**FUTURISTIC TRENDS IN ARTIFICAL INTELLIGENCE AND MACHINE LEARNING**

**Introduction**

John McCarthy, Professor Emeritus of Computer Science at Stanford University, coined the term : Artificial Intelligence “. He has defined this field for over fifty years. McCarthy was a giant and original figure in the fields of computer science and artificial intelligence. In 1995, when McCarthy attended a summer research conference on artificial intelligence in Dartmouth, he was offered a job with ten people and two months. When proposing a meeting, research should continue with the assumption that any aspect of learning or other properties of intelligence can in principle be described accurately enough to be modelled by machines. The subsequent conference is considered a watershed moment in computer science.

In 1958, McCarthy invented the computer programming language LISP, the second oldest programming language after FORTRAN. LISP is still used today and it is the programming language of choice for artificial intelligence. He also developed the concept of computer time-sharing in the late 1950s and early 1960s, an advance that greatly improved the efficiency of distributed computing and predated the era of cloud computing by decades. A bunch of people decided that time-sharing was clearly the way to work with a computer, but nobody could figure out how to make it work for general purpose computing nobody except John, said Les Earnest, a senior research scientist emeritus at Stanford and an early collaborator at the Stanford Artificial Intelligence Laboratory (SAIL) with McCarthy.

**Definition** - The term Artificial Intelligence refers to the simulation of human intelligence processes by machines, especially computer systems. It also includes Expert systems, voice recognition, machine vision, and natural language processing (NLP). Artificial Intelligence is an extensive field of computer science which focuses on developing intelligent machines capable of doing activities that would normally require human intelligence. While AI is a multidisciplinary science with numerous methodologies, advances in deep learning and machine learning create a paradigm shift in almost every aspect of technology. **History of Artificial Intelligence**

The term artificial intelligence was coined in 1956, but AI has become more popular today thanks to increased data volumes, advanced algorithms, and improvements in computing power and storage. Early AI research in the 1950s explored topics like problem solving and symbolic methods. In the 1960s, the US Department of Defense took interest in this type of work and began training computers to mimic basic human reasoning. For example, the Defense Advanced Research Projects Agency (DARPA) completed street mapping projects in the 1970s. And DARPA produced intelligent personal assistants in 2003, long before Siri, Alexa or Cortana were household names. This early work paved the way for the automation and formal reasoning that we see in computers today, including decision support systems and smart search systems that can be designed to complement and augment human abilities. Hollywood movies and science fiction depict AI as world-ruling humanoid robots, but the current evolution of AI technology isn't that scary or smart. Instead, AI has evolved to offer many specific benefits in every industry.

As the hype about AI working has accelerated, AI grows, vendors are struggling to promote the use of AI in their products and services. Often what they call AI is just one of the building blocks of AI, such as machine learning. AI requires specialized hardware and software to write and train machine learning algorithms. No programming language is synonymous with AI, but some are popular, including Python, R, and Java. In general, AI systems work by collecting large amounts of labelled training data, analyzing the data for correlations and patterns, and using these patterns to predict the future states.
In this way, a chatbot that is fed examples of text chats can learn to produce lifelike exchanges with people, or an image recognition tool can learn to identify and describe objects in images by reviewing millions of examples.

AI programming focuses on three cognitive aspects, such as learning, reasoning, and self-correction.

 **Learning Processes** - This part of AI programming is concerned with gathering data and creating rules for transforming it into useful information. The rules, which are also called algorithms, offer computing devices with step-by-step instructions for accomplishing a particular job.

**Reasoning Processes** - This part of AI programming is concerned with selecting the best algorithm to achieve the desired result.

**Self-correction Processes** - This part of AI programming aims to fine-tune algorithms regularly in order to ensure that they offer the most reliable results possible.

**Why is artificial intelligence important**

 AI is important because it can give enterprises insights into their operations that they may not have been aware of previously and because, in some cases, AI can perform tasks better than humans. Particularly when it comes to repetitive, detail-oriented tasks like analyzing large numbers of legal documents to ensure relevant fields are filled in properly, AI tools often complete jobs quickly and with relatively few errors. This has helped fuel an explosion in efficiency and opened the door to entirely new business opportunities for some larger enterprises. Prior to the current wave of AI, it would have been hard to imagine using computer software to connect riders to taxis, but today Uber has become one of the largest companies in the world by doing just that. It uses sophisticated machine learning algorithms to predict when people will need to ride a vehicle in a particular area, helping drivers get on the road ahead of time before they need it. Another example: Google has become one of the largest players in the marketplace for many online services by using machine learning to understand and improve how people use its services. In 2017, the company's CEO, Sundar Pichai, said that Google would be the first artificial intelligence company.
Todays largest and most successful enterprises have used AI to improve their operations and gain advantage on their competitors.

**Advantages**

Good at detail-oriented jobs

Reduced time for data-heavy tasks

Delivers consistent results

AI-powered virtual agents are always available.

