



What is a Robot

Seán Carmody - CBC Cork

A **robot** is a machine capable of carrying out a complex series of actions.

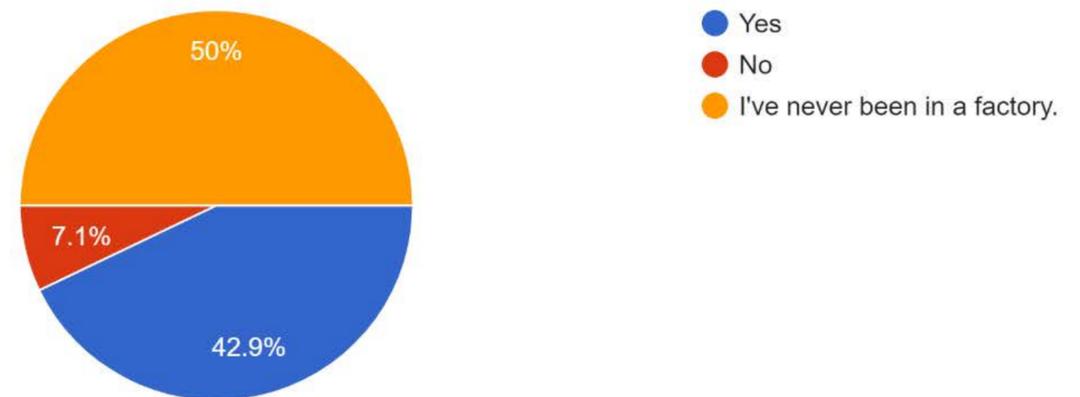
Robots can be found in industry, medicine, science, space exploration, construction, food packaging and are even used to perform surgery.

When the same sample of students (in the piechart) were asked if they knew or heard of any robots. I recieved the following answers:

- Grabber/Robotic arms
- Roomba
- pre-programmed robots
- SPOT
- R2-D2(for all ye star-wars fans)

Have you ever been in a factory that had robots in it?

14 responses



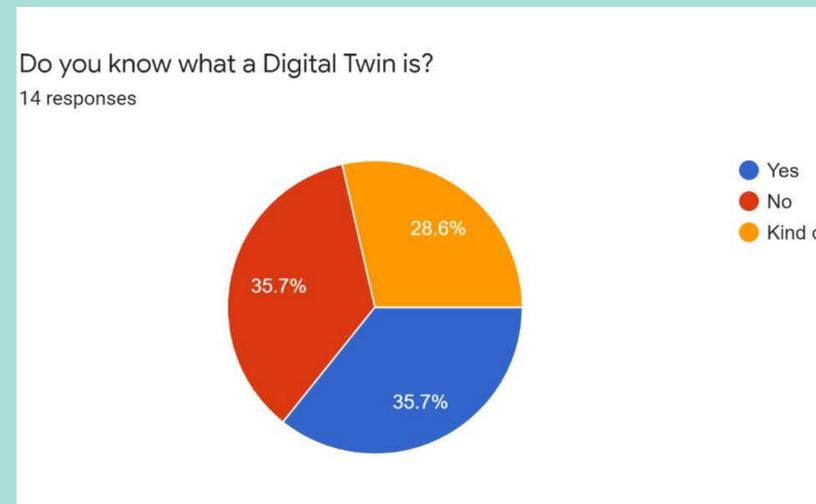
The term **robot** was first used in 1920 during the Czech-language play R.U.R.

DIGITAL TWINS



Sarah O'Sullivan Causeway Comprehensive School

SURVEY RESULTS



WHAT ARE DIGITAL TWINS?

A digital twin is a virtual replica of a physical product like a car or a bridge. ([YouTube Video](https://www.youtube.com/watch?v=iVS-AuSjpOQ) www.challenge.org)

HOW THEY WORK

A digital twin collects real-time data from installed sensors. The collected data is stored in a cloud. The data is then evaluated and simulated in virtual copy of the assets. After receiving the information from the simulation the parameters are applied to real assets.

([Video](https://www.youtube.com/watch?v=iVS-AuSjpOQ) <https://www.youtube.com/watch?v=iVS-AuSjpOQ>)

Based on the above results from group survey you can see that only about 1 in 3 people know what a digital twin is. Digital twins will be used a lot in the future so it is important that people know what they are.

