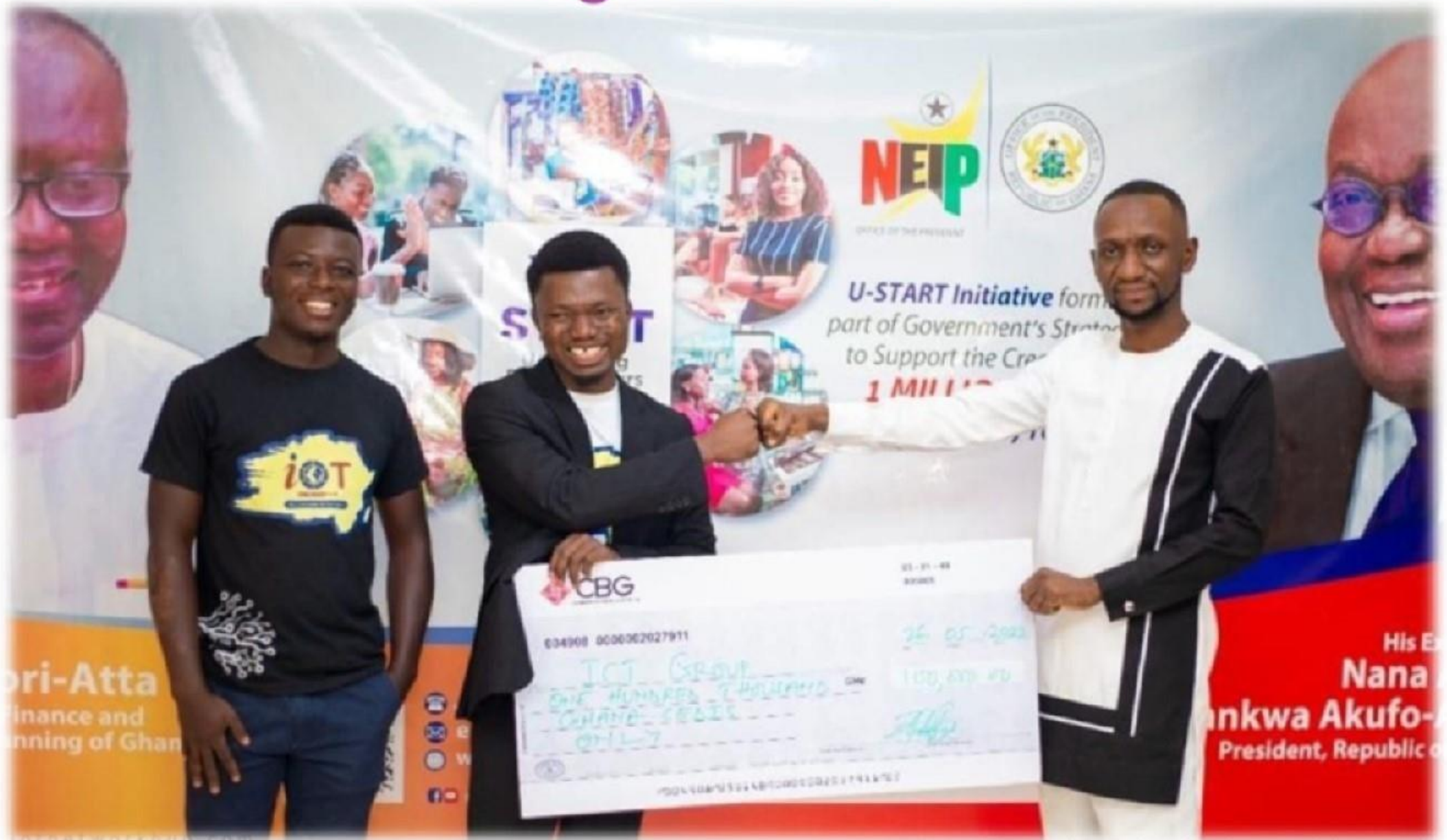


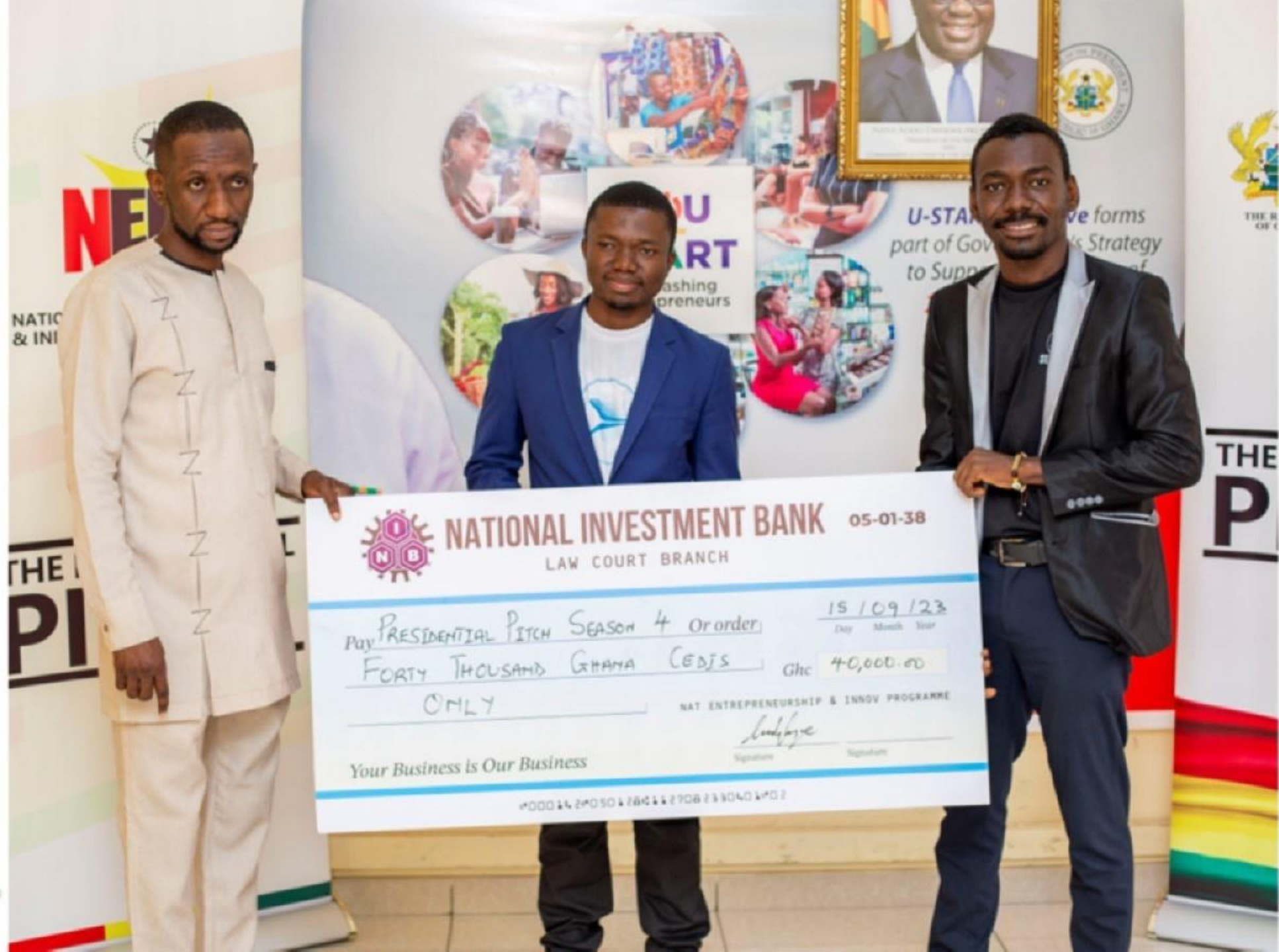
Congratulations!

Joshua Opoku Agyemang
IoT Network Hub



Funding from NEIP 2022





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05-01-38

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Your Business is Our Business

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The Future : Our Vision 2050

“IoT Vision 2050 isn't a distant dream;
it's a roadmap to shape Africa's future.”



Envisioning Africa's Future.



“The Future belongs to those who can Imagine it, Design it, and Execute it. It isn't something you await, but rather **Create!**”

“If Not Now Then When?
If Not Us, Then Who?”



Our Partners





Thank You!

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