

**Report**

**on**

**Introduction to Emerging Technologies  
GE102**

**By**

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## EMERGING TECHNOLOGY

**E**merging Technologies are technologies whose development, practical applications, or both are still largely unrealized, such that they are figuratively emerging into



prominence from a background of nonexistence or obscurity. These technologies are generally new but also include older technologies that are still relatively undeveloped in potential, such as gene therapy. Emerging technologies are often perceived as capable of changing the status quo.

Emerging technologies are characterized by radical novelty, relatively fast growth, coherence, prominent impact, and uncertainty and ambiguity. In other words, an emerging technology can be defined as “a radical novel and relatively fast-growing technology characterized by a certain degree of coherence persisting over time and with the potential to exert a considerable impact on the socio-economic domain(s) which is observed in terms of the composition of actors, institutions, and patterns of interaction among those, along with the associated knowledge production processes. Its most prominent impact, however, lies in the future and so in the emergence phase is still somewhat uncertain and ambiguous.

Emerging technologies include a variety of technologies such as artificial intelligence, edge computing, quantum computing, robotic process automation, etc.

New technological fields may result from the technological convergence of different systems evolving towards similar goals. Convergence brings

previously separate technologies such as voice, data and video together so that they share resources and interact with each other, creating new efficiencies.

Emerging technologies are those technical innovations which represent progressive developments within a field for competitive advantage, converging technologies represent previously distinct fields which are in some way moving towards stronger inter-connection and similar goals. However, the opinion on the degree of the impact, status and economic viability of several emerging and converging technologies vary.



## ARTIFICIAL INTELLIGENCE

### Introduction :-



**A**rtificial intelligence (AI) is defined as intelligence exhibited by an artificial entity. Such a system is generally assumed to be a computer.

Although AI has a strong science fiction connotation, it forms a vital branch of computer science, dealing with intelligent behavior, learning and adaptation in machines. Research in AI is concerned with producing machines to automate tasks requiring intelligent behavior. Examples include control, planning and scheduling, the ability to answer diagnostic and consumer questions, handwriting, speech, and facial recognition. AI systems are now in routine use in economics, medicine, engineering and the military, as well as being built into many common home computer software applications, traditional strategy games like computer chess and other video games.

### ❖ How Artificial Intelligence Is Impacting Our Everyday Lives

There are so many amazing ways artificial intelligence and machine learning are used behind the scenes to impact our everyday lives.

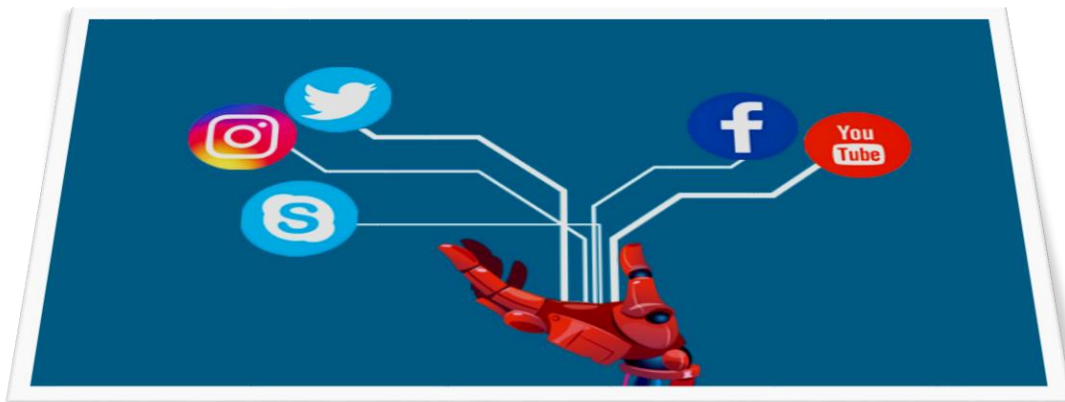
AI assists in every area of our lives, whether we're trying to read our emails, get driving directions, get music or movie recommendations.