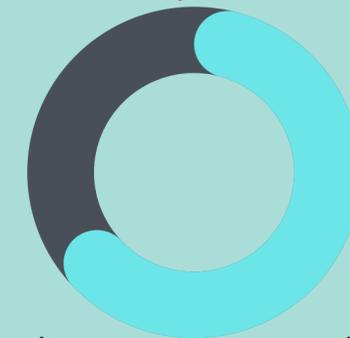
BENEFITS FOR MANUFACTURERS AND COMPANIES

- Increased reliability of equipment and production lines.
 - Improved productivity
 - Faster production times
 - Improved profits
 - New business opportunities such mixed manufacturing, small-batch manufacturing, and more.
- (<https://slcontrols.com/what-is-digital-twin-technology-and-how-can-it-benefit-manufacturing/>)

WHAT ARE THEY USED FOR

Digital twins are used to analyse data and to monitor systems. This allows for the heading off of problems before they occur. Digital twins are also used to prevent downtime, develop new opportunities and to plan for the future by using simulations.

(<https://www.forbes.com/sites/bernardmarr/2017/03/06/what-is-digital-twin-technology-and-why-is-it-so-important/>)



According to a survey done by Gartner in 2019, two thirds of companies are planning on implementing some form of digital twin into their organization by 2022.

So as you can see they are becoming increasingly popular. (<https://www.gartner.com/en/newsroom/press-releases/2019-02-20-gartner-survey-reveals-digital-twins-are-entering-mainstream>)

Smart manufacturing and the environment

By Rossa Keehan from Scariff community college

So first of all what is smart manufacturing?

Smart manufacturing is a broad category of manufacturing that employs computer-integrated manufacturing, high levels of adaptability and rapid design changes, digital information technology, and more flexible technical workforce training.

And how does this affect the environment

Manufacturing technology creates large amounts of waste, and used computers and electronics get thrown out when they break or become outdated ...



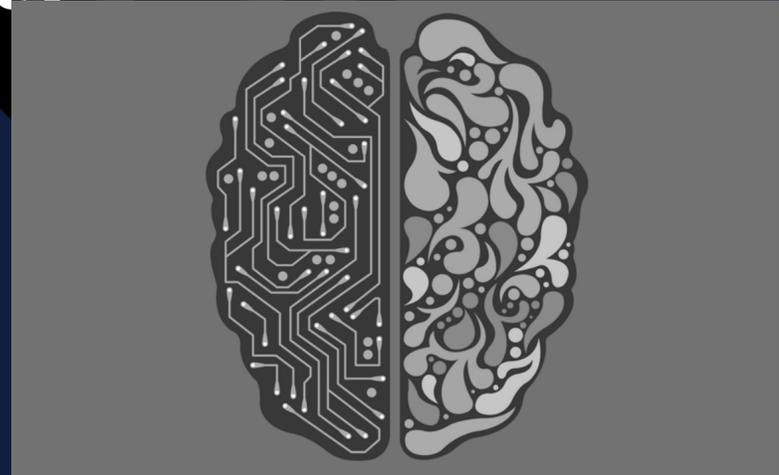
My Topic t
I was given the
topic of
researching smart
manufacturing
and the effects it
has on the
environment



AI

What is it?

AI(Artificial Intelligence) is the simulation of human intelligence found in machines. It is used so machines can think and do tasks independently. It enables machines and computers to mimic the perception, learning, problem-solving and decision- making capabilities of the human mind.



AI in the Modern World

AI is a huge part of our everyday lives thanks to computers. On Social Media and viewing sites such as YouTube AI is behind it personalising our feed, using past history to discover your interests and what you like. Even when sending a simple text message AI is behind it correcting grammar and spelling.



History of AI

The Concept of AI was first conceived in the early 1900's with the 'Heartless' Tin Man from The Wizard of Oz and was further looked into from there. In 1950 Alan Turing suggested that if humans can use information and reason to solve problems why can't a computer. His ideas could not be completed at the time however due to the extreme cost of computers. However from that point years and years of resaerch went into creating AI until we are where we are now with AI everywhere you go.

The evolution of technology in the future

This poster primarily highlights the positive and negative impacts of technology within the upcoming years. Yes there are advantages but there are very little compared to the downsides.

Here are some of the advantages:

- easier, faster and more effective communication
- better, more efficient manufacturing techniques
- less wastage
- more efficient stock management and ordering systems
- the ability to develop new, innovative approaches

source:

<https://www.bbc.co.uk/bitesize/guides/z4bjjhv/revision/6>

Disadvantages:



I mainly thought of just the basic jobs. How could they be replaced with technology? Can they be replaced? Think of architects and builders. They can be replaced easily and quickly. As we already know, there are robots that can sketch and there are cranes. With just a little development, builders and architectures would lose their jobs leaving just a small amount.



How will technology change the way we work in the future?

