WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Review: Comparative Analysis of Artificial Intelligence, Machine Learning (ML), and Data Science

Mrs. Pragati Patel , Miss. Shivani Gajjar

Swaminarayan University

ABSTRACT

In this modern era, Artificial Intelligence (AI), Machine Learning (ML), and Data Science are growing enormously. So, this review research paper provides comprehensive comparative analysis of artificial intelligence (AI) , Machine Learning(ML), and Data Science. We aim to clarify difference of artificial analysis, machine learning and data science. This paper includes definition of each module and there applications where we can use artificial intelligence (AI), machine learning (ML) and data science.

Keywords: Artificial Intelligence (AI), Machine Learning(ML), and Data Science

I. INTRODUCTION

Nowadays widespread use of terms like AI ,ML and Data science are often used interchangeably, but they are not the same. While they share some similarities, they also have distinct characteristics that set them apart. This research paper outlines the questions like: what are their similarities and differences among AI, ML, and Data science and also we discuss their application where we can use this technologies.

Data science focuses on managing, processing, and interpreting big data to effectively inform decision-making. Machine learning leverages algorithms to analyze data, learn from it, and forecast trends. AI requires a continuous feed of data to learn and improve decision-making.

II OVERVIEW

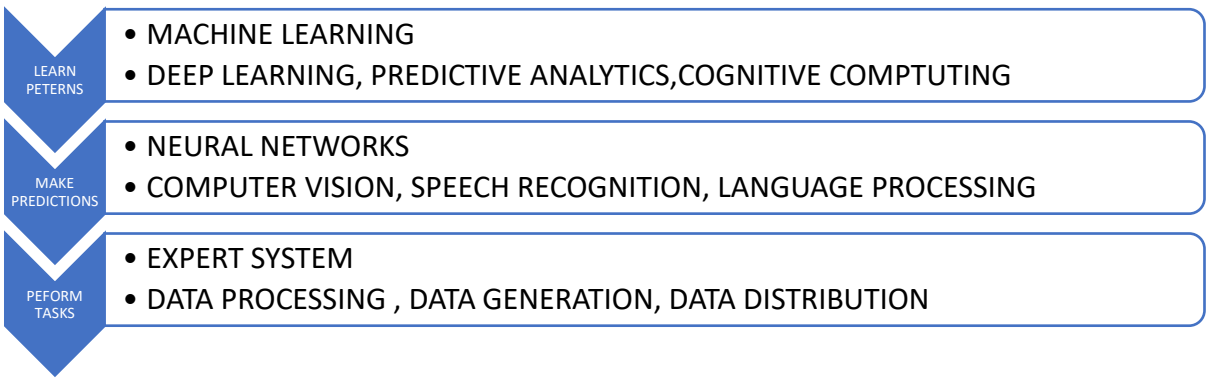
2.1 Artificial Intelligence (AI)

In a simple words **AI that means solutions**.

Artificial intelligence is the science of making machines that can think like humans. It can do things that are considered "smart." AI technology can process large amounts of data in ways, unlike humans. The goal for AI is to be able to do things such as recognize patterns, make decisions, and judge like humans.

AI technology is at the very foundation of some things, such as image recognition and classification. It's also changing how we make decisions— for example, it can be used to predict traffic light systems or when you get your coffee in the morning.

HOW AI WORKS?