How artificial intelligence is used in day-to-day activities such as:



- Social media
- Digital Assistants
- Self-Driving and Parking Vehicles
- Email communications
- Web Searching
- Stores and services
- Offline experiences

❖ *How Artificial Intelligence Improves Social Media*



Artificial intelligence makes it easier to locate and communicate with friends and business associates.

➤ **Twitter :-**

From tweet recommendations to fighting inappropriate or racist content and enhancing the user experience, Twitter has begun to use artificial intelligence behind the scenes to enhance their product.





➤ **Facebook :-**

Deep learning is helping Facebook draw value from a larger portion of its unstructured datasets created by almost 2 billion people updating their statuses 293,000 times per minute.

➤ **Instagram :-**

Instagram also uses big data and artificial intelligence to target advertising and fight cyberbullying and delete offensive comments.

➤ **Chatbots :-**

Chatbots recognize words and phrases in order to deliver helpful content to customers who have common questions. Sometimes, chatbots are so accurate that it seems as if you're talking to a real person.

❖ **How Artificial Intelligence Helps You Everyday Through Digital Assistant**

➤ **Digital Assistants :-**

Apple's Siri, Google Now, Amazon's Alexa and Microsoft's Cortana are digital assistants that help users perform various tasks, from checking their schedules and searching for something on the web, to sending commands to another app.





### ❖ How Artificial Intelligence Helps You Everyday Through Parking Your Car And Driving It

Self-driving and parking cars use deep learning, a subset of AI, to recognize the space around a vehicle. Technology company Nvidia uses AI to give cars “the power to see, think, and learn, so they can navigate a nearly infinite range of possible driving scenarios,”.



### ❖ How Artificial Intelligence Improves Email Communications

#### ➤ **Smart Replies in Gmail:-**

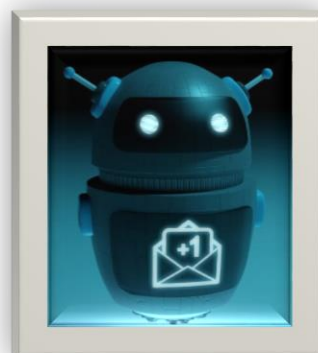
Smart replies offer users a way to respond to emails with phrases like “Yes, I’m working on it.” Or “No I have not.” with the click of a button.

Smart replies are tailored to the content of each email. Users can reply by typing a manual response or may instead choose a one-click smart reply.

#### ➤ **Email Filters in Gmail :-**

Google uses AI to ensure that nearly all of the email landing in your inbox is authentic. Their filters attempt to sort emails into the following categories :

- Primary
- Social
- Promotions
- Updates





- Forums
- Spam

The program helps your emails get organized so you can find your way to important communications quicker. For example, Gmail sorts email into 4 different tabbed categories, and sends the spam mail to a separate folder.

### ❖ How Artificial Intelligence Helps with Web Searches

AI has been used to help with Google searches for quite some time.

#### ➤ **Google Predictive Searches:**

When you begin typing a search term and Google makes recommendations.

Predictive searches are based on data that Google collects about you, such as your location, age, and other personal details. Using AI, the search engine attempts to guess what you might be trying to find.