Unemployment will rise severely in the future because of technology leading to an increase to homelessness Social and communication skills will drop, people wouldn't interact with others leading to anxiety in talking in the real world.

Schools could change its learning techniques and use robots instead
Businesses could get hacked or scammed leading to major losses



Unemployment Rate of 5.8% for January 2021 in Ireland
(www.cso.ie)

HOW WILL TECHNOLOGY CHANGE HEALTHCARE IN THE FUTURE

INTRODUCTION

The future of healthcare is shaping up in front of our very eyes with advances in digital healthcare technologies, such as artificial intelligence, VR/AR, 3D-printing, robotics or nanotechnology. We have to familiarize with the latest developments in order to be able to control technology and not the other way around. The future of healthcare lies in working hand-in-hand with technology and healthcare workers have to embrace emerging healthcare technologies in order to stay relevant in the coming years.

MISCONCEPTIONS ABOUT ROBOTS

Are you afraid that robots will take over the jobs of nurses, doctors and other healthcare professionals? Are you scared that artificial intelligence will control the world within a couple of years? Do you have nightmares about virtual reality-addicted kids and adults running around in their non-existent dream world? Are you frightened to have a genetic test because it might reveal the day of your death?

These are all half-truths, fake news and other imaginary dystopias. In a more fashionable way: alternative facts about the future of medicine. However, these all have one thing in common: the fear about the unknown place called the future and what it might bring upon

10 WAYS IN WHICH MEDICAL TECHNOLOGY IS REHAPSING HEALTHCARE

1. Artificial Intelligence
2. Virtual Reality
3. Augmented Reality
4. Healthcare Trackers, wearables and sensors
5. Medical Tricorder
6. Genome sequencing
7. Revolutionizing drug development
8. Nanotechnology
9. Robotics
10. 3D Printing

CONCLUSION

We are truly living in revolutionary times for healthcare thanks to the advent of digital health. My reason for this poster is to spread the knowledge and developments in healthcare that will usher the real era of the art of medicine.

Source:

<https://medicalfuturist.com/ten-ways-technology-changing-healthcare/#>

The Internet of things, and it's risks

By Matthew Ward



What is the Internet of things?

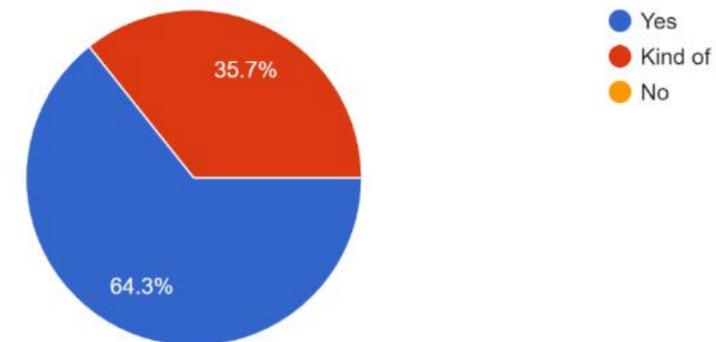
The internet of things is made up of all devices that are connected to the internet. It is a network of everything from smartphones to smart fridges

Only 4 of the 13 surveyed knew what the internet of things was, with one other having heard of it, and the rest having never heard of it

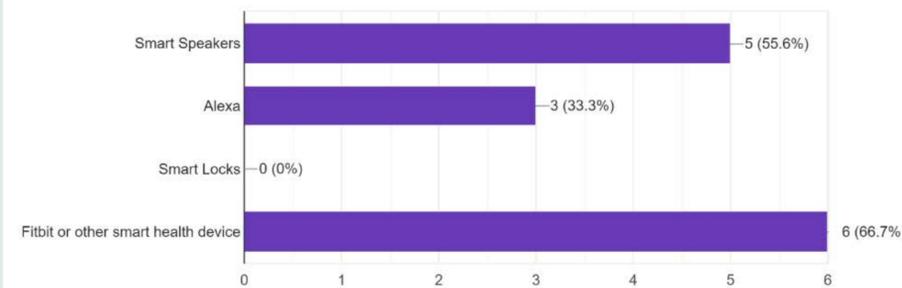
Security

All surveyed participants cared about their cyber security, albeit to varying levels

Are you concerned about cyber security?
14 responses



Do you own any of the following?
9 responses



Dangers

More than 87% of all home automation devices (www.zdnet.com/article/android-security-a-market-for-lemons-that-leaves-87-percent-insecure/)

(such as smart speakers) are vulnerable to security flaws which have not been patched.

