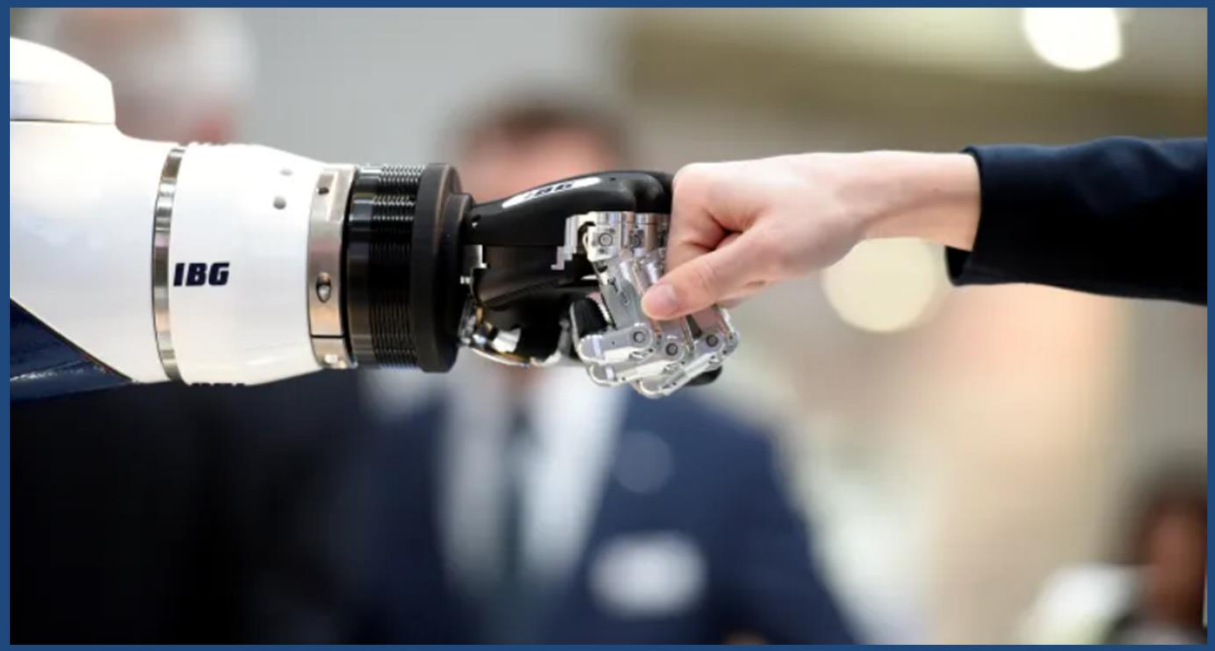
Unit – 1 AI Land scape



With theory we know the importance of everything, theory help us to build industries

Topic :- 1 AI Impact In The World Today

Artificial intelligence (AI) is a wide-ranging tool that enables people to rethink how we integrate information, analyze data, and use the resulting insights to improve decision making—and already it is transforming every walk of life.

In this report, Darrell West and John Allen discuss AI's application across a variety of sectors, address issues in its development, and offer recommendations for getting the most out of AI while still protecting

important human values.

Om Kant Sharma

AI benefits, we recommend nine steps for going forward:

- Encourage greater data access for researchers without compromising users' personal privacy,
- invest more government funding in unclassified AI research,
- promote new models of digital education and AI workforce development so employees have the skills needed in the 21 st-century economy,
- create a federal AI advisory committee to make policy recommendations,
- engage with state and local officials so they enact effective policies,
- regulate broad AI principles rather than specific algorithms,
- take bias complaints seriously so AI does not replicate historic injustice, unfairness, or discrimination in data or algorithms,
- maintain mechanisms for human oversight and control, and
- penalize malicious AI behavior and promote cybersecurity.

Table of Contents

I. Qualities of artificial intelligence

AI generally is thought- “machines that respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment and intention.” According to researchers Shubhendu and Vijay.

Intentionality - massive improvements in storage systems, processing speeds, and analytic techniques, they are capable of tremendous sophistication in analysis and decision making.

Note - Artificial intelligence is already altering the world and raising important questions for society, the economy, and governance.

- **Intelligence-**AI undertaken of conjunction with machine learning and data analytics.
- All that is require – data,
- algorithms find useful patterns. Data can come - digital information - satellite imagery- visual information - text, or unstructured data.
- **So Data makes intelligent after AI, ML, DS, DL analysis to find solutions**

- Adaptability: - AI systems have the ability to learn and adapt as they make decisions.

- “experience” - advanced algorithms, sensors, and cameras incorporate experience in operations.