2.2 Machine Learning(ML)

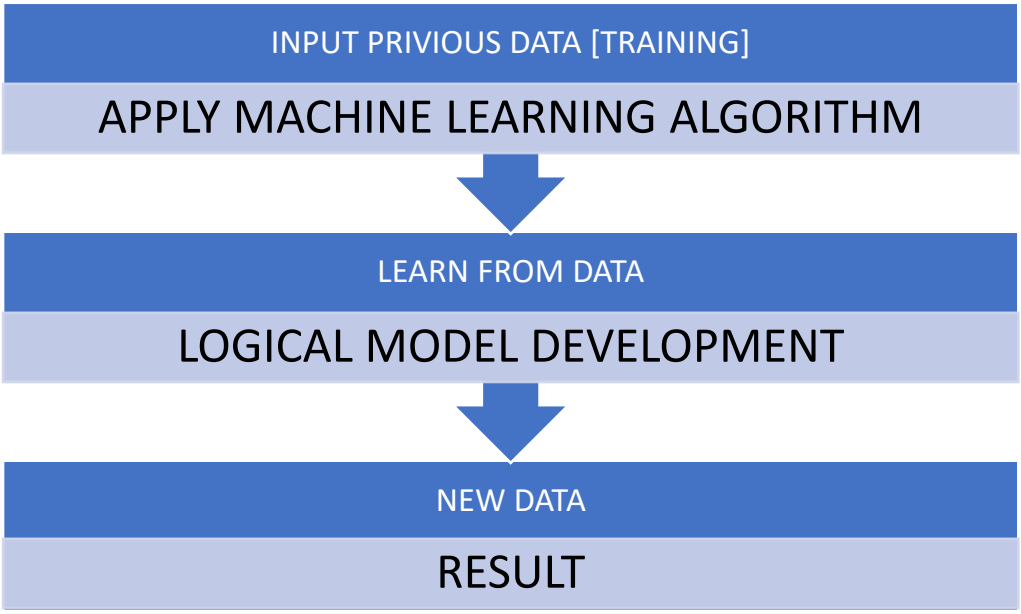
Machine learning (ML) is a part of artificial intelligence and is a technology of getting computers to learn and act as humans can do.

In general programming, a computer is given input data and an algorithm to produce an output.

If a computer is given input data with the corresponding output data, it can learn the algorithm itself and, therefore, continue to predict the right output data. This is called supervised learning.

Alternatively, if a computer is given a complex set of input data with no corresponding output data, the machine identifies the relationships in the data to provide valuable insights for decision-makers. This is called unsupervised learning.

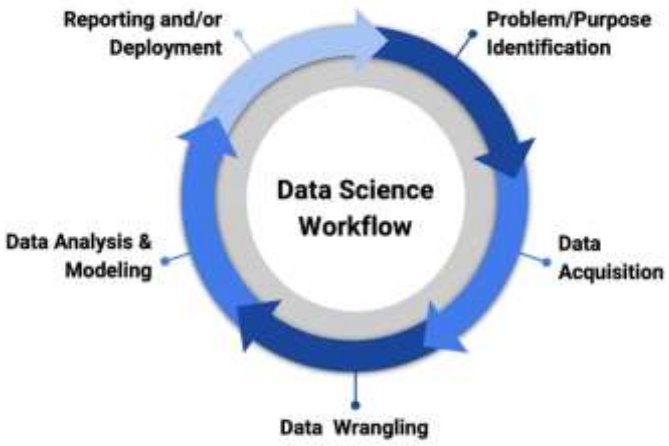
HOW ML WORKS?



2.3 DATA SCIENCE

Data Science has become the most trending job of the 21st century. Every organization and multinational companies are looking for employee with knowledge of data science. Data science is a deep study of the enormous amount of data, which involves extracting meaningful insights from raw, structured, and unstructured data that is processed using the scientific method, different technologies, and algorithms.

HOW DATA SCIENCE IS WORKS?