This, as well as the obvious dangers of a constantly active microphone (such as Alexa) being hacked pose significant risks to security

Smart Device Usage

Despite this, 9 out of the 14 surveyed own a smart device, with Fitbits and similar technology being most common. This allows me to conclude that there is little knowledge of the security risks in such devices.

Isolation, Ideas & IT

By Máire Geraghty of Dominican College,
Taylor's Hill, Galway



Medical

CRT (Covid Response Team) & the "Emergency Covid Ventilator" was founded by NUIG students Aaron Hannon & Emily Wallace in 2020.

CRT's ventilator is entirely mechanical, helping to meet the shortage of ventilators in hospitals and save lives.

CPAP (Continuous Positive Airway Pressure) was adapted & improved by a group of people from UCL, UCLH & the Mercedes Formula One team.

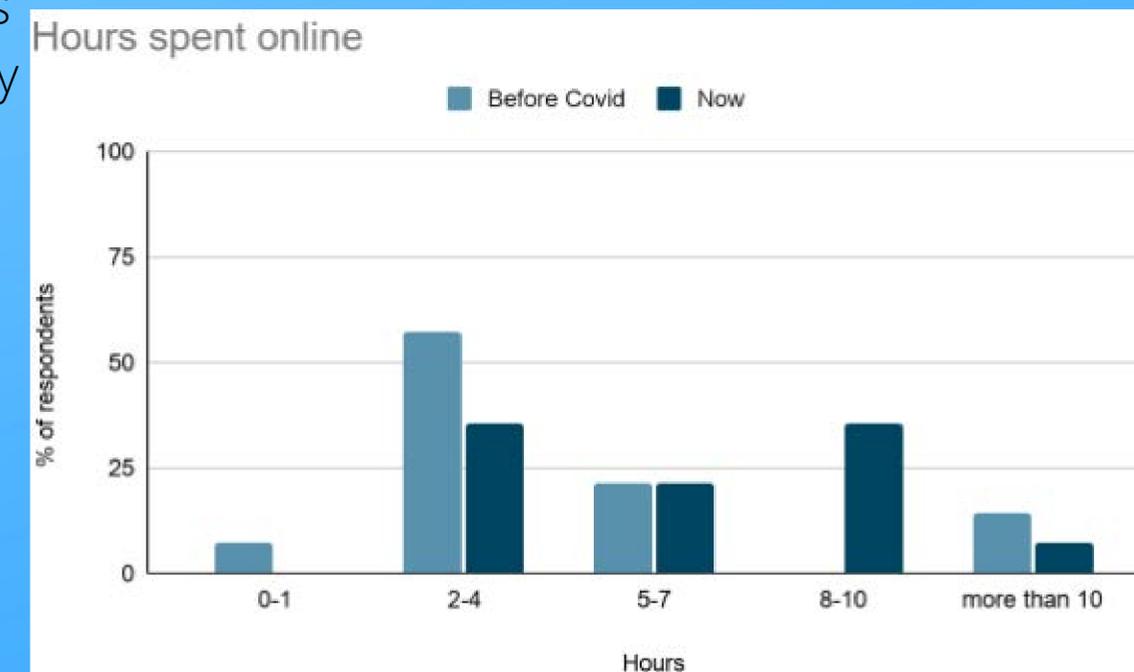
CPAP helps bridge the gap between an oxygen mask & the need for full ventilation, which requires sedation & an invasive procedure.

Globally

Our responses to Covid have speeded up the adoption of digital technologies by several years & according to a global survey of executives by McKinsey, many expect these changes to be permanent.

Their research has shown that funding for digital initiatives has increased more than anything else & that consumers have moved dramatically towards online channels.

In turn, companies & industries have responded with a rapid shift towards interacting with customers through digital channels



Sources: www.thejournal.ie, www.mckinsey.com, www.crt.com, www.nuigalway.ie, www.rte.ie, ie.gofundme.com, www.canva.com, www.pexels.com, my colleagues from CONFIRM



HOW ARE SMART SENSORS USED IN OUR EVERYDAY LIFE?

BY KITTY IRWIN

INTRODUCTION

The range of applications for sensor technology in everyday life is broad, especially in smart homes, from sensor-controlled burglary and fire protection through the control of heating and lighting to modern household control. There are cleaning robots that clean a residence independently, regardless of the floor covering. Sensors and cameras ensure that the residence is cleaned at all angles and that the vacuum cleaner can avoid obstacles. The same principle applies to wiper and window cleaning robots or automatic lawnmowers.

