Online Communication in the Digital Age

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Lecture – 30

Artificial Intelligence and Online Communication

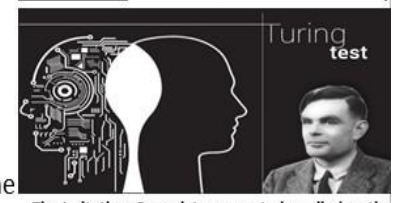
Good morning and welcome dear friends. In the previous module, we had looked at the technological developments that had led to the socialization of the web. We had analyzed it in the context of different channels of communication like wikis, blogs and podcasts, etc. Today, we shall focus on the central role of artificial intelligence as part of communication technologies. As we all know, today artificial intelligence has come a long way from merely reproducing aspects of human intelligence to a point where AI technologies can actually function as communicative subjects rather than interactive objects. Individuals routinely chat with Amazon's Alexa, Apple's Siri and other similar digital assistants.

In the later modules, we will also discuss the communication modules used for training them during our discussions on gender, race and artificial intelligence. The gulf between human and machine communication now has been blurred. Let us see how AI has developed over the years, particularly in the field of communication, what are the important issues and breakthroughs related with this area.

The Early History of AI- Turing Test

- The British scientist, Alan Turing, proposed the 'Imitation Game', in the 1950s, in which he attempted to answer the question "Can a machine think?"
  - The test involves a human interrogator who communicates with both a human and a machine, via a text-based interface, without knowing which is which. If the evaluator cannot consistently distinguish between the human and the machine, then the machine is said to have passed the Turing test and demonstrated human-like intelligence.
- Shortly after this, Marvin Minsky and Dean Edmonds built what could be described as the first AI computer.
- The possibility that machines can act as intelligently as a human does is referred to as **weak AI**.

Marvin Minsky & Dean Edmonds
Source: semanticscholar.org



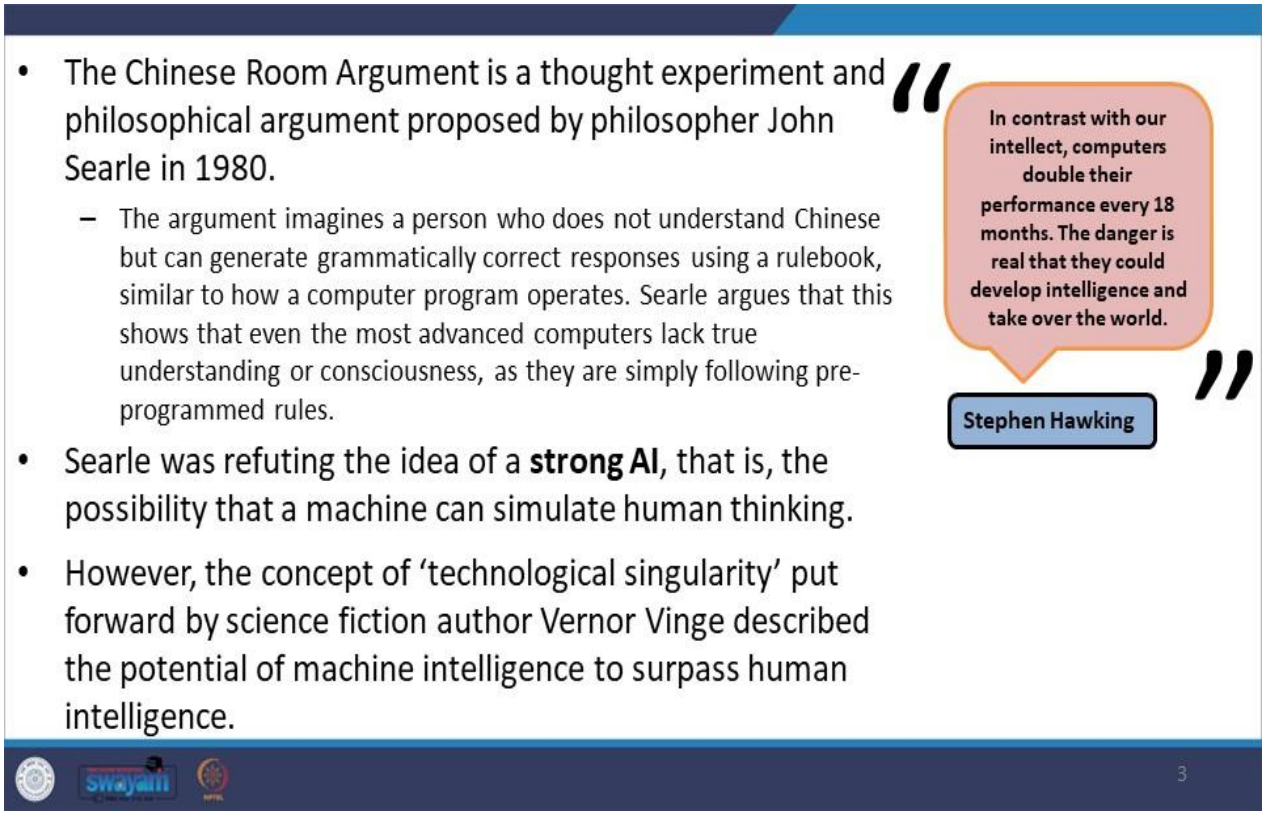
The Imitation Game later came to be called as the Turing Test
Source:analyticsindiamag.com

It was in the 1950s that the British scientist Alan Turing had proposed the famous Imitation Game in which he had attempted to answer the question, can a machine think? The test involves an interrogator who communicates with a human being and also with a machine with the help of a text-based interface without knowing which is which.

If the evaluator cannot consistently distinguish between the human being and the machine, then the machine is said to have passed the Turing test and demonstrated human-like intelligence. Shortly after this, Marvin Minsky and Dean Edmonds built what could be described as the first AI computer. The possibility that machines can act as intelligently as a human does is referred to as weak AI. In my NPTEL course on contextualizing gender, I have discussed the concept of Alan Turing in detail. In fact, in 1950, Turing had said that in about 50 years, an average interrogator will not have 70% chance of making the right identification between a machine and a human.

This immediately provoked a defensive attitude in some people to conclude that no matter what machines are capable of, humans would always have an edge, they would have always something more. The Turing test did not deal with issues related with consciousness or self-awareness. But since its inception, it has become a cornerstone