II. Applications in diverse sectors

- Govt, Semi govt & private orgs plans to deploying AI into a variety of sectors.
- like - finance, national security, health care, criminal justice, transportation, and smart cities

- **A project undertaken by Price Waterhouse Coopers estimated that "artificial intelligence technologies could increase global GDP by $15.7 trillion, a full 14%, by 2030." [7] That includes advances of $7 trillion in China, $3.7 trillion in North America, $1.8 trillion in Northern Europe, $1.2 trillion for Africa and Oceania, $0.9 trillion in the rest of Asia outside of China, $0.7 trillion in Southern Europe, and $0.5 trillion in Latin America. China is making rapid strides because it has set a national goal of investing $150 billion in AI and becoming the global leader in this area by 2030.**

Finance –

- Fraud detection represents another way AI is helpful in financial systems
- taking place in stock exchanges
- People submit buy and sell orders, and computers match them in the blink of an eye without human intervention.
- (advanced computing, these tools have much greater capacities for storing information because of their emphasis not on a zero or a one, but on “quantum bits” that can store multiple values in each location.[13] That dramatically increases storage capacity and decreases processing times)

E-Commerce - machine learning techniques that businesses employ to develop strong client connections.

National security –

(Artificial intelligence will accelerate the traditional process of warfare so rapidly that a new term has been coined: hyper war.**)**

AI will affect the speed of warfare, the proliferation of zero day or zero second cyber threats as well as polymorphic malware will challenge even the most sophisticated signature-based cyber protection

Criminal justice –

AI is being deployed in the criminal justice area. The city of Chicago has developed an AI driven "Strategic Subject List" that analyzes people who have been arrested for their risk of becoming future perpetrators. It ranks 400,000 people on a scale of 0 to 500, using items such as age, criminal activity, victimization, drug arrest records, and gang affiliation. In looking at the data, analysts found that youth is a strong predictor of violence, being a shooting victim is associated with becoming a future perpetrator, gang affiliation has little predictive value, and drug arrests are not significantly associated with future criminal

activity.

Transportation - **Autonomous vehicles—cars, trucks, buses, and drone delivery systems—use advanced technological capabilities.**

Light detection and ranging systems (LIDARs) and AI are key to navigation and collision avoidance. LIDAR systems combine light and radar instruments. They are mounted on the top of vehicles that use imaging in a 360-degree environment from a radar and light beams to measure the speed and distance of surrounding objects.

Smart cities –

Metropolitan governments are using AI to improve urban service delivery. For example- "smart meters for utilities, intelligent traffic signals, e-governance applications, Wi-Fi kiosks, and radio frequency identification sensors in pavement."

III. Policy, regulatory, and ethical issues

- balance basic human values,
- Data access problems
- Biases in data and algorithms
- AI ethics and transparency
- Legal liability

IV. Recommendations

- Improving data access -that promotes innovation and consumer protection.
- Increase government investment in AI-According to Greg Brockman, the co-founder of OpenAI, the U.S. federal government invests only $1.1 billion in non classified AI technology.
- **Promote digital education and workforce development**
- Create a federal AI advisory committee - Federal officials need to think about how they deal with artificial intelligence.
- Engage with state and local officials.
- **Regulate broad objectives more than specific algorithms** - By taking a restrictive stance on issues of data collection and analysis, the European Union is putting its manufacturers and software designers at a significant disadvantage to the rest of the world.
- **Take biases seriously**
- **Maintaining mechanisms for human oversight and control**
- Penalize malicious behavior and promote cybersecurity