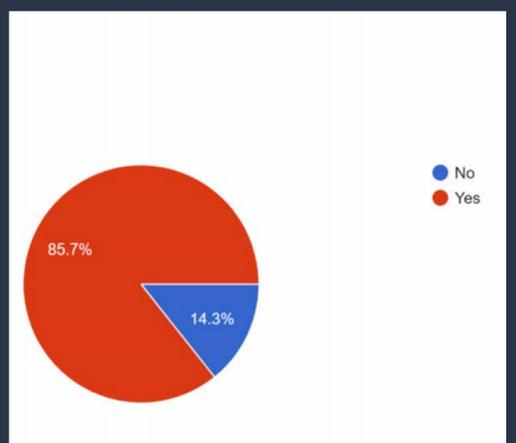
HOW DO THEY MAKE OUR LIFE EASIER?

1. A new generation of tissue-integrated sensors from the Californian company Profusa enables people to monitor their individual body chemistry in an innovative way. The biosensors are not isolated from the body, but work completely integrated within the body tissue - without metal devices and without electronics. Applications are planned for fitness, wellness and health. Especially for chronically ill persons this sensor technology offers more safety and a relief in everyday life.

2. flood Testing Laboratories, a Chicago-based company has been bringing innovative technology to make the construction industry smarter. The company has brought the maturity method into the world, which eliminated the need for concrete cylinder brake tests. The company's product, SmartRock wireless temperature and strength sensor is the latest innovations in the market. The sensor is a mobile-based wireless sensor, which can be entirely embedded into fresh concrete to monitor strength and temperature during construction. In addition, the sensors can be installed on the rebar and then concrete can be poured. While the sensor monitors the records of the temperature of concrete poured in real-time, the gathered data can be analyzed automatically onsite using the SmartRock app.

SURVEY RESULTS

I asked my classmates two questions regarding smart sensors. I asked an open ended question and a closed question. The first was are you aware of any smart sensors we use in our everyday life? Many said they were aware of different smart sensors on mobile phones and in heart monitors. Others said they were aware of smart sensors in traffic and manufacturing. I also asked the question Do you think smart sensors have made life easier for us? 85.7% said yes and 14.3% said no



BOUNDARIES ARE BLURRING

What are the differences between the 3rd and 4th industrial revolutions?

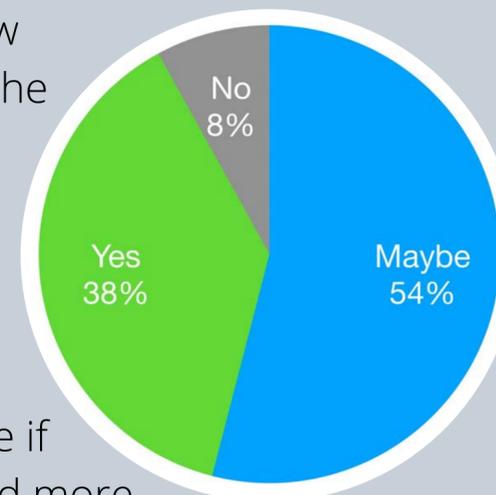


Background

Throughout history there have been 4 industrial revolutions. The 1st occurred back in the late 18th/early 19th centuries, and saw the introduction of new ways of manufacturing. The 2nd came in the early 20th century with the coming of the assembly line. The 3rd was in the 1950's, when computers and PC's began taking off. We are currently living through the 4th, which is the rise of the internet and connectivity. The 3rd and 4th industrial revolutions, or Industry 3.0 and Industry 4.0 as they are called, don't seem that different at first glance. But what are the differences between them?

Findings

The main difference between Industry 3.0 and Industry 4.0 is how we use technology. In Industry 3.0, the technology was supervised by humans. We used the internet and electricity to complete tasks in a digital online world. In Industry 4.0, we are now starting to use technology and the internet to help us solve tasks in the physical world. Machines and AI can now supervise themselves, and more and more everyday objects are being connected to the internet of things. Factories around the world are being connected, and can share data with each other to improve their outputs. The lines between the physical and digital worlds are blurring, and that is the mark of the 4th industrial revolution. In my survey, I asked people if they thought it was a good thing that technology is becoming more and more intertwined with our daily lives. Over half of people said that it is 'maybe' a good thing. 38% said that yes, it is a good thing and 8% said no, it is not a good thing.