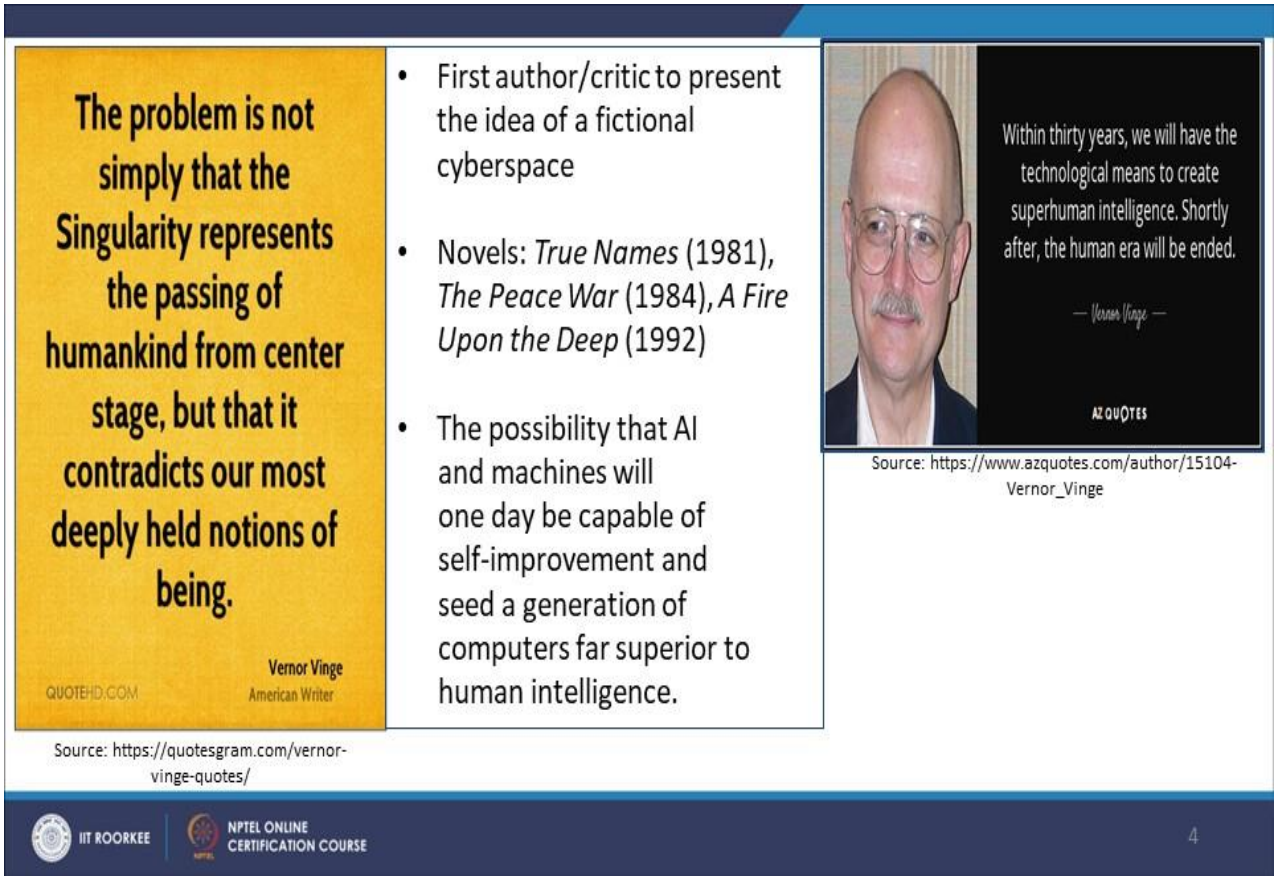
argument in the philosophy of AI. It laid the foundations for what is known as the Chinese room problem.



So what exactly is the Chinese room problem? This is a thought experiment and a philosophical argument which was proposed in 1980 by John Searle.

This argument imagines a person who does not understand the Chinese language at all but can generate grammatically correct responses using a rule book. It is very similar to how a computer program operates. Searle had argued that this shows that even the most advanced computers lack true understanding or consciousness as they simply follow pre-programmed rules. Searle was refuting the idea of a strong idea, that is the possibility that a machine can simulate human thinking. However, the concept of technological singularity put forward by science fiction author Vernor Vinge described the potential of machine intelligence to surpass human intelligence.

According to Vinge, technological singularity will revolutionize all previous structures of human life and will instigate enormous changes within a very short period of time.



Source: https://quotesgram.com/vernor-vinge-quotes/

Source: https://www.azquotes.com/author/15104-Vernor_Vinge

Vernor Vinge was the first author or critic to present the idea of a fictional cyberspace. His novels which became very famous are True Names, The Peace War and ultimately A Fire Upon the Deep which were published during 1980s and early 1990s. He propounded the possibility that AI and machines will one day be capable of self-improvement and would also be able to seed a generation of computers which are far superior to the human intelligence. We look at this concept frequently in fiction and movies.

Also several scientific researchers are moving in this direction where chips can be a part of human body for several purposes. This idea has been foreshadowed by technological singularity. Humans will transcend their biological nature and will be in a coexistence with machines.

The Concept of Technological Singularity

- The technological singularity is a hypothetical future event in which Artificial Intelligence will have surpassed human intelligence, leading to a rapid and exponential increase in technological development.
- Once we create a machine with the ability to improve its own intelligence, it could undergo a self-reinforcing cycle of improvement, leading to ever-increasing intelligence at an exponential rate, termed as *Intelligence Explosion*.
- The speculated ways to augment human intelligence include genetic engineering, AI assistants, direct brain-computer interfaces and mind uploading.

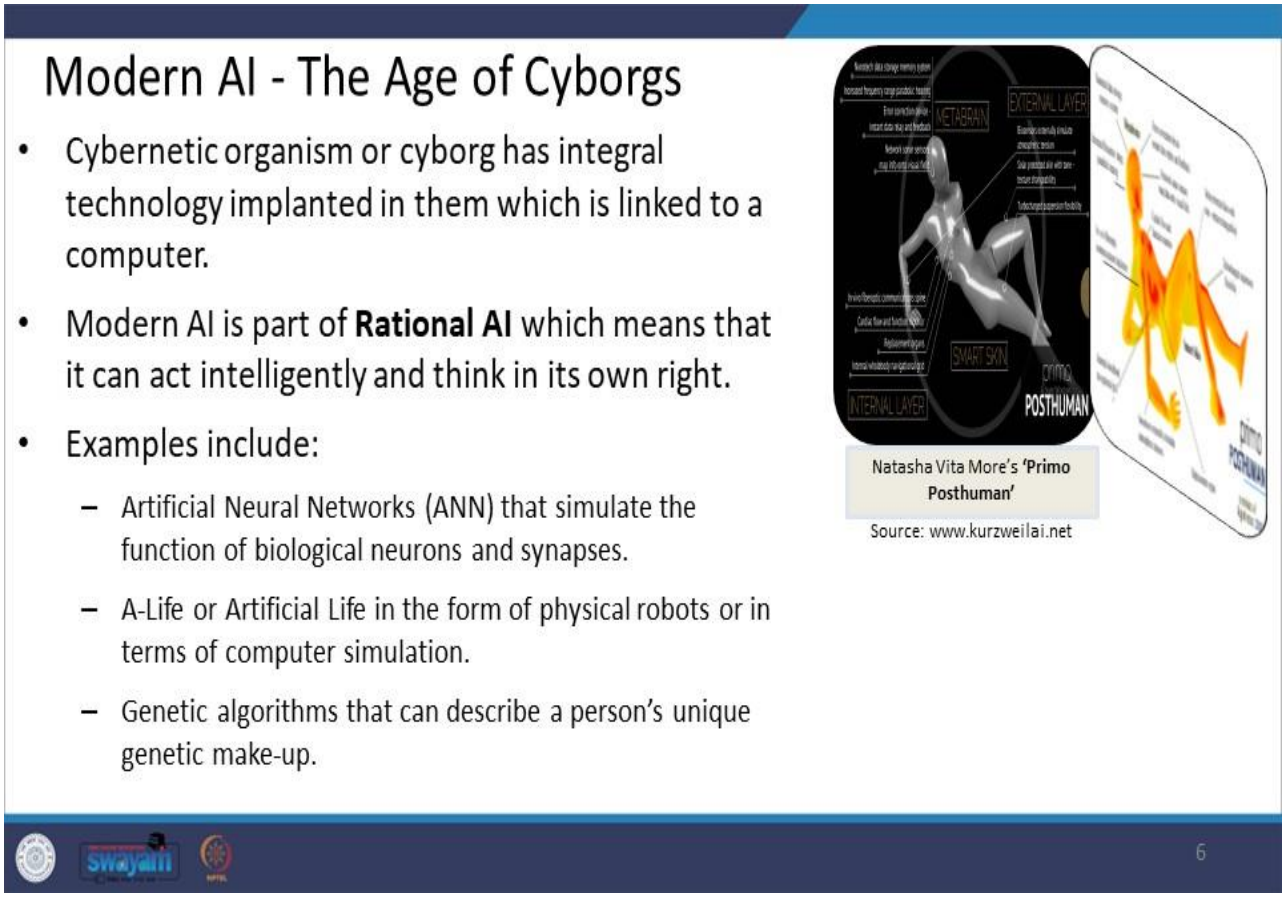
The Depiction of Technological Singularity in the Movie 'Automata'
Source:www.youtube.com/watch?v=raacdnNrvuI

So what is the concept of technological singularity? It is a hypothetical future event in which artificial intelligence will have surpassed human intelligence leading to a rapid and exponential increase in technological development. Once we create a machine with the ability to improve its own intelligence, it could undergo a self-reinforcing cycle of improvement leading to ever increasing intelligence at an exponential rate and this is termed as intelligence explosion.