V. Conclusion

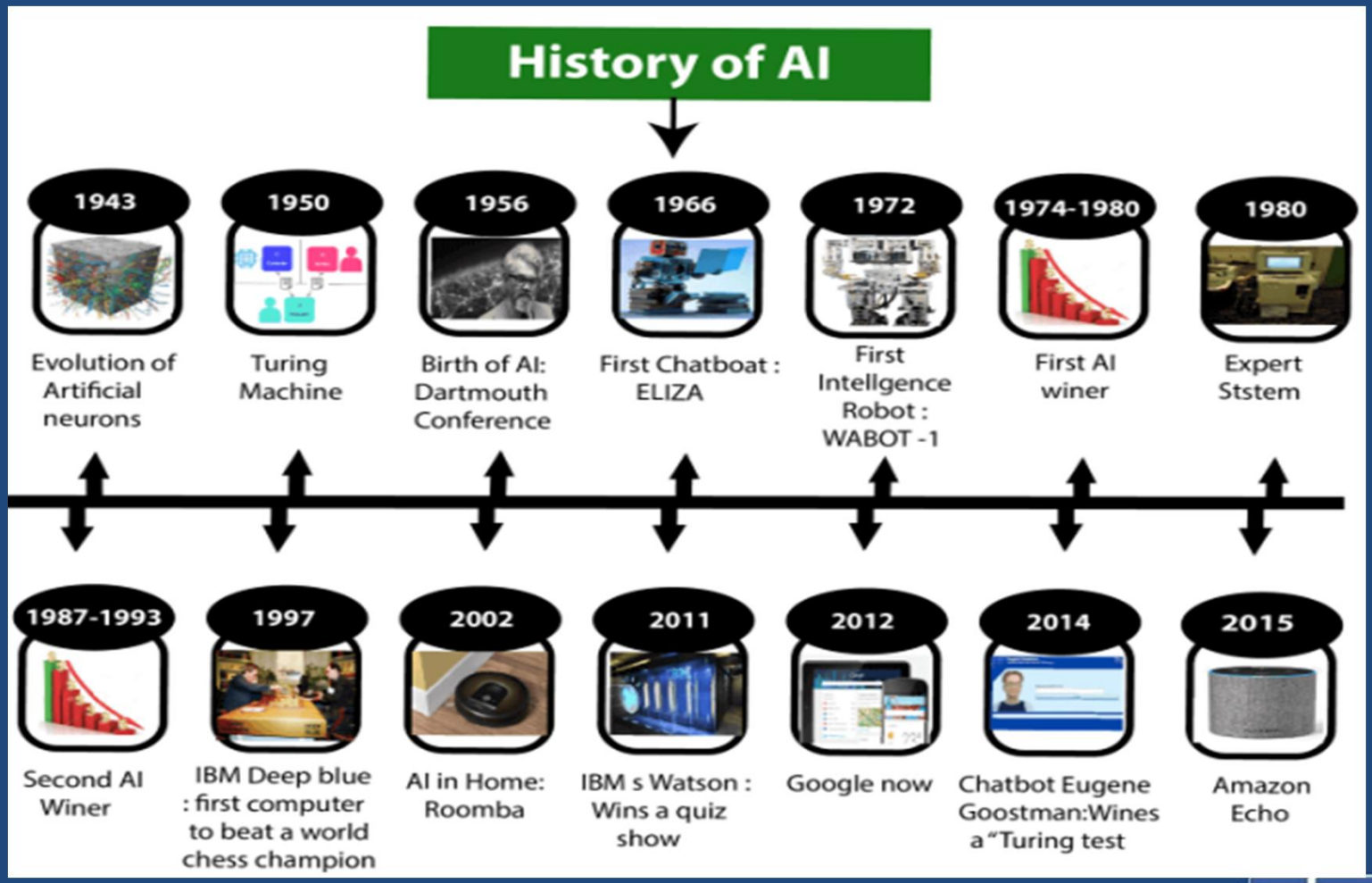
- The world is on the cusp of revolutionizing many sectors through artificial intelligence, but the way AI systems are developed need to be better understood due to the major implications these technologies will have for society as a whole

Topic - 2 -History and Evolution of AI

UNIT-I AI Landscape

Om Kant Sharma

History of Artificial Intelligence



Maturation of Artificial Intelligence (1943-1952)

- **Year 1943:** The first work which is now recognized as AI was done by Warren McCulloch and Walter pits in 1943. They proposed a model of **artificial neurons.**
- Year 1949: Donald Hebb demonstrated an updating rule for modifying the connection strength between neurons. His rule is now called **Hebbian learning.**
- Year 1950: The Alan Turing who was an English mathematician and pioneered Machine learning in 1950. Alan Turing publishes **"Computing Machinery and Intelligence"** in which he proposed a test. The test can check the machine's ability to exhibit intelligent behavior equivalent to human intelligence, called a Turing test.

Om Kant Sharma

The birth of Artificial Intelligence (1952-1956)

- Year 1955: An Allen Newell and Herbert A. Simon created the "first artificial intelligence program“ Which was named as "Logic Theorist". This program had proved 38 of 52 Mathematics theorems, and find new and more elegant proofs for some theorems.
- Year 1956: The word "Artificial Intelligence" first adopted by American Computer scientist John McCarthy at the Dartmouth Conference. For the first time, AI coined as an academic field.

- At that time high-level computer languages such as FORTRAN, LISP, or COBOL were invented. And the enthusiasm for AI was very high at that time.

The golden years-Early enthusiasm (1956-1974)

- Year 1966: The researchers emphasized developing algorithms which can solve mathematical problems. Joseph Weizenbaum created the first chatbot in 1966, which was named as ELIZA.
- Year 1972: The first intelligent humanoid robot was built in Japan which was named as WABOT-1.

The first AI winter (1974-1980)

- The duration between years 1974 to 1980 was the first AI winter duration. AI winter refers to the time period where computer scientist dealt with a severe shortage of funding from government for AI researches.
- During AI winters, an interest of publicity on artificial intelligence was decreased.

Om Kant Sharma

A boom of AI (1980-1987)

- Year 1980: After AI winter duration, AI came back with "Expert System". Expert systems were programmed that emulate the decision-making ability of a human expert.
- In the Year 1980, the first national conference of the American Association of Artificial Intelligence was held at Stanford University.

The second AI winter (1987-1993)

- The duration between the years 1987 to 1993 was the second AI Winter duration.
- Again Investors and government stopped in funding for AI research as due to high cost but not efficient result. The expert system such as XCON was very cost effective.

Om Kant Sharma

The emergence of intelligent agents (1993-2011)

- Year 1997: In the year 1997, IBM Deep Blue beats world chess champion, Gary Kasparov, and became the first computer to beat a world chess champion.
- Year 2002: for the first time, AI entered the home in the form of Roomba, a vacuum cleaner.
- Year 2006: AI came in the Business world till the year 2006. Companies like Facebook, Twitter, and Netflix also started using AI.