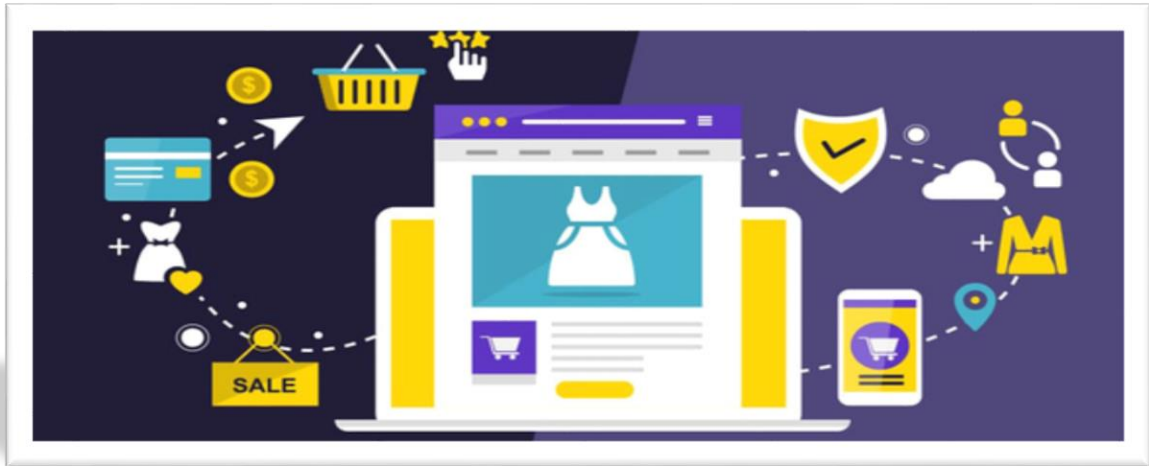
#### ➤ **Google's Algorithm:-**

Google search engines evolved over time by studying the linguistics used in searches. Its AI learns from results and adapts over time to better meet the needs of users.

The purpose of the Google's algorithm is to deliver the best possible results to the searcher. In order to do this, Google uses AI to try to determine the quality of content and match it to the user's query.



## ❖ How Artificial Intelligence Improves Your Experience at Online Stores and Services



### ➤ **Product Recommendations:-**

Amazon and other online retailers use AI to gather information about your preferences and buying habits. Then, they personalize your shopping experience by suggesting new products tailored to your habits.

### ➤ **Music Recommendations :-**

Music services use AI to track your listening habits. The, they use the information to suggest other songs you might like to hear.

For example, Spotify offers suggestions for new discoveries, new releases, and old favorites, based on your listening habits.

### ➤ **Maps and Directions :-**

When apps like Google Maps calculate traffic and construction in order to find the quickest route to your destination, that's AI at work.

### ➤ **Commercial Airline Flights :-**

You might be surprised to discover how little flying your friendly pilot actually does in the cockpit. A 2015 survey of airline Boeing 777 pilots reported spending only 7 minutes manually flying the

plane during a typical flight, with much of the rest being done by AI technology.

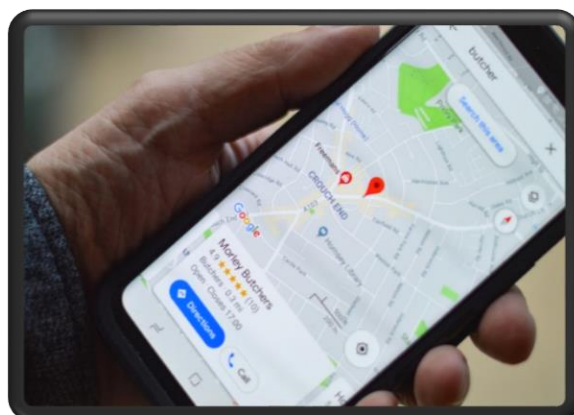
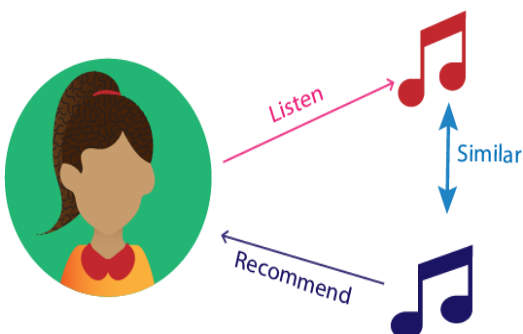
### **Conclusion :-**

Artificial Intelligence makes our lives more efficient every day AI powers many programs and services that help us do everyday things such as connecting with friend, using an email program, or using a ride-share service.

If you have reservations about the use of artificial intelligence, it may be comforting to know that most of us have been using AI on a daily basis for many years.

We conclude that if the machine could successfully pretend to be human to a knowledgeable observer, then you certainly should consider it intelligent. AI systems are now in routine use in various field such as economics, medicine, engineering and the military, as well as being built into many common home computer software applications, traditional strategy games etc.

AI is an exciting and rewarding discipline. AI is branch of computer science that is concerned with the automation of intelligent behavior. The revised definition of AI is – AI is the study of mechanisms underlying intelligent behavior through the construction and evaluation of artifacts that attempt to enact those mechanisms.