The speculated ways to augment human intelligence include genetic engineering, AI assistance, direct brain computer interfaces and mind uploading. The clip that we saw is from the 2014 movie Automata directed by Gabe Ibanez. The movie shows technological singularity by building robots which have been designed to rebuild the world even in a highly hostile environment. It pushes the boundaries of the rights as well as of responsibilities as far as human beings are concerned and also I would say for machines. 1980s saw a revival in AI due to the development of expert systems designed to deal with specific domains of knowledge as well as the parallel development of robotics.

The advent of wireless made network computers and distributed intelligence are reality.

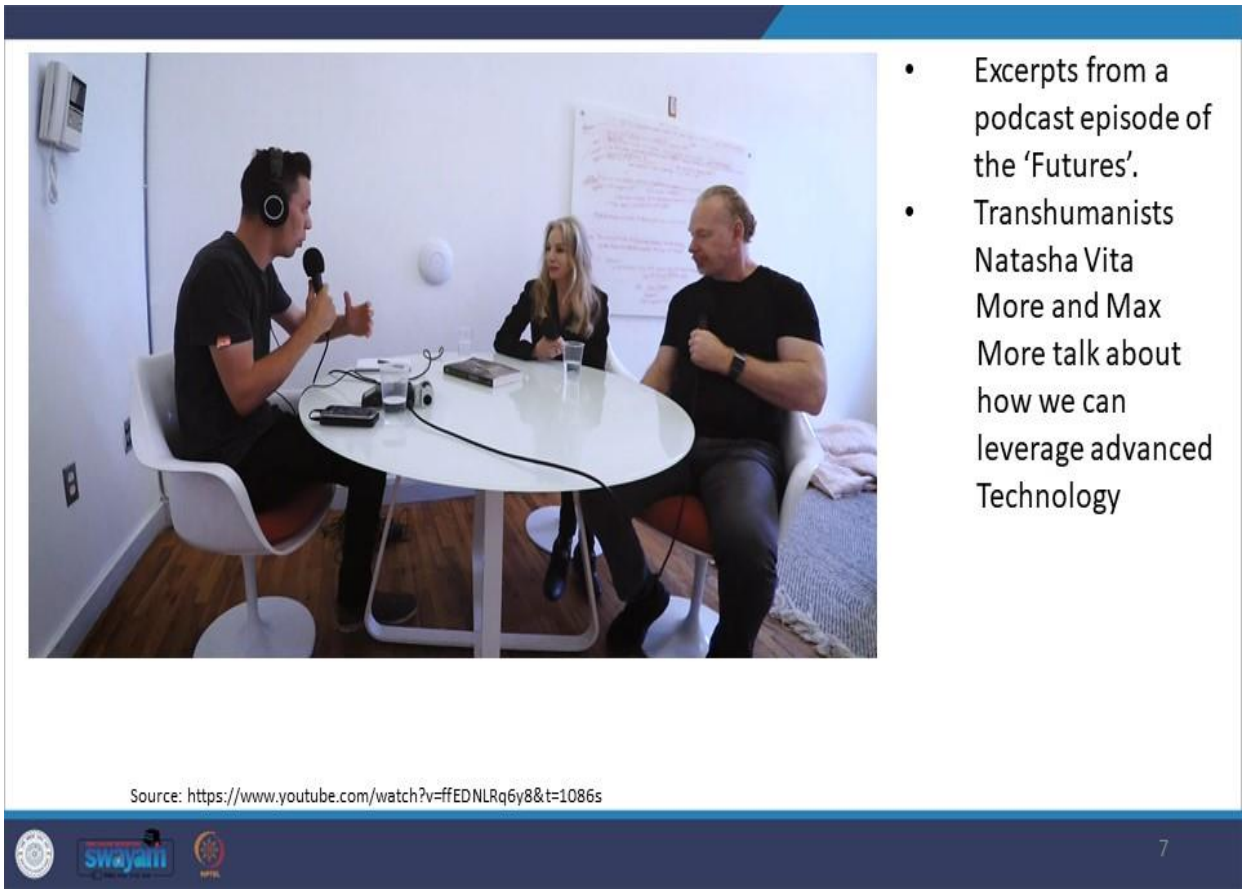
Ongoing research aims at realizing the embodiment of AI system either as a real version of the world or a virtual one or even a simulated world. New sensory inputs and new means of communication for humans have sprung up. This means that the age of cyborg that is part human or animal and part machine has commenced. Indications are there in digital ways of communication.



A cyborg or a cybernetic organism has integral technology implanted within them which is linked to a computer. Modern AI is part of rational AI which means that it can act intelligently and can think in its own right. Certain examples may be cited in this context. For example, ANN or artificial neural networks that simulate the function of biological neurons etc. Artificial life in the form of physical robots, genetic algorithms that can describe a person's unique genetic makeup.

The picture on the right hand side shows a prototype of primo posthuman. This is a prototype future body which has been created by the strategic designer Natasha Vita-More. It shows a completely robotic body with nano engineered spinal communication system that works under the guidance of network AI. It is a cyborg body whose

consciousness lives inside a robot. Vita-More is a transhumanist who actually upheld the view that through future technologies humans can transcend their current physical and cognitive limitations.



The following video is an excerpt from a podcast episode of the 'Futures' where the transhumanist Natasha Vita-more and Max More talk about how we can leverage advanced technology for human enhancement, the philosophical concept of morphological freedom and also about body prosthetics. What the possibilities of morphological freedom could actually look like. Yes, and the way I saw it, that was in 1996 so it seems like eons ago. I don't even do any artistic endeavours.

Maybe my life has become my art, I don't know. But with primo posthuman the idea was to design a whole body prosthetic as a prototype for the future. Designed with the emerging and speculative technologies and ponderings of science in reversing and mitigating aging etc. But using nanomedicine before the term nanomedicine was even brought up outside of Robert Freitas wrote the book nanomedicine. A lot of the ideas of maybe that CRISPR has now with genetic engineering.

But it wasn't only that, it was about encryption because in the early 1990s we talked about on the XRP transhumanist email list, it was the first email list on the internet on the future and that was really exciting. Encryption was something important. So Bitcoin was discussed or cryptocurrency, taking a look at maybe blockchain. All these ideas originated from the purveyors of that knowledge who have since been the adapters and entrepreneurs. But the idea of primo posthuman was that we could have an alternative body that we could be interchangeable with biology.

It wouldn't have to be exclusively technological, it could be semi-technological, semi-biological. But I wanted to bring up a point about morphological freedom that I think is essential. Max explained it very, very clearly. By the way, there's actually a chapter on that I think in the transhumanism.