Conclusion

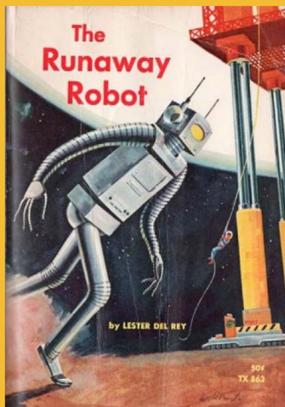
In conclusion, the main differences between the 3rd and 4th industrial revolutions are the rise of connectivity, and the different ways in which we use technology. What was once something separate to our lives, is now integral to our everyday experiences. The 4th industrial revolution has allowed us to connect the many systems running in our world via the internet. After doing all of this research, I think that this will change the world for the better.



By Emma Counihan, Pipers Hill College

ROBOTS SCI-FI VS. REALITY.

Does science fiction's portrayal of robots negatively affect our perception of them?

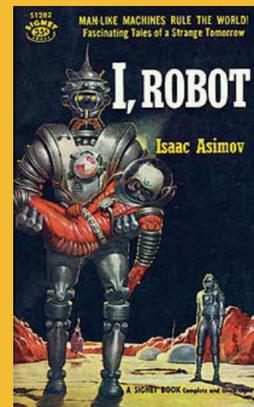


BACKGROUND

According to the Oxford dictionary, a robot is '(especially in science fiction) a machine resembling a human being and able to replicate certain human movements and functions automatically'. Robots and artificial intelligence ('AI') have a long history in science fiction. Over time, as robots have become more commonplace, a lot of widespread fear has emerged about whether they are going to take over the world, and

whether they are going to start by taking people's jobs. The fear is not unfounded - according to a study from Oxford Economics, robots could take over 20 million jobs by 2030.

The other reason that people are so afraid of artificial intelligence, in my opinion, is science fiction. Science fiction has a long history of AI takeover and villainous, nefarious robots. My hypothesis is this: science fiction has negatively affected our perception of robots.



PHYSICAL FEATURES

Robots in sci-fi tend to look like futuristic, shiny robotic humans. This can give people an unrealistic idea of what robots actually look like. Most robots aren't humanoid at all but simply a physical representation of their purpose - a single motor arm on an assembly line, for instance, or a roomba to vacuum your floor.

This is what a lot of science fiction robots tend to look like. Very humanoid with only a few 'robotic' features.



Here is an example of a real robot. It doesn't resemble a human at all, it is a machine made simply to vacuum floors.

'AI REBELLION'

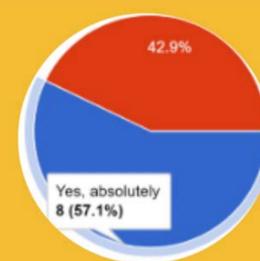
In a terrible sequence of events, the intelligent beings made by humankind become sentient, push back against the humans and try to destroy humanity. One of the best examples is Stanley Kubrick's 1968 film 2001: A Space Odyssey, in which the artificially intelligent onboard computer H.A.L. 9000 lethally malfunctions on a space mission and kills the entire crew except the spaceship's commander, who manages to deactivate it. (source: The New York Times.)

AI rebellion is a common theme in science fiction, where the robots rise up against the humans. A good example of this theme would be the 2015 film 'Avengers: Age of Ultron'. In the film, the Avengers fight Ultron, an artificial intelligence obsessed with causing human extinction.

But can these ideas about AI and robots become dangerous? A pie chart (see right) reflects the results of a survey I carried out with my class on artificial intelligence and robots. When asked 'Do you think false ideas about artificial intelligence can cause

harm?', there was a fairly even divide over people saying 'yes' and 'some harm, but nothing too serious'. Out of 14 participants no one voted 'absolutely not'.

Do you think false ideas about artificial intelligence can cause harm? (think about how movies and pop culture spread the idea that artificial intelligence and robots are very dangerous.)
14 responses



● Yes, absolutely
● Some harm but nothing too serious
● Absolutely not

THE 'FRANKENSTEIN COMPLEX'

Isaac Asimov was an American science fiction writer who coined the term 'Frankenstein complex', a scenario where a robot turns on its creator. The term refers to the monster in Mary

Shelley's novel, but Asimov actually thought of robots more like a tool than a monster - they would not turn on you out of malice, but simply because some bit of programming told them to do so. However, popular science fiction doesn't seem to have gotten that message. There is a very long list of well-known movies and books that use the 'Frankenstein complex', from

Jurassic Park to Planet of the Apes to The Matrix and so on. According to The Guardian, a new study has found that more than 70% of the US fear robots will take over our lives. It seems likely that this very high percentage is linked to the amount of media that seems to take science fiction as fact.