### Introduction:-

**W**e are currently living in a “data era,” where a vast amount of data is collected and stored every day. In the face of this growing quantity of data, machine learning methods have become inescapable. So much so that you probably use them dozens of times a day without even noticing!



Let's start with an example of an “everyday” machine learning contribution for millions of users: the algorithm behind Facebook's News Feed. Facebook uses machine learning to exploit users' data and feedback to personalize their feeds. If you “like” a post or stop scrolling to read something, the algorithm learns from this and starts to populate your feed with further similar content. This learning is done continuously, and so the material suggested in your News Feed evolves with your preferences, making your user experience more enjoyable.

This is only one example! There are many others. Apple can recognize your friend's face in the photo you just took. Amazon Echo understands you and can answer your questions. Your vacuum can even navigate its way around your house while Netflix is recommending videos that match your profile! Machine has become a massive part of our daily lives, and it's not going anywhere soon.

### **Definition of Machine Learning:-**

But what is machine learning exactly? What's behind these magical-looking algorithms? And how do they use data to work so well?

Formally, machine learning is the science of getting computers to realize a task without being explicitly programmed. In other words, the big difference between classical and machine learning algorithms lies in the way we define them.

Classical algorithms are given exact and complete rules to complete a task. Machine learning algorithms are given general guidelines that define the model, along with data. This data should contain the missing information necessary for the model to complete the task. So, a machine learning algorithm can accomplish its task when the model has been adjusted with respect to the data. We say that we “fit the model on the data” or that “the model has to be trained on the data.”

Let's illustrate this with a simple example. Let's say we want to predict the price of a house based on the size of the house, the size of its garden, and the number of rooms it has.

We could try to build a classical algorithm that answers this problem. This algorithm would have to take the three house features and return the predicted formula has to be known and coded explicitly. But in practice, this formula is often not known.

On the other hand, we could build a machine learning algorithm. First, such algorithm would define a model that can be an incomplete formula created from our limited knowledge. Then, the model would be adjusted by training on given housing prices examples. Doing so, we combine a model with some data.

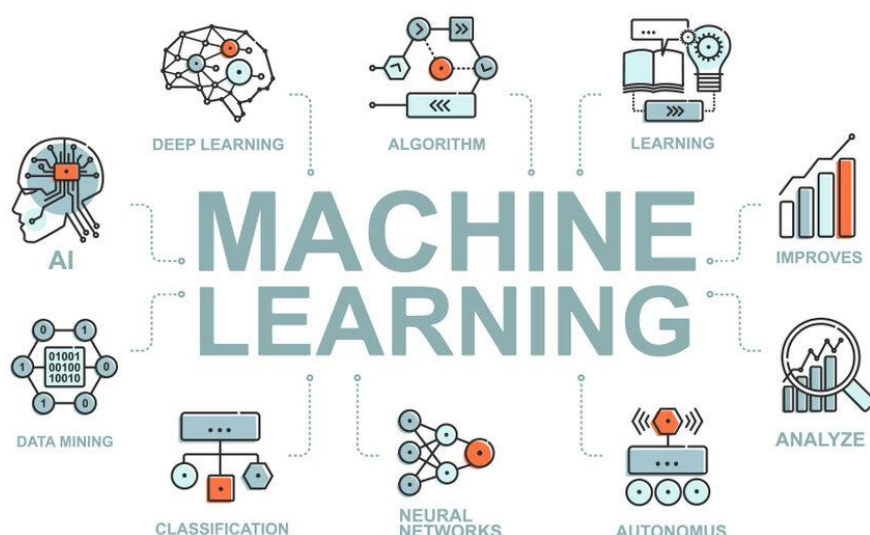
In general, machine learning is incredibly useful for difficult tasks