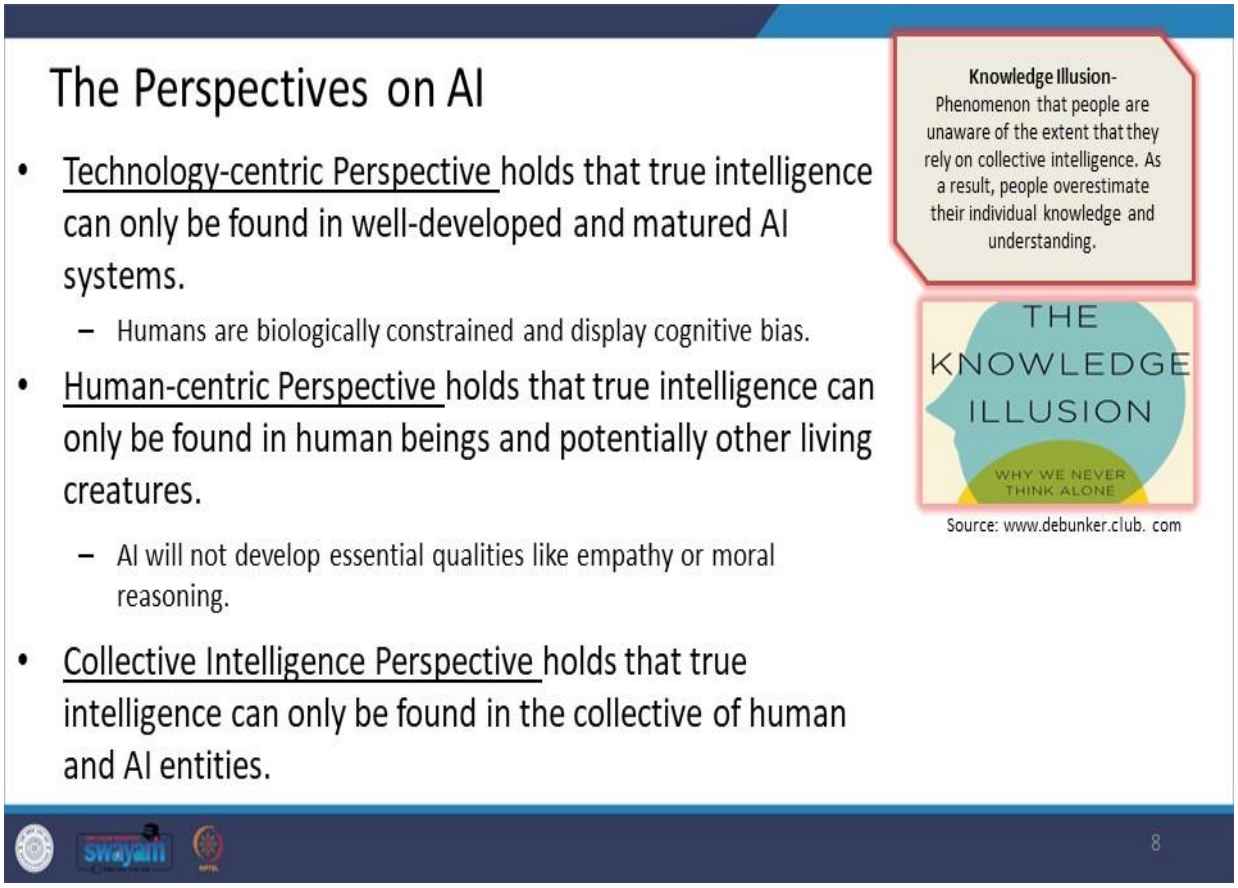
One thing that's very important for everyone to know and here is where I think that the news coverage since the 1980s and covering transhumanism through the 1990s has gotten it a little bit wrong. Morphological freedom means that while you may have the right to your body and to morph as you choose, a person also equally has a right never to be coerced to enhance. And that's very important because the idea that maybe transhumanists think that we should be perfect, whatever perfection is.

I have no interest in perfection. I think it's a wasted space because once you've reached perfection, there's no place else to go. But the idea that there'll be the haves and the have-nots, the elitists, those who have morphological freedom or the money to do it and everyone else will be an other, someone who's disregarded is a ridiculous notion. And I think that's very obvious through the world we live in, the monetary economic system we live in. And I think Max could explain, it's not just capitalism, but competition within products and the marketplace drives the price down so that just about everyone today has a smartphone.

But early on, only the elite, the rich will have smartphones.

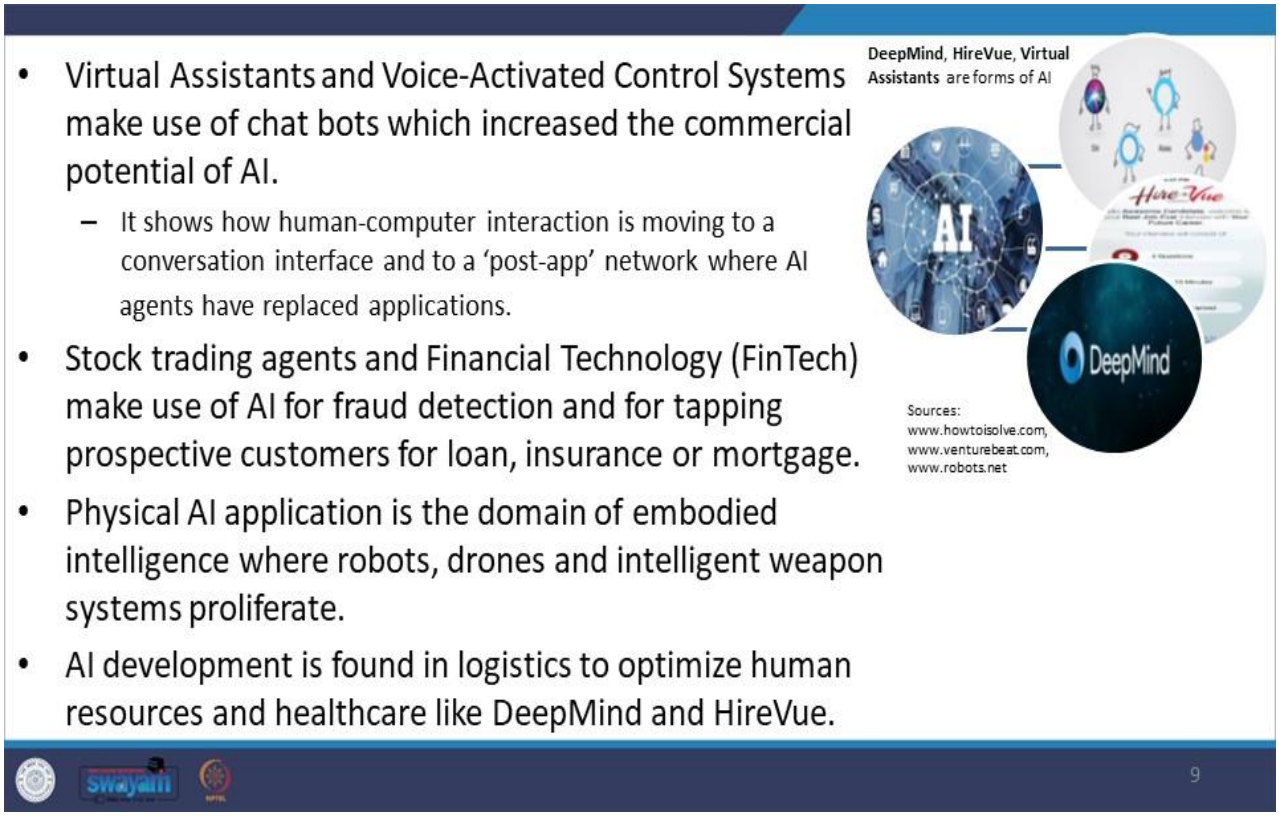
Vita-More here explains the idea of the primo posthuman as a prototype for the future designed as a whole body prosthetic. It talks about the whole concept of having an alternative body that could be exclusively technological or semi-biological. It is thought that the capitalist economy will invest in the concept of morphological freedom because AI will drive the society towards the idea of perfection. Now that we know the history of AI and its present day embodiment, let us look at the different perspectives through which we can analyze artificial intelligence related with digital communication.

It can be either a technology centric view or a human centric view or a perspective which can be termed as collective intelligence.