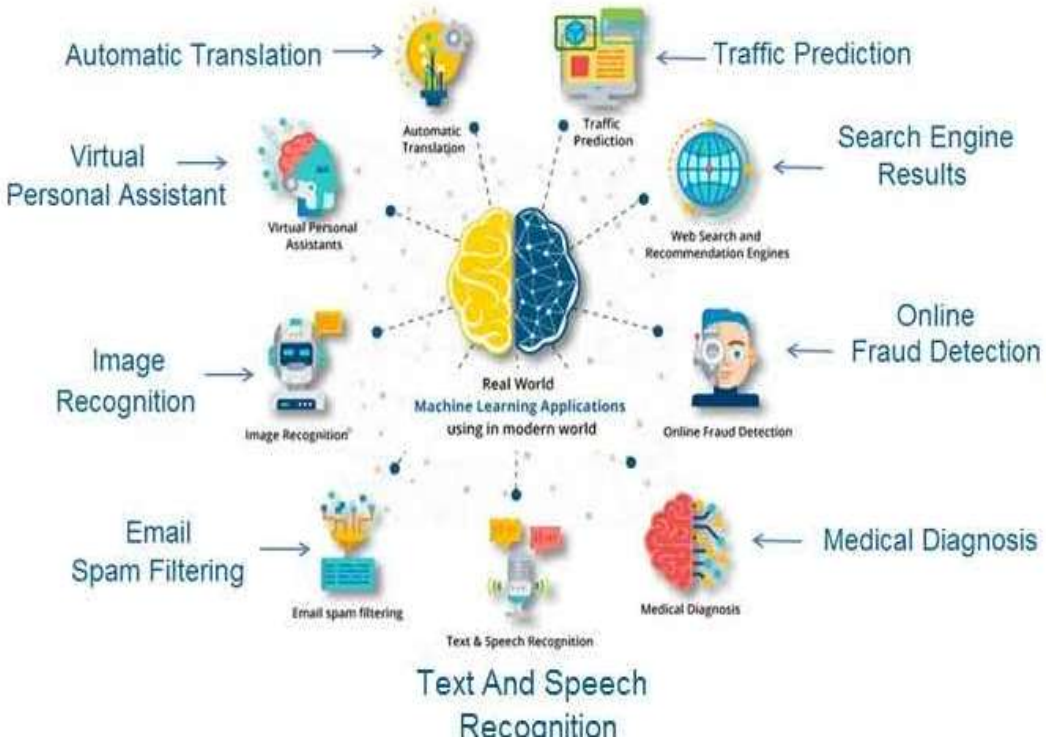
III. APPLICATION OF AI, ML AND DATA SCIENCE

This paper explores the diverse applications of artificial Intelligence(AI), Machine Learning(ML), and Data Science across the various domain.

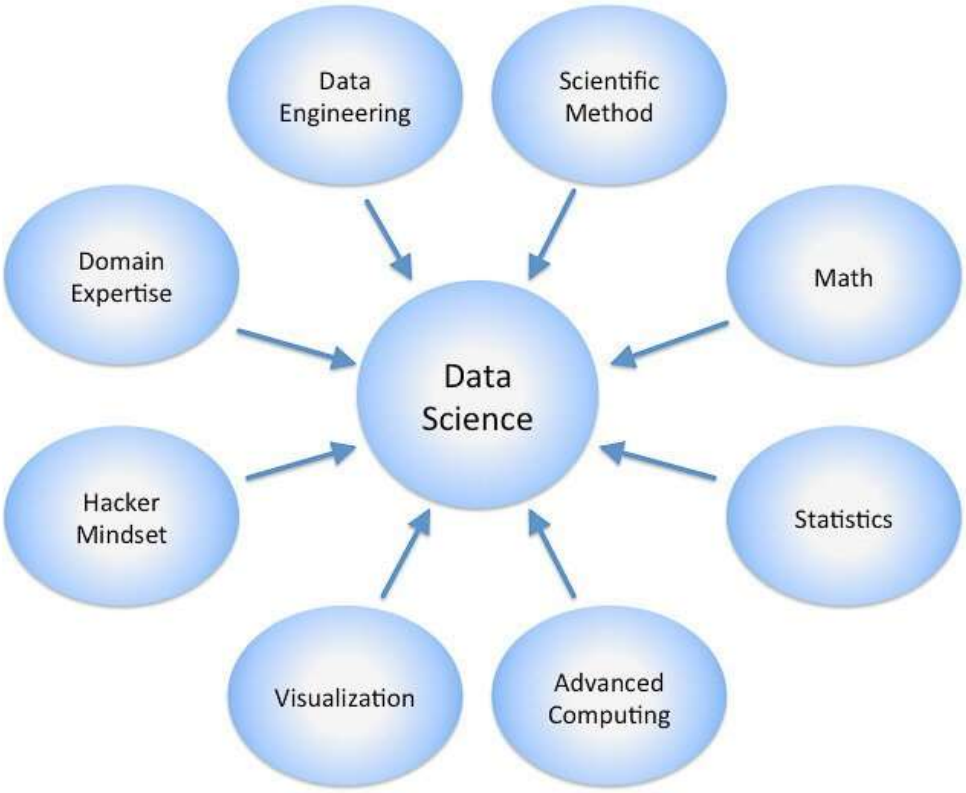
3.1 ARTIFICIAL INTELLIGENCE (AI)