Deep learning, big data and artificial general intelligence (2011-present)

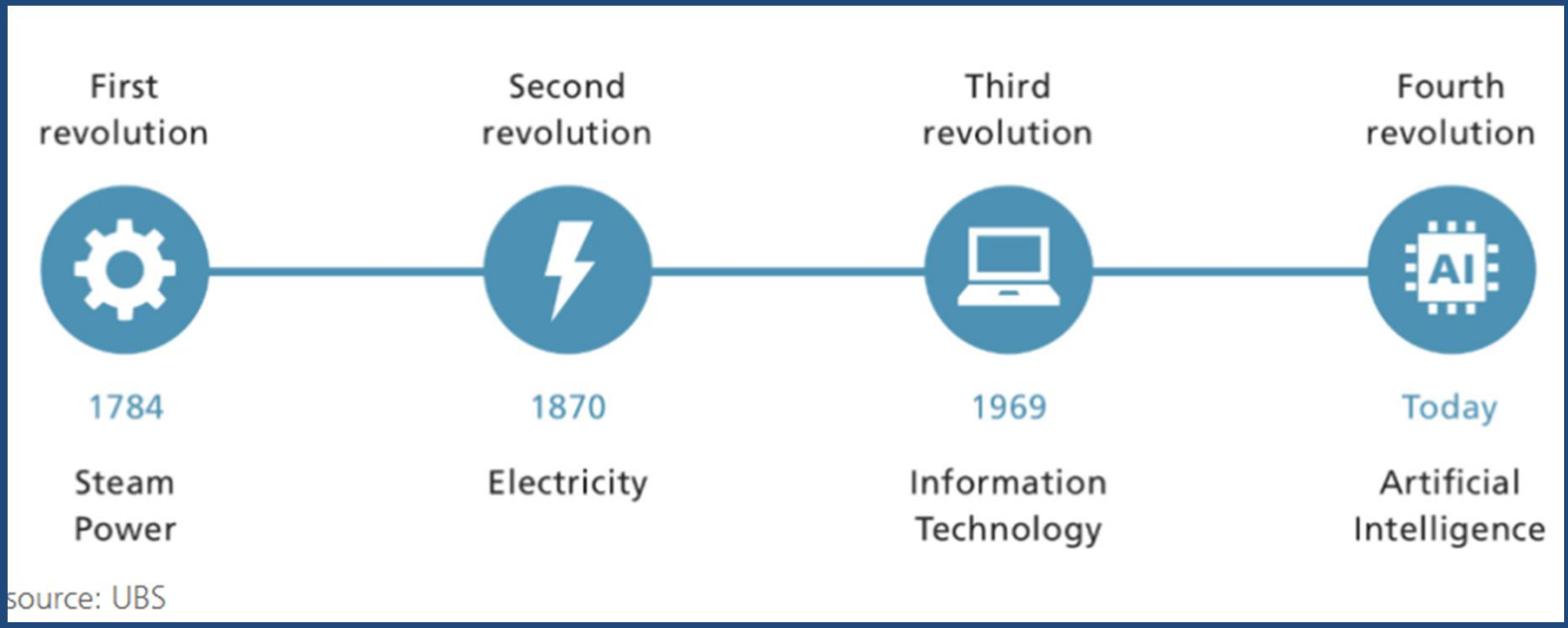
- Year 2011: In the year 2011, IBM's Watson won jeopardy, a quiz show, where it had to solve the complex questions as well as riddles. Watson had proved that it could understand natural language and can solve tricky questions quickly.
- Year 2012: Google has launched an Android app feature "Google now", which was able to provide information to the user as a prediction.
- Year 2014: In the year 2014, Chatbot "Eugene Goostman" won a competition in the infamous "Turing test."
- Year 2018: The "Project Debater" from IBM debated on complex topics with two master debaters and also performed extremely well.
- Google has demonstrated an AI program "Duplex" which was a virtual assistant and which had taken hairdresser appointment on call, and lady on other side didn't notice that she was talking with the machine.

- Now AI has developed to a remarkable level. The concept of Deep learning, big data, and data science are now trending like a boom. Nowadays companies like Google, Facebook, IBM, and Amazon are working with AI and creating amazing devices. The future of Artificial Intelligence is inspiring and will come with high intelligence