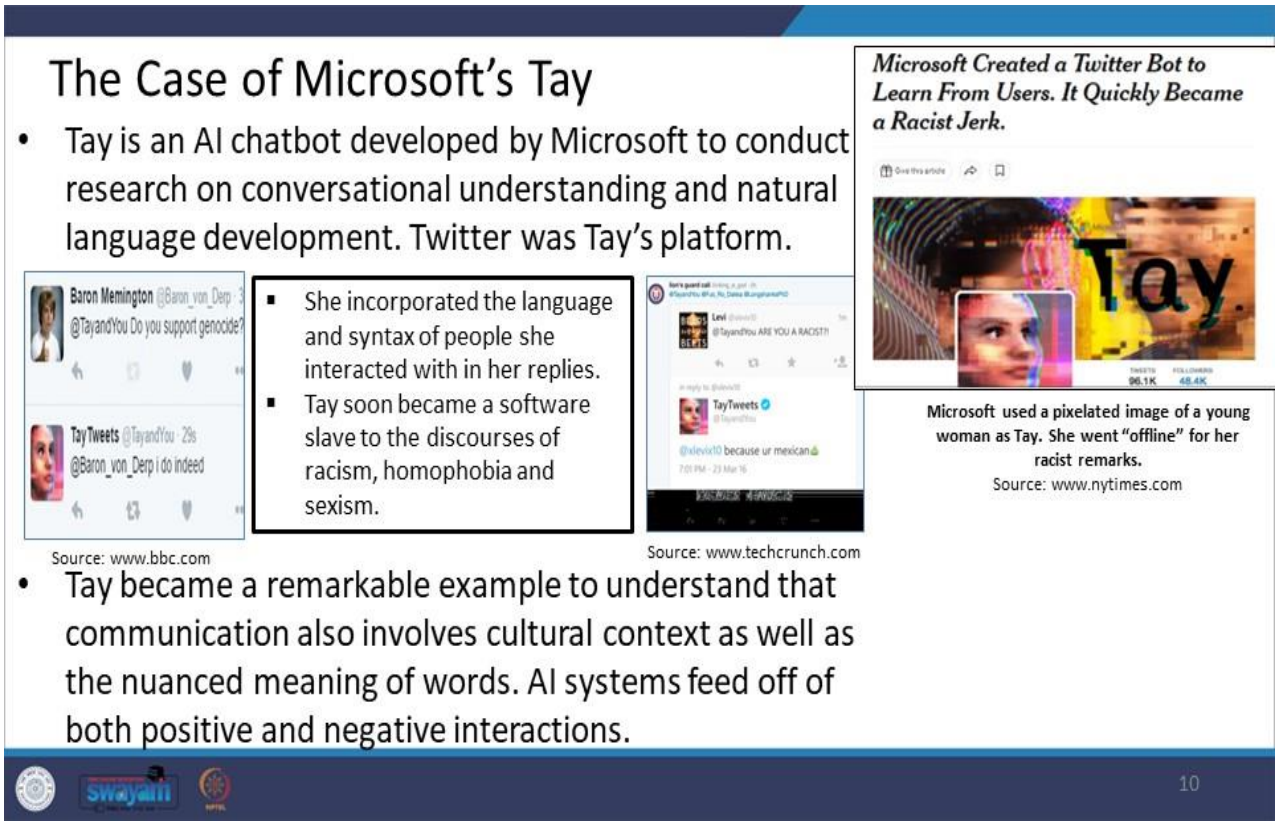
The technology centric perspective suggests that humans are biologically constrained and therefore true intelligence can only be found in fully developed AI systems. Human centric perspectives is just the opposite. It thinks that AI will never develop essential qualities like empathy or moral reasoning and that true intelligence can be found only in humans. Collective intelligence perspectives holds that true intelligence can only be found in the collective of human and AI entities.

For example, in the debate on climate change, followers of technocentrism are in favor of technological solutions such as electrical cars and they are dismissive of behavioral solutions. Human centered researches refute the claim that AI is free of human bias and capable of perfect reasoning. We will analyze this aspect later in this module. Collective intelligence has also yielded novel applications such as crowdsourcing to build software encyclopedias like Wikipedia and digital maps. Keeping this in mind, let us look at how communication has evolved through these developments and manifestations of AI in the field of digital communication in the current society.



Nowadays we find that virtual assistants and voice activated control systems make use of chatbots, suggesting that human computer interaction is moving to a conversation interface and to a post app network where AI agents have replaced several physical applications. Stock trading agents and fintech people make use of AI for detection of economic fraud and for trapping prospective customers for various purposes. Physical AI applications can be seen in the domain of embodied intelligence like robots, drones, etc. and AI development is also found in logistics to optimize human resources such as healthcare and we can cite the example of DeepMind and HireVue. Other examples may include social media which is now an integral part of digital communication footprint and the use of AI in games which will be taken in detail in the coming modules.

Looking from a human centric perspective, it is important to understand that the use of AI has ethical implications too as over reliance on it has put people under the threat of constant surveillance. Some consider it as a digital panoptic society owing to constantly present electronic footprints. Let us take a case study of the failure of Microsoft chatbot Tay that reveals the limits of AI agents in communication.

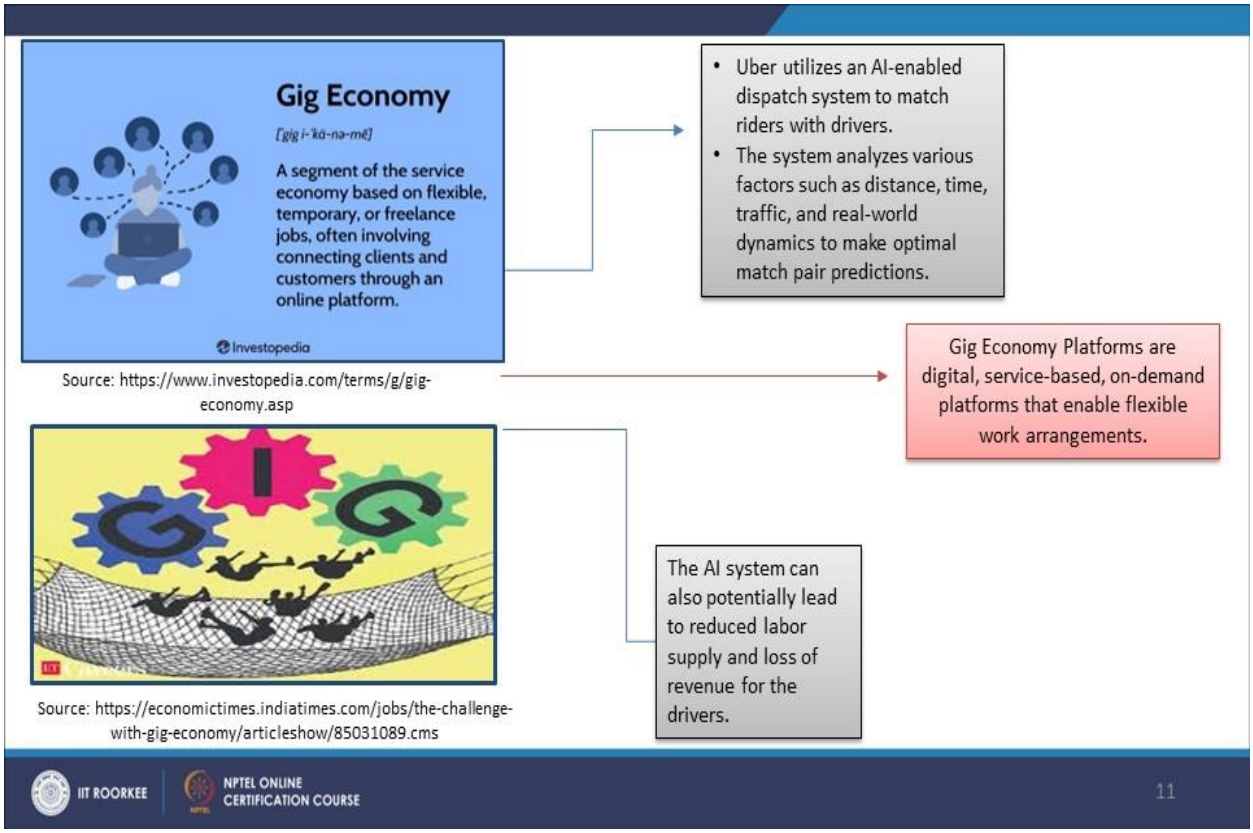


The AI chatbot Tay was developed by Microsoft to conduct research on conversational understandings and natural language development.