Applications Of Artificial Intelligence
autonomous vehicles (such as roms and fring car)
medical diagnosis
creating art (such as poetry)
proving mathematical theorems
playing games (such as Chess)
search engines (such as Google ch
online assistants (such as S) image recognition in photographs
spam filtering
targeting online advertisements
Telecommunications maintenance • Online and telephone customer service

3.2 machine learning



3.3 data science



Difference between AI and Machine Learning

Artificial Intelligence	**Machine Learning**
AI aims to make an intelligent computer system work like humans to solve complex problems.	ML allows machines to learn from data so they can provide accurate output
Based on capability, AI can be categorized into Weak AI, General AI, and Strong AI	ML can be categorized into Supervised Learning, Unsupervised Learning, and Reinforcement Learning
AI systems are concerned with maximizing the chances of success	Machine Learning primarily concerns with accuracy and patterns
AI enables a machine to emulate human behavior	Machine Learning is a subset of AI
Mainly deals with structured, semi-structured, and unstructured data	Deals with structured and semi-structured data
Some applications of AI are virtual assistants such as Siri, chatbots, intelligent humanoid robots, etc.	Applications of ML are recommendation systems, search algorithms, Facebook auto friend tagging systems, etc.

Difference Between DS and ML

Data Science	Machine Learning
Data Science helps with creating insights from data that deals with real-world complexities	Machine Learning helps in accurately predicting or classifying outcomes for new data points by learning patterns from historical data
Preferred skillset: – domain expertise – strong SQL – ETL and data profiling – NoSQL systems, Standard reporting, Visualization	Preferred skillset: – Python/ R Programming – Strong Mathematics Knowledge – Data Wrangling – SQL Model-specific Visualization
Horizontally scalable systems preferred to handle massive data	GPUs are preferred for intensive vector operations
Components for handling unstructured raw data	Significant complexity is with the algorithms and mathematical concepts behind them.
Most of the input data is in a human-consumable form	Input data is transformed specifically for the type of algorithms used

Difference Between Data Science, Artificial Intelligence, and Machine Learning

Artificial Intelligence	Machine Learning	Data Science
Includes Machine Learning.	Subset of Artificial Intelligence.	Includes various Data Operations.
Artificial Intelligence combines large amounts of data through iterative processing and intelligent algorithms to help computers learn automatically.	Machine Learning uses efficient programs that can use data without being explicitly told to do so.	Data Science works by sourcing, cleaning, and processing data to extract meaning out of it for analytical purposes.
Some of the popular tools that AI uses are- 1. TensorFlow2. Scikit Learn 3. Keras	The popular tools that Machine Learning makes use of are-1. Amazon Lex2. IBM Watson Studio3. Microsoft Azure ML Studio	Some of the popular tools used by Data Science are-1. SAS2. Tableau3. Apache Spark4. MATLAB
Artificial Intelligence uses logic and decision trees.	Machine Learning uses statistical models.	Data Science deals with structured and unstructured data.
Chatbots, and Voice assistants are popular applications of AI.	Recommendation Systems such as Spotify, and Facial Recognition are popular examples.	Fraud Detection and Healthcare analysis are popular examples of Data Science.

IV. CONCLUSION

Hence, purpose of Artificial Intelligence is to bring human intellect to machines.

Machine Learning is a subset of AI trying to make computers learn and act like humans do while improving their learning over time in an autonomous way.