**Disadvantages**

Expensive

Requires deep technical expertise

Limited supply of qualified workers to build AI tools Only knows what its been shown

Lack of ability to generalize from one task to another.

**Strong AI vs. weak AI**

AI can be categorized as either weak or strong.

**Weak AI -** also known as narrow AI, is an AI system designed and trained to perform a specific task. Industrial robots like Apple Siri and virtual personal assistants use weak AI.

**Powerful AI** - also known as artificial general intelligence (AGI), describes programming that can replicate the cognitive abilities of th e human brain. When unfamiliar problems arise, powerful AI systems can apply knowledge from one domain to another and autonomously find solutions autonomously.

**Types of artificial intelligence**

Arend Hintze, an assistant professor of integrative biology and computer science and engineering at Michigan State University, explained in a article that AI can be categorized into seven types, beginning with the task-specific intelligent systems in wide use today and progressing to sentient systems, which do not yet exist. The categories are as follows:

**Type 1 Reactive machines**.

These AI systems have no memory and are task specific. An example is Deep Blue, the IBM-International-Business-Machines IBMchess program that beat Garry Kasparov in the 1990s. Deep Blue can identify pieces on the chessboard and make predictions, but because it has no memory, it cannot use past experiences to inform future ones.

**Type 2 limited memory**.

Because these AI systems have memory, they can use past experiences to make future decisions.
Some decision-making functions of driverless-car are designed in this way.

**Type 3 Theory of mind.**

Theory of mind is a psychological term. When it comes to AI, this means that the system must have social intelligence to understand emotions. This type of AI can infer human intentions and predict behavior, which is a necessary skill for AI systems to become integral members of human teams.

**Type 4 Self-awareness.**

In this category, AI systems have a conscious sense of self. Self-aware machines understand the present state. This type of AI doesn't exist yet.

**Type 5 Artificial Narrow Intelligence (ANI)**

This type of artificial intelligence represents all AI that exists, including the most sophisticated and capable AI ever created. Artificial narrow intelligence refers to an AI system that can autonomously perform certain tasks using only human capabilities. These machines have very limited or narrow range of capabilities as they cannot do anything other than the tasks they have been programmed to do. According to the aforementioned classification system, all reactive and memory-constrained AIs fall into this category.
Even the most complex AI that uses machine learning and deep learning to teach itself falls under ANI.

**Type 6 Artificial General Intelligence (AGI)**

Artificial General Intelligence is the ability of an AI agent to learn, perceive, understand, and function completely like a human being. These systems will be able to independently build multiple competencies and form connections and generalizations across domains, massively cutting down on time needed for training. This will make AI systems just as capable as humans by replicating our multi-functional capabilities.

**Type 7 Artificial Superintelligence (ASI)**

The development of Artificial Superintelligence will probably mark the pinnacle of AI research, as AGI will become by far the most capable forms of intelligence on earth. ASI, in addition to replicating the multi-faceted intelligence of human beings, will be exceedingly better at everything they do because of overwhelmingly greater memory, faster data processing and analysis, and decision-making capabilities. The development of AGI and ASI will lead to a scenario most popularly referred to as the singularity. And while the potential of having such powerful machines at our disposal seems appealing, these machines may also threaten our existence or at the very least, our way of life.

At this point, it is hard to picture the state of our world when more advanced types of AI come into being. However, it is clear that there is a long way to get there as the current state of AI development compared to where it is projected to go is still in its rudimentary stage. For those holding a negative outlook for the future of AI, this means that now is a little too soon to be worrying about the singularity, and there is still time to ensure AI safety. And for those who are optimistic about the future of AI, the fact that were merely scratched the surface of AI development makes the future even more exciting.

**Some of the examples of AI are as follows**

1. Google Maps and Ride-Hailing Applications
2. Face Detection and recognition
3. Text Editors and Autocorrect Paraphrases
4. Chatbots
5. E-Payments
6. Search and Recommendation algorithms
7. Digital Assistant
8. Social media
9. Healthcare
10. Gaming
11. Online Ads-Network
12. Banking and Finance
13. Smart Home devices
14. Security and Surveillance
15. Smart Keyboard
16. App Smart Speaker
17. E-Commerce
18. Smart Email Apps
19. Music and Media Streaming Service
20. Space Exploration

**BEST USAGES OF ARTIFICIAL INTELLIGENCE IN EVERYDAY LIFE**

Artificial intelligence (AI) appears in popular culture most often as a group of intelligent robots bent on destroying humanity, or at the very least a stunning theme park. Were safe for now because machines with general artificial intelligence don’t yet exist, and they arent expected to anytime soon. According to a recent poll, more than 72% of Americans are concerned that machines will do many human tasks in the future. Also, tech entrepreneur Elon Musk, who has long been pushing for government regulation of AI, recently compared AI to a nuclear weapon. This makes sense when you think about the impact on Industry 4.0, but we haven't done that yet. .  AI is hiding in the background every time you open your Facebook news feed, do a Google search, buy an offer on Amazon, or book a trip online. There are also popular artificial intelligence applications that help us. Artificial intelligence is superior to humans.
**EXAMPLES OF HOW AI IMPROVES OUR EVERYDAY LIFE**

AI and ML-driven software and devices emulate human thought processes to help society move forward with the digital revolution. AI systems recognize their surroundings, handle what they see, resolve issues, and take action to assist with chores to make daily life more comfortable.