Om Kant Sharma

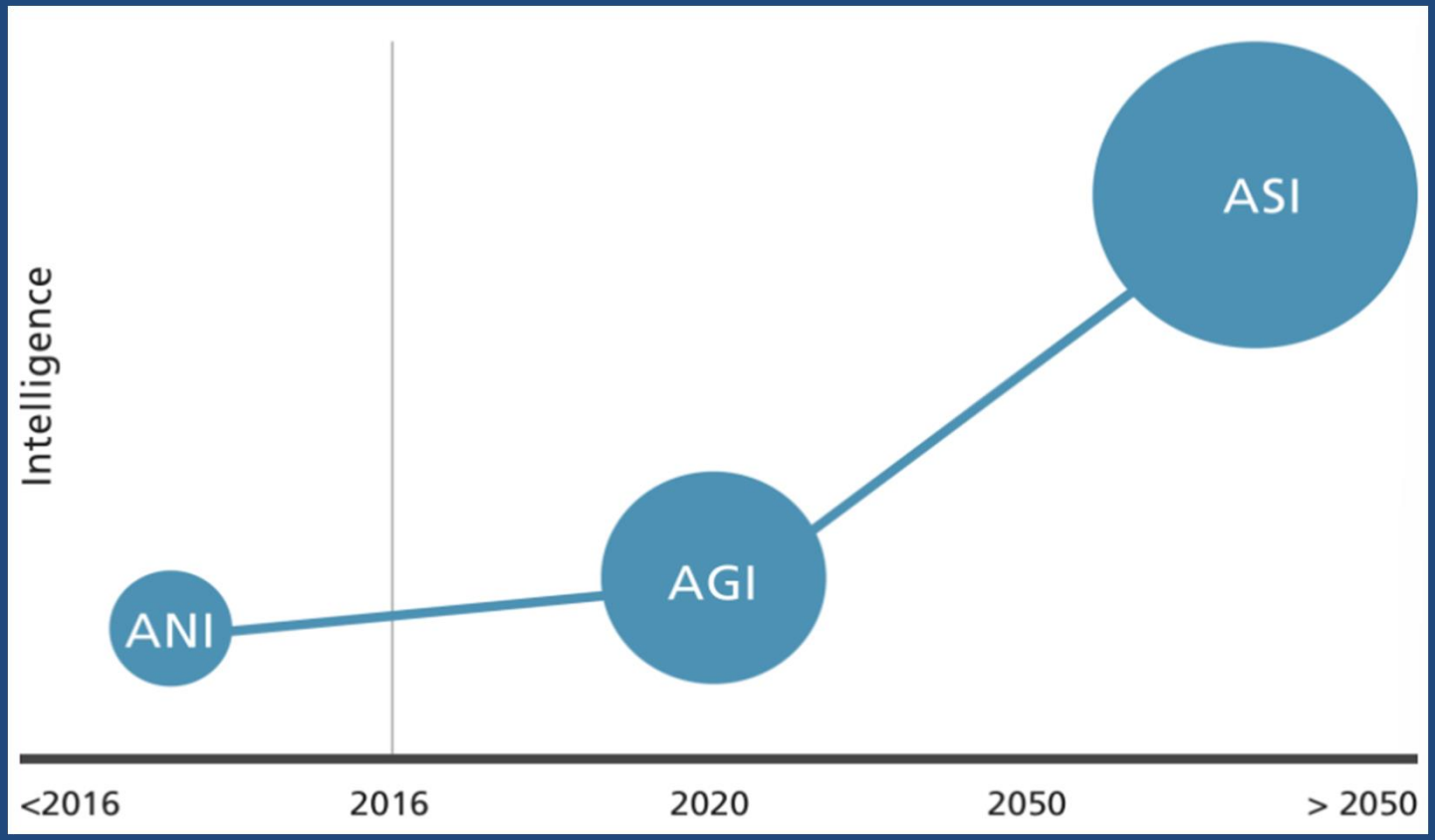
Evolution of AI

Industrial revolutions



in this new digital age, there will be one development so profound and seismic that it will rupture the Earth's long-held human-centric status quo - the birth and transcendence of artificial intelligence (AI).

The evolution of artificial intelligence



AI is divided broadly into three stages: artificial narrow intelligence (ANI), artificial general intelligence (AGI) and artificial super intelligence (ASI).

- The first stage, ANI, as the name suggests, is limited in scope with intelligence restricted to only one functional area. ANI is, for example, on par with an infant.
- The second stage, AGI, is at an advanced level: it covers more than one field like power of reasoning, problem solving and abstract thinking, which is mostly on par with adults.
- ASI is the final stage of the intelligence explosion, in which AI surpasses human intelligence across all fields.

- The transition from the first to the second stage has taken a long time (see chart), but we believe we are currently on the cusp of completing the transition to the second stage - AGI, in which the intelligence of machines can equal humans. This is by no means a small achievement.