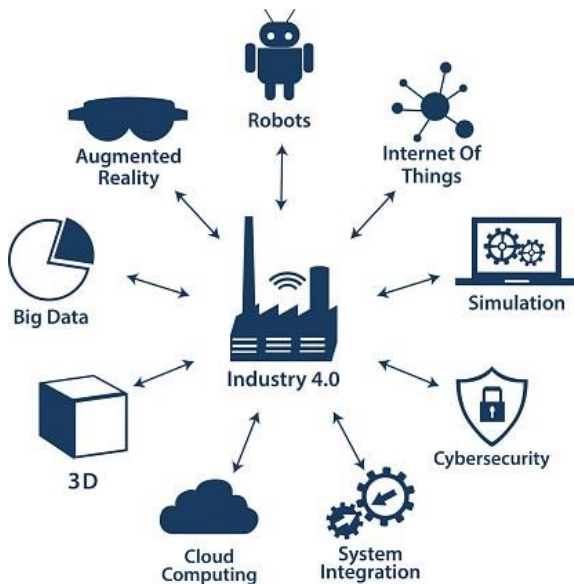
when we have incomplete information or information that's too complex to be coded by hand. In these cases, we can give the information we have available to our model and let this one “learn” the missing information that it needs by itself. The algorithm will then use statistical techniques to extract the missing knowledge directly from the data.

### **Conclusion: -**

Let's conclude this post by mentioning that machine learning is not that new, and that many of the algorithms driving today's applications have been around for years. Nevertheless, some major advances took place along the time: we have built datasets larger than ever before, we have increased our computation power, and we have imagined new cutting-edge models. If these advances have already made it possible to approach and in some cases even exceed human abilities across many tasks, there is also no doubt that we are only scratching the surface of what's possible.



## AI IN THE INDUSTRY 4.0



One of Artificial Intelligence's qualities is that it can enable robots to learn from the data they collect from the activities they carried out in a factory and thus improve their skills in every interaction.

This can be considered one of the fundamental bases of Industry 4.0, after all, and it will help make factories more autonomous and more productive.

### ❖ How Artificial Intelligence Works:-

Artificial Intelligence is the combination of several technologies, which allow software and machines to sense, understand, act and learn on their own or augment human activities.

Through Artificial Intelligence, industrial production can achieve higher efficiency compared to human labor.

Also, AI can enable robots to perform tasks that a person would not be able to do, for example, handling dangerous raw materials or microscopic components.

It is essential to know that, at this moment, many of these industrial robots are not that smart. In many cases, they can even perform many skillfully tasks, but they are programmed in a limited way. If you need something more, you need to reprogram it.

There is a constant growth in the area driven by the fact that this technology increases with Industry 4.0. Artificial Intelligence evolve, and its costs decrease.

Implementing more complex AI algorithms has also enabled Industries to evaluate the acquisition of new technologies, which allow them to solve problems and carry out decision making in a more complex and secure way.

❖ **Three advantages of AI for the manufacturing:-**

AI has several advantages for the manufacturing industry when applied with the right approach. Here I've selected 3 of the most relevant advantages for the manufacturing sector today:

➤ **Error reduction:**

tasks that are susceptible to errors in processes executed by humans.

➤ **Cost reduction:**

Several e-commerce stores or banks are using robots to initiate customer services. The human attendant is only called if it is a more complex problem.

➤ **Revenue growth:**

With fewer errors and employees focused on more critical processes, decision-makers will have more time to think about the core business and leave other AI tasks.

❖ **Three areas where AI has been applied in manufacturing:-**

During the last years, AI has been adopted in production lines. Still, companies from the most diverse sectors and sizes worldwide are already adopting intelligent technologies that allow them to automate and improve processes.

Here I've selected to you have some relevant examples:



➤ **AI in agriculture:-**

There are some prototypes of autonomous machines that can carry out their harvesting process without human intervention or even automatic systems for diagnosing diseases or pests in individual plantations.



➤ **AI in transportation :-**

Smart technology can support estimated transit time on the route or provide suggestions for more efficient means of transport, alternative routes, identification of traffic signs, self-driving vehicles, and sensors.



➤ **Intelligent manufacturing :-**

Intelligent manufacturing utilizes real-time data analysis, AI and machine learning in the manufacturing process to accomplish the above optimizations.



❖ **Conclusion :-**

Industry 4.0 is already a reality for a large number of companies across the world. Still, it is worth saying that all the changes required to enter this industrial revolution and to achieve the benefits that may come with it fully will not happen overnight.



As with Digital Transformation and Automation, this is an ongoing process that is continuously improving. As we can see, AI is one of the most important components of this revolution.\_