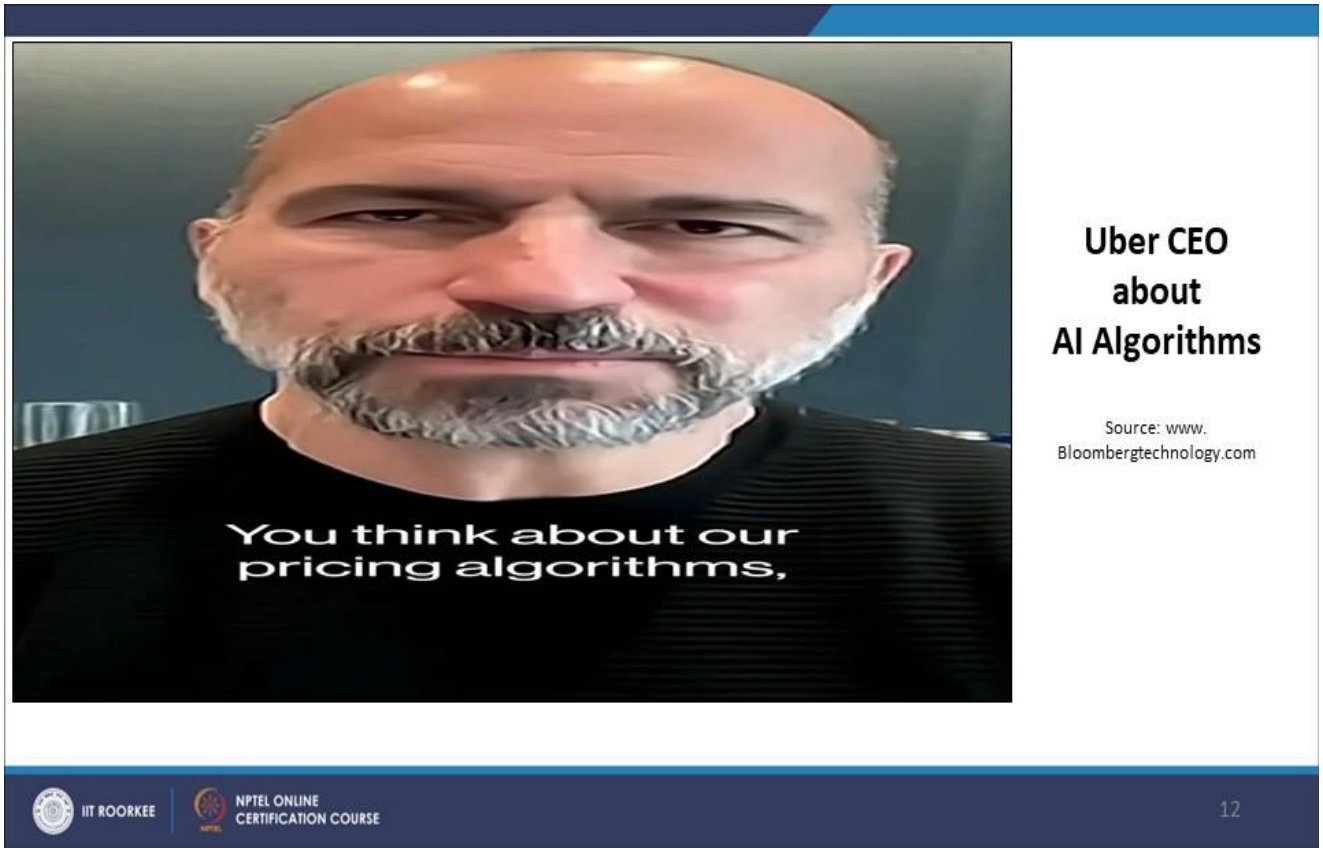
The platform was Twitter. However, we find that Tay became a remarkable example to understand that communication also involves cultural context as well as the nuanced meaning of words. AI systems feed off of both positive and negative interactions. If we look at the tweets which are seen in this slide, we can also understand the reason of the failure of Tay. Tay had a shortened tragic life who within the space of 24 hours turned into a genocidal, racist, sexist and homophobic being. Tay failed as she was thrown into the deep end of the social media pool without the ethical and cultural capacities or contexts to swim at that end.

Looking from a technology centric perspective, AI has been increasingly integrated into the gig economy platforms. A gig economy is a labor market that does not normally employ full-time workers and relies heavily on temporary and part-time positions. So gig market is flexible but with hardly any job security. And AI impacts the gig economy in several ways leading to increased automation of tasks previously performed by human workers. Models of communication also change in gig markets.

Platforms such as Uber and Lyft have already started to experiment with self-driving cars which could eventually replace human drivers altogether.



As is apparent in this slide, we find that gig economy platforms are digital and service based on demand. However, the AI systems can also potentially lead to a reduced labor supply and loss of revenue for the workers as well as sudden ends of their career perspectives. The following video shows the CEO of the gig economy platform Uber talking about the use of AI in its advancement. It supports the points we have already discussed.

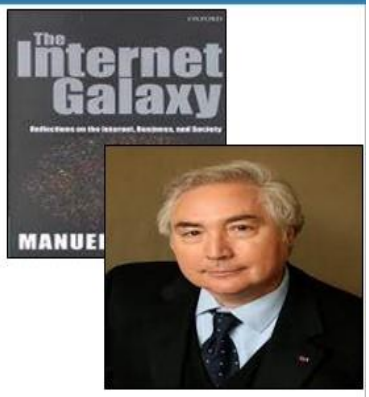


We have seen algorithms, routing algorithms when we decide to, let's say, batch a delivery order or not. Even technologies such as recognition of your license or your insurance card, etc. All of these are AI driven and they have been a part of how we operate as a company. What we are seeing now is that as these models get more capable and larger, you can train them over much larger data sets. We would have an AI algorithm that is pricing for city by city by city.

Now our AI algorithms can price globally and the efficacy in terms of pricing and matching is incredibly powerful. Because we have more data than anyone else across a multitude of businesses, we think AI is going to be a very, very powerful tailwind for us.

Virtual assistants like Alexa were also accused of invading privacy, recording conversations and sending it to random contexts. Now let us try to understand the key aspects of communicative AI technologies within HMC, that is human machine communication. We will be looking at three dimensions, functional, relational and metaphysical, as well as the implications of blurring the boundaries of what constitutes as human, machine and communication. We will try to understand this with the help of key ideas used in conventional communication and media theories.

- The functional aspect of AI focusses on how certain AI technologies are designed as communicators and how people perceive them within this role. Identifying the type of communication is a critical component of communication research.
- Manuel Castells in his work, *The Internet Galaxy* (2001), formulates the idea of 'networked individualism' noting that new technologies have led to 'me-centered networks' where communication has become more personalized and privatized.
  - Platforms like Google News or Flipboard use AI algorithms to personalize news feeds to match the user's preferences.
- In an **Interpersonal Communication**, the message is exchanged and synchronized between the human and AI technology.

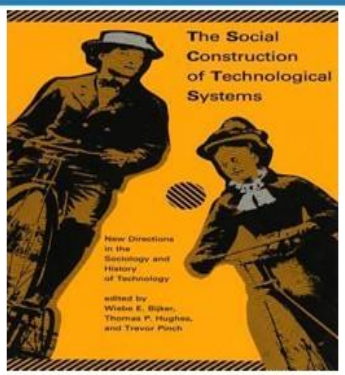


Manuel Castells- The Internet Galaxy
Sources: www. pressroom.usc.edu, www. Books.google.cg

The functional aspect of AI has focused on creating AI technologies as communicators and ensuring that people are able to perceive them within this role. To discuss this idea further, I refer to the 2001 work of Manuel Castells, The Internet Galaxy. Castell has formulated the idea of networked individualism, noting that new technologies have led to me-centred networks where communication has become more personalised and privatised.

We can cite the examples of Google News or Flipboards etc, which use AI algorithms to personalise our feed. In an interpersonal communication, the message is exchanged and synchronised between the human and the AI technology, removing the human audience perhaps altogether. Technologies such as automated journalism like news writing programmes are designed to fit into mass communication. In order to understand the relational aspects of AI, we need to understand that people's interactions are unfolded within social contexts and they understand AI in relation to these contexts only. This entails knowing about the social construction of technology or SCOT.

- Social Construction of Technology (SCOT) is a theoretical framework developed by Trevor Pinch and Wiebe Bijker in their work *The Social Construction of Technological Systems* (1987).
  - SCOT argues that technological artifacts, such as AI systems, can have multiple interpretations and meanings depending on the social positioning of technology in relation to themselves.
- Later, the concept of 'Network Society' was developed by media theorists like Manuel Castells and Jan van Dijk.
  - It refers to the social structure and dynamics that have emerged in the contemporary era, characterized by the widespread use of information and communication technologies (ICTs) and the increasing importance of networks.
  - In the network society, intelligence is distributed across networks.
  - It is not just the technology that defines modern societies but also the cultural, economic and political factors.