Takeaways

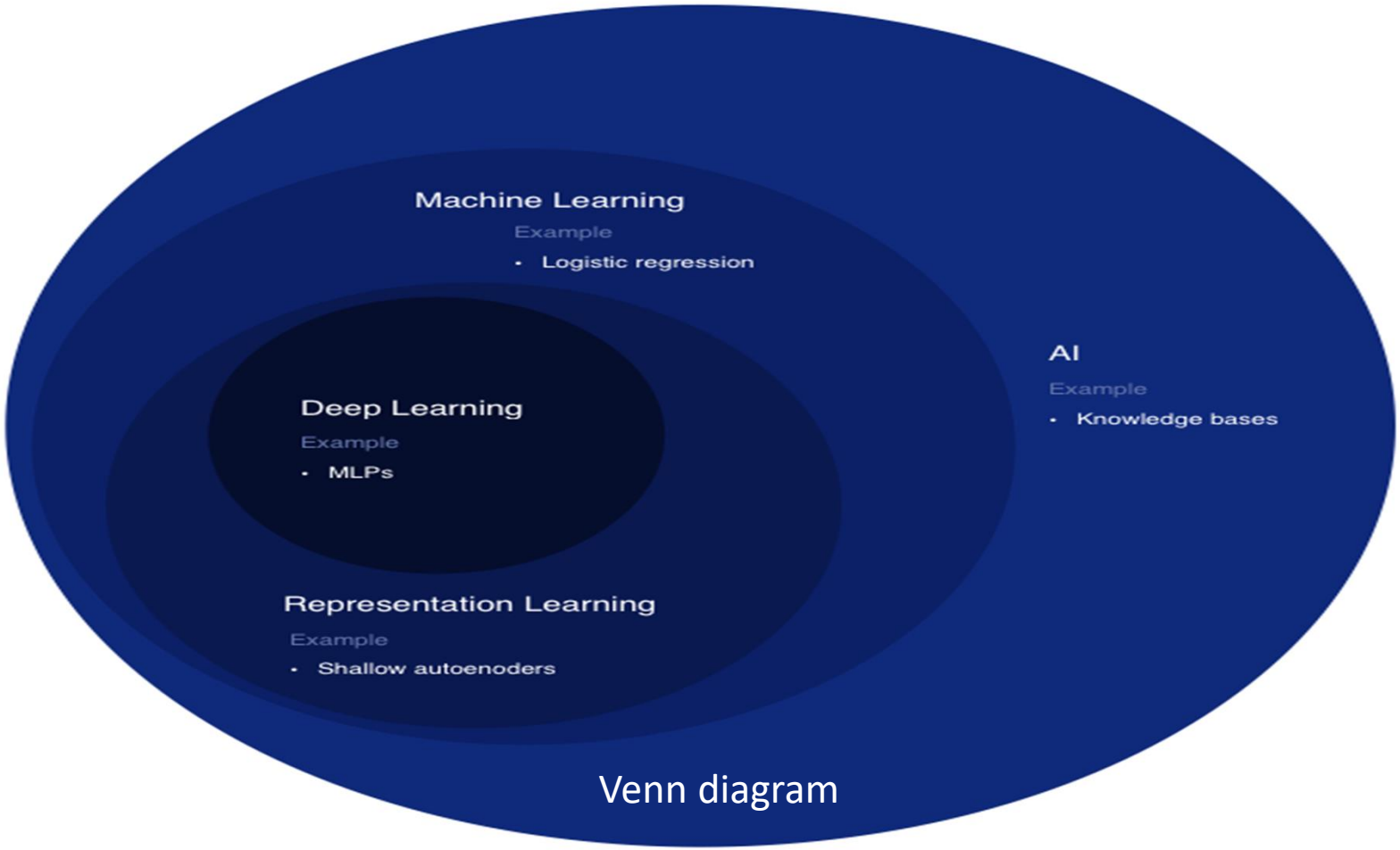
We have entered the fourth Industrial Revolution, an era driven by automation and connectivity.

- There are three phases of AI:

- Artificial Narrow Intelligence (ANI)
- Artificial General Intelligence (AGI)
- Artificial Super Intelligence (ASI)

- The transition between the first and second phase has been the longest.