CONCLUSION

There are so many movies where robots revolt against humans. In fact, if you search 'robots take over the world' on google, a list of movies where this happens will come up. You'll see everything from WALL-E to Robocop to The

Matrix, Ex Machina, Interstellar, 2001: A Space Odyssey... and even more that I have cited in my research. By all counts, and with proven results, it is no wonder that science fiction is considered by many to have had a negative effect on our perception of robots.

I feel as though my results are reliable because I took care to use only unbiased, dependable

and well known sources, while still citing relevant source material and continually drawing the point back to the colossal amount of popular science fiction that has simply put robots in a bad light.

Therefore I am confident that science fiction has negatively affected our perception of robots.

WHAT IS 5G?



How will it impact us?

- Faster internet rates (20 Gbps)
- It's improving coverage throughout the country.
- We be will process information quicker & create more

Myths circulating around about 5g

5G responsible for COVID-19? Unsurprisingly, there is not a scrap of evidence to suggest that 5G is responsible for the coronavirus

The first mobile to have 5g on it was the 'Samsung Galaxy S20' which was released at the beginning of 2020.

5G is the fifth generation mobile network & is the most advanced cellular technology available worldwide.

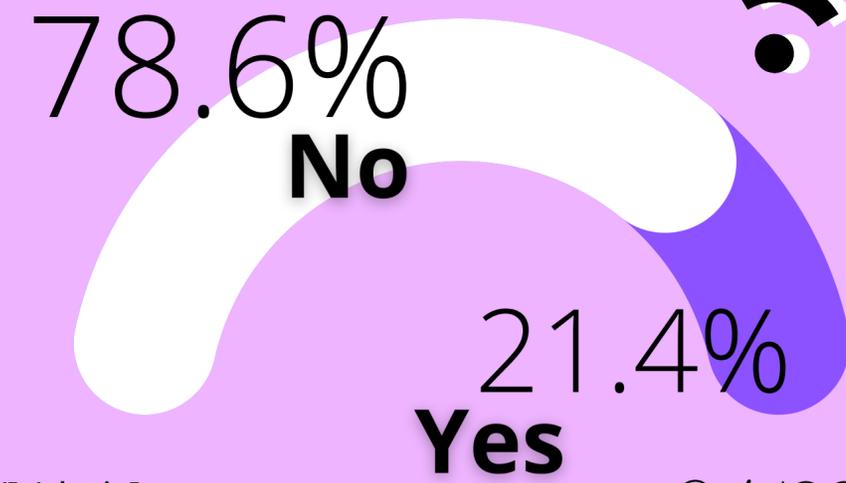
DID YOU KNOW...

5G speed tops out at 10 gigabits per second (Gbps). 5G is 10 to x100 faster than what you can get with 4G.

WHAT PERCENTAGE OF THE WORLD HAS 5G?

- Feb 2021, over 30% of the world's countries have 5G.
- 2.65B people by 2025

HOW MANY CURRENTLY USE 5G?

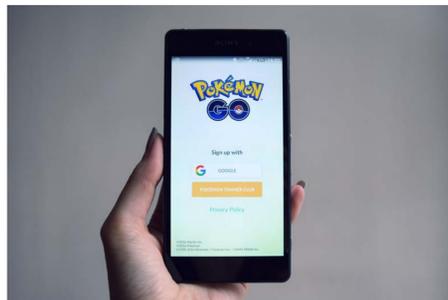


Reality in Reality - How is augmented and virtual reality being used in manufacturing?

Ayushi Mahajan

Background

- Augmented reality lets us see our surroundings with a digital augmentation overlaid on them. A well-known example of AR would be the popular mobile game Pokemon Go.



- Virtual reality is the use of computer technology to create a simulated environment. Instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds. By simulating as many senses as possible, the computer is transformed into a gatekeeper to this artificial world.



- Virtual Reality and Augmented Reality are two sides of the same coin. You could think of Augmented Reality as VR with one foot in the real world: Augmented Reality simulates artificial objects in the real environment; Virtual Reality creates an artificial environment to inhabit.

Research

- To research this topic to the best of my ability, I used many sources, primarily websites. I also conducted a survey, the results of which are analyzed in a later section



How is it used in manufacturing?

- In a factory, even simple maintenance tasks, such as machine servicing, can be tedious due to the amount of administrative work involved. AR lets maintenance crews see exactly which machines and equipment need servicing at a glance by using an AR device to see product data and history, cutting out hours spent digging out the information needed for the task.
- Although virtual reality technology has been available for many years, it has only been recently utilized in manufacturing environments.
- Virtual reality, when used in the manufacturing industry, can help with a wide range of issues such as increasing productivity, reducing training costs and increased the availability of new products to market.