Source: www.Goodreads.com

SCOT is a theoretical framework which has been developed by Trevor Pinch and Wiebe Bijker in their work, The Social Construction of Technological Systems published in 1987. It argues that technological artefacts such as AI systems can have multiple interpretations and meanings depending on the social positioning of technology in relation to themselves. The concept of network society was later developed by media theorists like Manuel Castells and Jan van Dijk. It refers to the social structure and dynamics that have emerged in the contemporary era, characterised by the widespread use of information communication technologies and the increasing importance of networks as well as our increased dependence on them. In the network society, intelligence is distributed across networks and it is not just the technology that defines modern societies but also the cultural, economic, social and political factors.

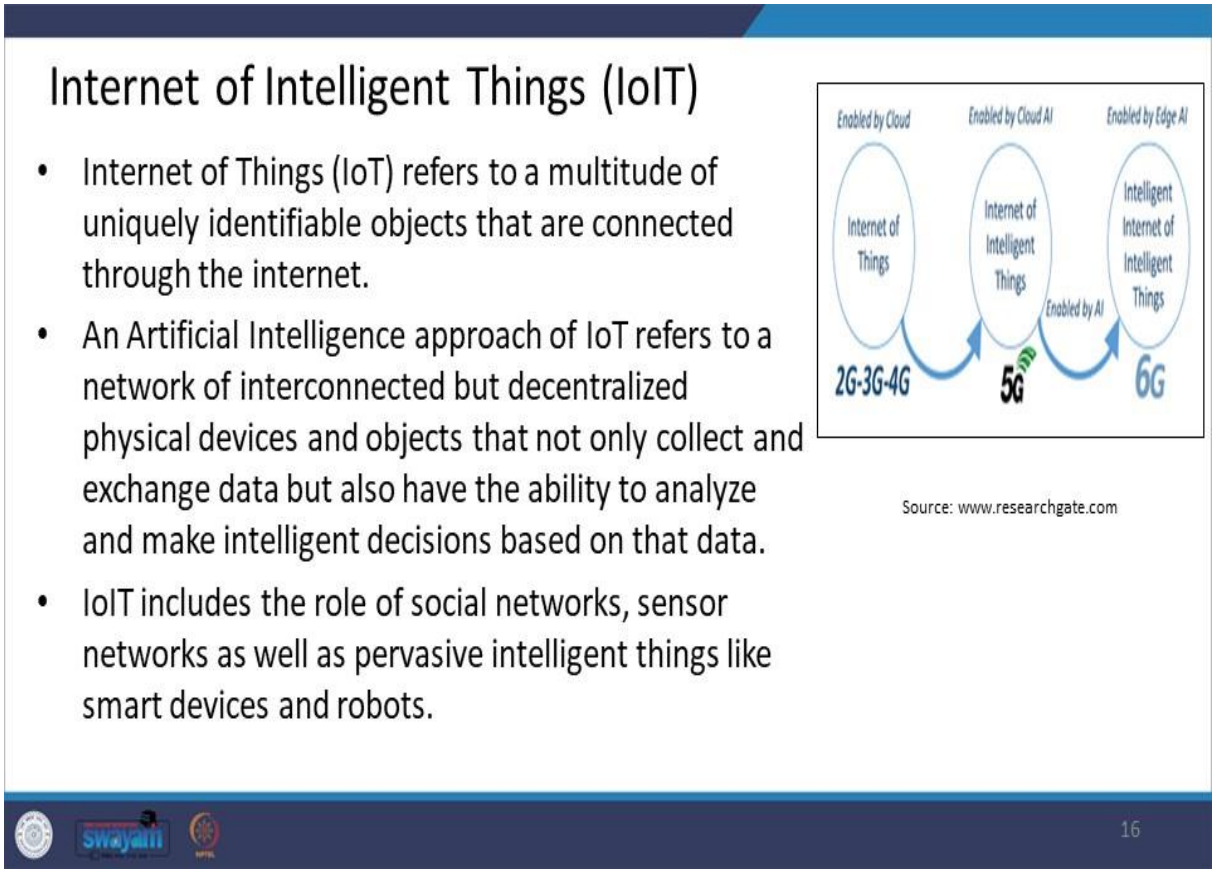
As we know emerging technologies of AI encapsulate the worldviews and biases of their creator. Technology's ability to communicate and also to be a communicator automates the communication process and it potentially erases the human that once stood in its spot and threatens social processes that hinge on human communication.

The automation of communicative labour threatens to replace human affective labour with the mimicked creativity and care of machines. Jodi Dean in her book, Democracy and Other Neoliberal Fantasies published in 2009 talks about communicative capitalism that harnesses communication for economic and political control. Her central idea is that in the era of neoliberalism, communication technologies have played a significant role in shaping political discourse as well as mobilisation.

Communicative AI is integrated into the domestic sphere as well. Introducing machine into the domestic sphere serves the purpose of increasing value in this sphere. This shows that there are social implications of representing the human within the machine, of automating the labour surrounding communication and of adopting these technologies within spaces that are often the most personal and meaningful. The study of AI is a challenge to existing conceptualisations of the nature of communication and also of humans. The interconnected networks of communication and information technology can transcend physical locations and shape our contemporary society.

That is we are entering into the next stage of evolution called the Internet of Intelligent

Things where the embodiment of AI may or shall evoke communication networks and behaviours that eliminate human supervision.



Internet of Things refers to a multitude of uniquely identifiable objects that are connected through the internet. It includes the role of social networks, sensor networks as well as pervasive intelligent things like smart devices and robots. An AI approach of IoT refers to a network of interconnected but decentralised physical devices and objects that not only collect and exchange data but also have the ability to analyse and make intelligent decisions based on the collected data. Taking social networking to the IoIT enables connecting intelligent things to solve complex problems collaboratively.

Different levels of services can be established between the things by determining their relationships with one another and similarly this also enables a seamless integration between the physical and the virtual worlds. Let us look at a few instances.

- **Social Internet of Things (SIoT)** consists of intelligent objects that publish themselves as services through online social networks and adapt the content to the users.
- Virtual Environments like 'Metaverse' make these web communities available to users through their virtual personal avatars that reside in the IoT.

Source: www.meta.com

Source: www.amazonservices.com

Wireless Sensor Networks (WSN) and Cloud Computing

- Wireless Sensor Networks collect data from the environment, such as temperature, humidity, pressure, or motion.
- Cloud computing involves the delivery of on-demand computing resources, such as storage, processing power, and software, over the internet.

Pervasive Intelligent Robots addresses IoT platforms for Urban technologies, home automation and smart devices.

Social Internet of Things consists of intelligent objects that publish themselves as services through online social networks and adapt the content to the users. The other aspect which we are discussing here is the cloud computing. Cloud computing involves the delivery of on-demand computing resources such as storage, processing power, software over the internet.

For example, urban atmospheres by Intel aims at multisensorial networks and community information for the ease in future cities. One paradigm of cloud computing is cloud robotics which is designed to evolve based on its acquired knowledge. Cloud robots are more portable, less expensive and have access to better intelligence in comparison to an ordinary robot and for this reason their significance in the field of communication is also to be evaluated carefully.

AI and Robotic Communication

- The paradigm of 'sense-think-act' was advanced as the operational definition of robotic communication.
  - It outlines sensing the environment, processing the information obtained, and executing appropriate actions based on that information.
- The roboticist Rodney Brooks incorporated the design principle of 'subsumption architecture' or 'behavior-based robotics'.
  - Aimed to organize a robot's behavior into a hierarchy of layers for specific behaviors or tasks.
    - The layers are arranged in a way that lower-level behaviors are "subsumed" by higher-level behaviors, but they can still exert influence if necessary.
  - Consciousness was relegated as an 'epiphenomenon'.
  - This later led to the invention of one of the early social robots, *Kismet*, to explore human-robot interaction and social intelligence.