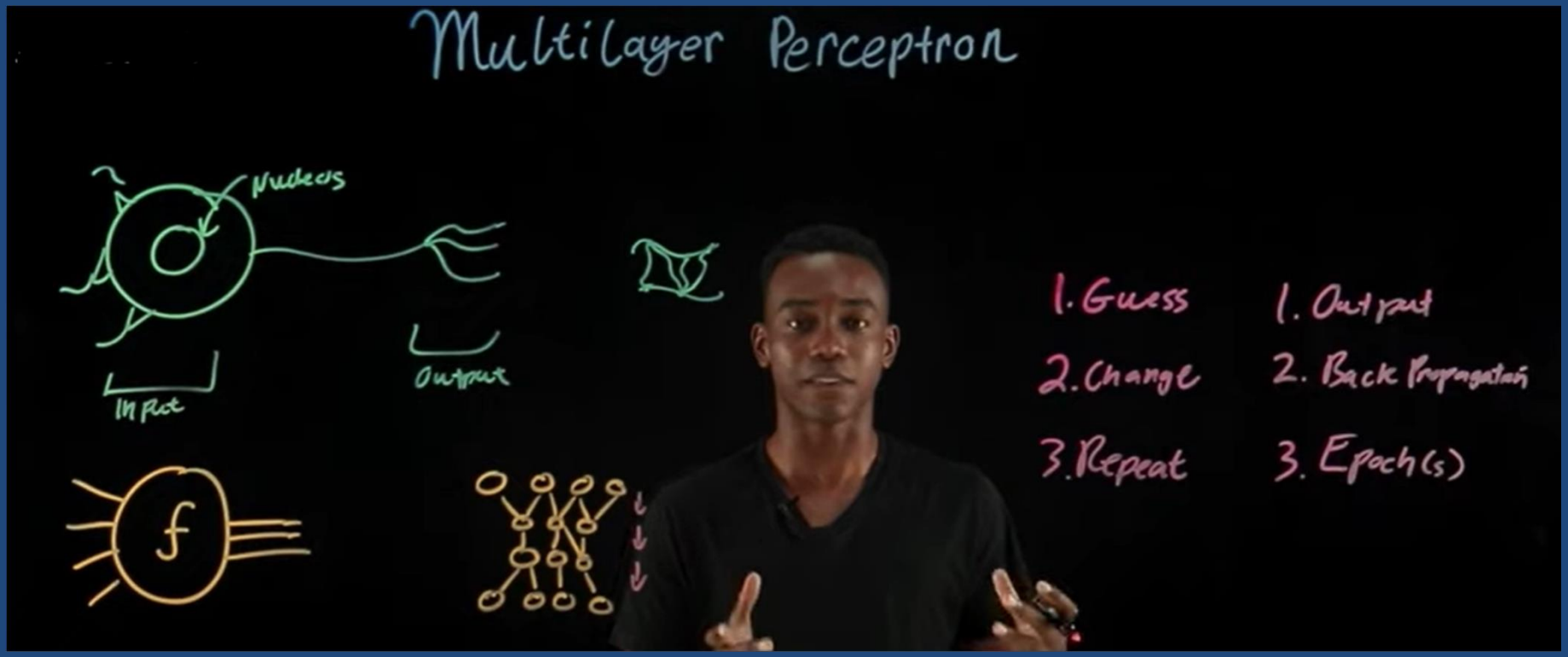
- We are in the final stages of ANI, in which the intelligence of machines and humans are equal.



Venn diagram

According to the Merriam Webster dictionary, “Artificial intelligence is a branch of computer science dealing with the simulation of intelligent behavior in computers.” When a machine can make intelligent decisions, it can be referred to as being intelligent- artificially. We mostly see people using the terms of machine learning, deep learning, and AI synonymously. However, deep learning is a subset of machine learning, and machine learning is a subset of AI.

MLPs



https://www.youtube.com/watch?v=xjlvVfEbhz4
https://www.youtube.com/watch?v=7YaqzpitBXw
https://www.youtube.com/watch?v=jmmW0F0biz0
https://www.youtube.com/watch?v=e_n2hht9Yc8
https://www.youtube.com/watch?v=b61DPVFX03I
https://www.youtube.com/watch?v=S27pHKBEp30

Om Kant Sharma

Topic - 3 -AI Explained

UNIT-I AI Landscape

Om Kant Sharma

What is artificial intelligence?

While a number of definitions of artificial intelligence (AI) have surfaced over the last few decades, John McCarthy offers the following definition in this 2004 paper -

" It is the science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable."

- However, decades before this definition, the birth of the artificial intelligence conversation was denoted by Alan Turing's seminal work, "Computing Machinery and Intelligence“ ,(https://redirect.cs.umbc.edu/courses/471/papers/turing.pdf) which was published in 1950. In this paper, Turing, often referred to as the "father of computer science", asks the following question, "Can machines think?" From there, he offers a test, now famously known as the "Turing Test", where a human interrogator would try to distinguish between a computer and human text response. While this test has undergone much scrutiny since its publish, it remains an important part of the history of AI as well as an ongoing concept within philosophy as it utilizes ideas around linguistics.

- Stuart Russell and Peter Norvig then proceeded to publish, Artificial Intelligence: A Modern Approach (https://aima.cs.berkeley.edu/global-index.html), becoming one of the leading textbooks in the study of AI. In it, they delve into four potential goals or definitions of AI, which differentiates computer systems on the basis of rationality and thinking vs. acting:

Human approach:

– Systems that think like humans

– Systems that act like humans

Ideal approach:

– Systems that think rationally

– Systems that act rationally

Alan Turing's definition would have fallen under the category of "systems that act like humans."

Types of artificial intelligence— weak AI vs. strong AI

- Weak AI—also called Narrow AI or Artificial Narrow Intelligence (ANI)—is AI trained and focused to perform specific tasks. Weak AI drives most of the AI that surrounds us today. ‘Narrow’ might be a more accurate descriptor for this type of AI as it is anything but weak; it enables some very robust applications, such as Apple's Siri, Amazon's Alexa, IBM Watson, and autonomous vehicles.