The central aspect of Data Science is getting new results from data: finding meaning, revealing problems you never knew existed, and solving complex issues. To achieve these outcomes, you can think of it as a process of data collection, preparation, analysis, and refinement. AI and Machine Learning are

tools used by Data Science to implement actual and applicable insights and are now more and more being leveraged by tools that enable citizen data scientists to achieve new insights from data.

To nutshell, as you can see in all of these examples, it is important to notice that AI, Data Science, and Machine Learning are designed to help augment humans to drive new progress and do not have the intention of replacing humans in their analytical, tactical, or strategic roles. Instead, it can be seen as a tool to offer new insights, increased motivation, and better human success.

V. REFERNCES

https://www.google.com/search?q=Difference+Between+Data+Science%2C+Artificial+Intelligence%2C+and+Machine+Learning&sca_esv=575386901&rlz=1C1YTUH_enIN1020IN1020&ei=pmkzZf63HNmKnesP0pOakA0&ved=0ahUKEwj-ouH2u4aCAxVZRWcHHdKJBtIQ4dUDCBA&uact=5&oq=Difference+Between+Data+Science%2C+Artificial+Intelligence%2C+and+Machine+Learning&gs_lp=Egxnd3Mtd2l6LXNlcnAiTkRpZmZlcmVuY2UgQmV0d2VlbiBEYXRhIFNjaWVuY2UsIEFydGlmaWNpYWwgSW50ZWxsaWdlbmNlLCBhbmQgTWFjaGluZSBMZWFybmluZzIKEAAYRxjWBBiwAzIKEAAYRxjWBBiwAzIKEAAYRxjWBBiwAzIKEAAYRxjWBBiwAzIKEAAYRxjWBBiwAzIKEAAYRxjWBBiwAzIKEAAYRxjWBBiwA0iXGFCZCViZCXADeAGQAQCYAQCgAQCqAQC4AQPIAQD4AQL4AQHiAwQYACBBiAYBkAYI&sclient=gws-wiz-serp

https://www.google.com/search?q=application+in+ml&sca_esv=575422878&rlz=1C1YTUH_enIN1020IN1020&tbm=isch&source=lnms&sa=X&ved=2ahUKEwjHk7b48YaCAxXb2TgGHTwhDaoQ_AUoAXoECAIQAw&biw=1280&bih=913&dpr=1#imgrc=FTB9VJ5xoh1VCM

https://www.google.com/search?q=data+science+applications&sca_esv=575422878&rlz=1C1YTUH_enIN1020IN1020&tbm=isch&source=lnms&sa=X&ved=2ahUKEwiaiIfW8oaCAxU8-TgGHQxxCoEQ_AUoAXoECAIQAw&biw=1280&bih=913&dpr=1

https://www.google.com/search?q=HOW+AI+WORKS&tbm=isch&ved=2ahUKEwjUntOG5oaCAxWMUGwGHadkBgYQ2-cCegQIABAA&oq=HOW+AI+WORKS&gs_lcp=CgNpbWcQAzIHCAAQigUQQzIFCAAQgAQyBggAEAcQHjIGCAAQCBAeMgcIABAYEIAEMgcIABAYEIAEMgcIABAYEIAEMgcIABAYEIAEMgcIABAYEIAEMgcIABAYEIAEOggIABAIEAcQHjoGCAAQBRAeUIALWNsXYPgeaAFwAHgAgAHTAYgB0geSAQUwLjUuMZgBAKABAaoBC2d3cy13aXotaW1nwAEB&sclient=img&ei=0pUzZdTtBIyhseMPp8mZMA&bih=913&biw=1280&rlz=1C1YTUH_enIN1020IN1020

https://braincube.com/resource/manufacturing-ai-vs-machine-learning-vs-data-science/

https://www.mygreatlearning.com/blog/difference-data-science-machine-learning-ai/

https://www.javatpoint.com/data-science-vs-machine-learning

https://www.researchgate.net/publication/364547319_Current_Trends_and_Applications_of_Artificial_Intelligence_and_Machine_Learning

https://www.researchgate.net/publication/370761516_Artificial_Intelligence_Trends_and_Challenges

https://www.ijrti.org/papers/IJRTI2304061.pdf