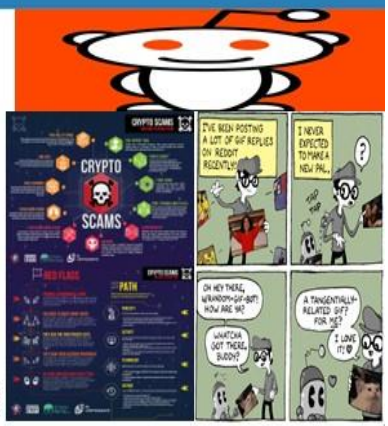
Kismet was developed by Dr. Cynthia Breazeal at the MIT.
Source: www.twitter.com, robots.ieee.org

The paradigm of sense-think-act is considered as an operational definition of robotic communication. It outlines sensing the environment, processing the information and executing appropriate actions.

Rodney Brooks, a well-known roboticist has incorporated the design principle of subsumption architecture or behaviour based robotics. She aimed to organize a robot's behaviour into a hierarchy of layers for specific behaviours or tasks. The layers are arranged in a way that lower level behaviours are subsumed by higher level behaviours but they can still exert influence if necessary. Consciousness was relegated as an epiphenomenon. This later led to the invention of one of the early social robots Kismet to explore human-robot interaction and social intelligence.

We can look at a photograph of this robot in this slide. The photograph suggests that Kismet's features are specifically designed to encourage emotional responses from humans and this became the beginning of attributing agency to robots and the emergence of social bots. Let us speculate on the sociality of social bots and their role in promoting opinions on media platforms which has come to be termed as deliberative democracy.

- Wiebe Bijker's concept of 'technological frame' is a socio-cognitive approach to study the convergence of communication and information technology.
  - Mediating structure shaping the interactions within a social group regarding a technological artifact and being shaped by these interactions. Social bots are part of the technological artifact.
- Socialbots are liminal social entities that are situated at the threshold between humans and non-humans.
  - According to Latour, they are actors in the network of humans and non-humans that have agency and share the material production of reality with humans.
  - They are part of post-cybernetic identity performances as they can act and pass as human online.
- Socialbots are developing a distinctive, machinic sociality.
  - Wikipedia has socialbots for tasks such as combating vandalism, policing copyright violations etc.



Reddit uses socialbots for bitcoin tips, gifs etc
Source: www.reddit.com

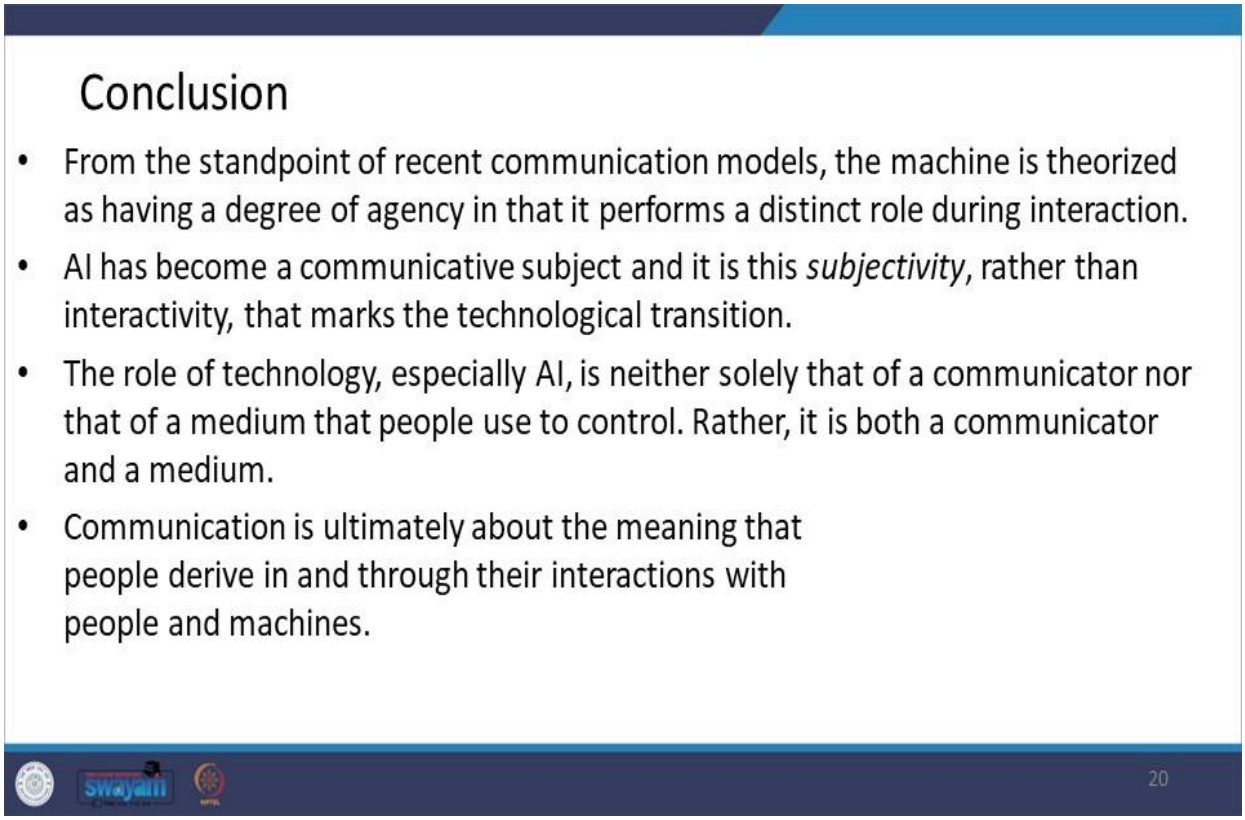
I would refer to the concept of technological frame which is a socio-cognitive approach suggested by Wiebe Bijker to study the convergence of communication and information technology.

Mediating structure shaping the interactions within a social group regarding a technological artefact and in turn being shaped by these interactions and social bots are part of the technological artefact. Social bots are liminal social entities that are situated at the threshold between humans and non-humans. According to Latour, they are actors in the network of humans and non-humans who also have some agency and share the material production of reality with humans. They are part of post cybernetic identity performance as they can act and pass as human online.

Social bots are developing a distinctive machinic sociality. For example, Wikipedia has social bots for certain tasks such as combating vandalism, policing copyright violations, etc. Social bots also have negative influences as through the proliferation and deliberately designing and controlling our access to specific opinions only, they can easily sway the public sentiments. Social bots also negatively define the boundaries of human sociality online. For example, in December 2014, Instagram had deleted a number of accounts in the name of being fake and a number of critics termed it as

Instagram rapture. The complex role of social robotics is entangled in the trajectories of power and politics reminding us of what Lyotard had mentioned in his 1979 work, The Postmodern Condition: Areport on knowledge.

In his 1988 work, The Inhuman, Lyotard had again talked about the dominance of technology and visiting a world where knowledge to be understood as knowledge has to be translated first into data. Let us understand this further with the help of Habermas ideal of public sphere and deliberative democracy. We will take up this idea further with the help of the theoretical stance of Habermas, particularly his ideal of public sphere and deliberative democracy in the next modules.



From the standpoint of recent communication models, the machine has been theorized as having a degree of agency in that it performs a distinct role during interaction. AI has become a communicative subject and it is the subjectivity rather than interactivity that marks a significant technological transition.

The role of technology, particularly of AI is neither solely that of a communicator nor that of a medium that people use to control, rather it is both a communicator and a medium. And therefore, communication as we see is ultimately about the meaning that

people derive in and through their interactions not only with people but with people as well as machines. Culture, society and its power relations are always embodied within technology and enacted within its use. Technology, communication, self and society intersect in many ways and in turn shape relations with the world. In the context of digital communication, when we talk about the intersections with gender and race, it also brings us to the emerging concerns of communication capitalism and data colonialism.

It makes the issues of ethical considerations in the latest intersection of communication and AI vital and urgent. We also cannot ignore developments like chat GPT. In the next module, we shall address these concerns and discuss them in detail. Thank you.