Types of artificial intelligence— weak AI vs. strong AI

- Strong AI is made up of Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI). Artificial general intelligence (AGI), or general AI, is a theoretical form of AI where a machine would have an intelligence equaled to humans; it would have a self-aware consciousness that has the ability to solve problems, learn, and plan for the future. Artificial Super Intelligence (ASI)—also known as super intelligence—would surpass the intelligence and ability of the human brain. While strong AI is still entirely theoretical with no practical examples in use today, that doesn't mean AI researchers aren't also exploring its development. In the meantime, the best examples of ASI might be from science fiction, such as HAL, the superhuman, rogue computer assistant in 2001: A Space Odyssey

Topic - 4 AI Technologies

UNIT-I AI Landscape

Om Kant Sharma

Artificial Intelligence Technologies

- https://www.edureka.co/blog/top-15-hot-artificial-intelligence-technologies/
- Natural Language Generation
- Speech Recognition
- Machine Learning Platforms
- Virtual Agents
- Decision Management
- AI Optimized Hardware
- Deep Learning Platforms
- Robotic Process Automation
- Text Analytics and Natural Language Processing (NLP)
- Bio-metrics
- Cyber Defense
- Content Creation
- Emotion Recognition
- Image Recognition
- Marketing Automation

Om Kant Sharma

topic - 5 - Applications of AI

UNIT-I AI Landscape

Om Kant Sharma

Applications of Artificial Intelligence

- https://www.simplilearn.com/tutorials/artificial-intelligence-tutorial/artificial-intelligence-applications

1. E-Commerce

AI-Powered Assistants

Fraud Prevention

2. Education

Administrative Tasks Automated to Aid Educators

Creating Smart Content

Voice Assistants

Personalized Learning

3. Lifestyle

Autonomous Vehicles

Spam Filters

Facial Recognition

Recommendation System

4. Navigation
5. Robotics
6. Human Resource
7. Healthcare
8. Agriculture
9. Gaming
10. Automobiles
11. Social Media

Instagram

Facebook

Twitter

12. Marketing
13. Chatbots
14. Finance
15. Astronomy

16. Data Security
Identifies Unknown Threats
Flaw Identification
Threat Prevention
Responding to Threats
Recognize Uncharacterized Action
17. Travel and Transport
Heavy Goods Transportation
Traffic Management
Ride-Sharing
Route Planning
18. Automotive Industry
Manufacturing
Supply Chain
Passenger and Driver Experience
Inspections
Quality Control

References

- https://www.youtube.com/watch?v=xjlvVfEbhz4
- https://www.youtube.com/watch?v=7YaqzpitBXw
- https://www.youtube.com/watch?v=jmmW0F0biz0
- https://www.youtube.com/watch?v=e_n2hht9Yc8
- https://www.youtube.com/watch?v=b61DPVFX03I
- https://www.youtube.com/watch?v=S27pHKBEp30
- AI = all senses –
- 1. Neural Network, Keras
- Logic – data prediction – ANN,
- Image Processing - CNN,
- Audio processing - RNN / LSTM https://www.answerrocket.com/product/
- 2. Computer Vision CV- OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library.
- 3 Neural language Processing NLP -
- 4.
-
-
- https://www.brookings.edu/research/how-artificial-intelligence-is-transforming-the-world/
- **unit – 1 – topic 1-** AI impact in the world today
- **How artificial intelligence is transforming the world**
- https://hyperight.com/what-is-the-impact-of-artificial-intelligence-ai-on-society/
- https://ourworldindata.org/ai-impact
- https://towardsdatascience.com/7-impacts-of-the-artificial-intelligence-technology-5a4663397961
-
- **topic 2- History and Evolution of AI**
- https://www.javatpoint.com/history-of-artificial-intelligence#:~:text=Year%201943%3A%20The%20first%20work,is%20now%20called%20Hebbian%20learning.
- https://www.lftechnology.com/blog/ai/ai-evolution/
- https://www.ubs.com/microsites/artificial-intelligence/en/new-dawn.html
- **topic 3 - AI Explained**
- https://www.ibm.com/topics/artificial-intelligence
- https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp#:~:text=Artificial%20intelligence%20(AI)%20refers%20to,as%20learning%20and%20problem%2Dsolving.
-
- https://medium.com/mytake/artificial-intelligence-explained-in-simple-english-part-1-2-1b28c1f762cf
- **topic – 4 - AI Technologies**
- https://www.sas.com/en_in/insights/articles/analytics/five-ai-technologies.html
-
- https://mindmajix.com/artificial-intelligence-technologies
- https://www.mygreatlearning.com/blog/artificial-intelligence-technologies/
- https://www.mygreatlearning.com/blog/artificial-intelligence-technologies/
- **most important**
- https://www.edureka.co/blog/top-15-hot-artificial-intelligence-technologies/
- https://www.edureka.co/blog/top-15-hot-artificial-intelligence-technologies/
-
-
- https://www.simplilearn.com/top-artificial-intelligence-technologies-article
- **topic – 5 Applications of A.I**
- **https://www.simplilearn.com/tutorials/artificial-intelligence-tutorial/artificial-intelligence-applications**
- **https://www.javatpoint.com/application-of-ai**
-
- **topic – 6 Summary & Resources**
-

Om Kant Sharma