Results

- In a study conducted, with young people interested in STEM, it was found that 62% have used and/or are familiar with VR technology. It is becoming a bigger and bigger part of our lives, and even though many manufacturing companies are hesitant to adopt it, it shows promise and has success stories in companies such as Ford and Lockheed Martin.

References

- <https://www.marxentlabs.com/what-is-virtual-reality/>
- <https://www.fi.edu/what-is-augmented-reality>
- <https://www.machinedesign.com/automation-iiot/article/21838157/augmented-reality-and-manufacturing>
- <https://www.business.com/articles/virtual-reality-changing-manufacturing/>
- <https://internetofbusiness.com/augmented-reality-in-manufacturing/>

HOW IS ARTIFICIAL INTELLIGENCE BEING USED IN OUR DAILY LIVES?

INTRODUCTION

AI is when machines can learn and make decisions similarly to humans. There are multiple types of AI, based on their ability and functionality. AI helps us through lots of aspects of our lives from transport to targeted ads to proofreading a document.



RESULTS & DISCUSSION

The results of the questions I asked mostly followed with what I assumed they would be. Everyone of those asked knew what apps and devices used an AI and had a idea of why. Although I did assume more people would own these items then the results show.

TYPES OF AI

Narrow/weak AI

Narrow AI is a term used to describe systems that are specified to handle a singular or limited task.

General AI

General AI is a term used to describe systems that can hypothetically understand or learn any intellectual task that a human being can.

AI WE HAVE

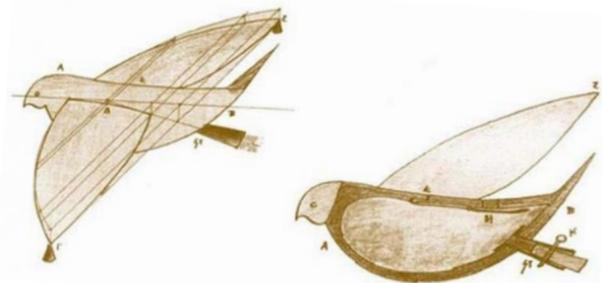
All the AI we have falls under weak AI.

Social Media, self driving/parking cars and speech recognition just to name a few are all examples of weak AI. There is currently no working example of general AI.



History of Robotics

There are many people who believe that robots are only a recent creation, but they've been around since the 20th century and even in 400B.C. This poster will give you a brief explanation of all major robotic advancements we have made.



400 B.C.

Starting way back before even the Holy Roman Empire, the first 'robot' was accidentally created by Archytas of Ancient Greece. He tried to create a steam-powered pigeon that would compress steam inside itself to fly. It didn't just fly three feet either, it flew for 300 meters before literally running out of steam.

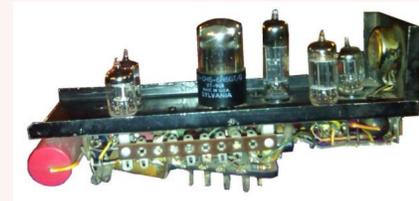
1495

Around 1495, Leonardo DaVinci designed the first human-like robot. After the discovery of Leonardo's journal, the robot has been rebuilt based on his design and is on display in Berlin with fully functional bodyparts and an anatomically-correct jaw.



1951

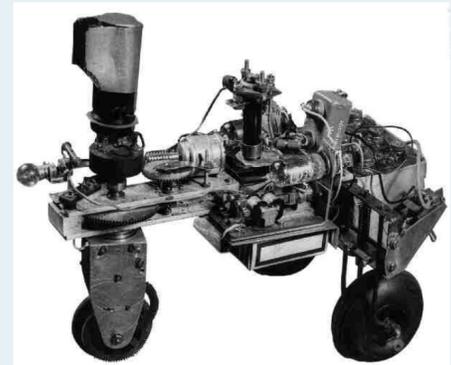
The first neurocomputer is built, called 'SNARC'. This simulated a rat running through a maze and functioned much the way of human minds, with synapses and neurons simulated.



(Stochastic Neural Analog Reinforcement Computer)

1948

British robotics pioneer William Grey Walter creates the first "turtle" robots. Machines that can mimic life-like behaviour with simple circuitry.



1984

A team working with Doug Lenat begin working on encoding millions of snippets of information meant to represent common sense in humans.

1988

Researchers launch "Jabberwacky" an AI chatbot designed to learn through human conversation.

2000 Onwards

We've been constantly developing many robots to this day, with companies like Boston Dynamics working on SPOT and ATLAS, to the leading innovators in the Far East, Yaskawa who have distributed most of their products to East Asia or China for 'field testing'.