**HOW ARTIFICIAL INTELLIGENCE IMPROVES SOCIAL MEDIA**

People regularly check social media accounts, including Facebook, Twitter, Instagram, and other platforms. AI is not only working behind the scenes to customize your feeds, but its also detecting and eliminating false news.

TWITTER Twitter has started to rely on artificial intelligence behind the scenes to improve its product, from suggesting tweets to fighting offensive or racist material and improving the user experience. To learn in time what customers preferences are, they use advanced neural networks that process a large amount of data.

 FACEBOOK Facebook in extracting value from a growing number of its unstructured data sets, acquired from almost 2 billion users updating their statuses 293,000 times a minute. Most of Facebooks deep learning technology is based on the framework, which focuses on deep learning and neural networks.

INSTAGRAM Instagram also makes use of big data and artificial intelligence to target advertising and combat cyberbullying, as well as remove abusive comments. As the number of posts on the platform increases, artificial intelligence is becoming increasingly important in showing people information they might be interested in, removing spam, and improving user experience.

Chatbots Chatbots are artificial intelligence programs that can answer questions and provide relevant information to consumers who ask common questions. Sometimes chatbots are so successful that they appear to be talking to real people.
**AUTONOMOUS VEHICLES AND AIRCRAFT**

Drones, or unmanned aerial vehicles (UAVs), are already present in our skies, conducting surveillance and providing delivery services in various plans, among them the delivery of medicines and necessities to confined-to-home elderly persons COVID-19 restricts their mobility. While the autonomous vehicle market is still in its early phases, there are already enough prototype and pilot projects to indicate that such vehicles will become more common as artificial intelligence and IoT (Internet of Things) technologies improve. Artificial Intelligence in everyday life is increasing day by day.

**DIGITAL ASSISTANTS** Virtual assistants like Siri, Cortana, Google Assistant, and others have made our lives easier. They have acted as a fantastic friend, reminding us to pick up a package and telling us jokes. The software recognizes speech patterns and provides natural language processing capabilities. It also keeps track of work time, screen time, and other related data to know about you. You can use artificial intelligence to practice learning and listening like humans. **Food Ordering Sites** Apps and online ordering sites often provide breakfast, lunch and dinner reminders while you eat. This is made possible by artificial intelligence software that tracks when you most want to eat. Not only that, the AI ​​tracks what kind of food you like and suggests similar dishes based on your taste.

**Music and media streaming service** AI is the music and video streaming service we use every day. When using Spotify, Netflix, or YouTube, AI makes the decisions for you. These platforms provide offers based on their preferences.

**PLAGIAIST** college students (or perhaps professors) have nightmares. Whether you're a content manager or an essay grading teacher, you've probably experienced the same problems the Internet has made plagiarism more convenient. The knowledge and data available to unscrupulous students and faculty is virtually limitless.

**Banking Services** Many major banks today allow you to deposit checks using your smartphone. Deposit checks in just a few taps without going to the bank. In addition to the obvious precautions against using your cell phone to access your bank account, checks require signatures. Banks now use artificial intelligence (AI) and machine learning software to read handwritten signatures, compare them to signatures previously provided to banks, and accept checks risk-free. While we talk about credit and scam banks, let's talk a little bit about scams. Banks process millions of transactions every day. It is difficult for the average person to track and analyze all of this. Online shopping is becoming more personal and streamlined thanks to artificial intelligence (AI) technologies such as online commerce (ECO-COMMERCE) and shopping machine learning. AI-powered automated warehousing and supply chain management systems assist commercial enterprises in better managing their logistics. At the same time, sentiment analysis allows them to better understand and react to their consumers needs and behavior.

**NAVIGATION AND TRAVEL** The job of AI engineers behind navigation apps like Google Maps and Waze never ends. Only satellite images, which are updated every second, can effectively be cross-checked by ML algorithms unleashed on them.

**TRANSPORTATION** Vehicle rentals, such as Uber and Lyft, are extremely useful since they can provide you with a car nearly every time you need one
But we underestimate the AI-powered programs that run on them. We are often reminded to call a taxi before we leave work. How does this app know when we need a taxi? These applications can be done because they use deep learning techniques and have already determined their day-to-day behaviors. Artificial intelligence in our daily life is growing day by day.

**Job Search Apps** Many job search engines use deep learning to better understand users and their needs. These apps use software that allows consumers to find the best opportunities by suggesting jobs, roles, employees, and other relevant information.Top of Form