International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 11 | Nov - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

Data and Artificial Intelligence for the Beginners

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Introduction :

When I published my first article "Data and Data Analysis for beginners", I wanted to also capture my thoughts in my second article for Artificial Intelligence (AI) again for "beginners". Why I want to make it for beginners is because whether it is the Bank or the Railways or the Airports, AI is everywhere and I thought normal people should understand the basics of Artificial Intelligence because it has entered their normal domestic life.

For example, AI, today, is in self driven cars where Tesla largely, are trying out their cars in self driven mode and recently I read a report about an Airplane fully flying without the pilot is ready at Florida. It may sound unbelievable today, but I am sure these are the things to come in future. Why these are pending so far is for Security in travel, whether on road or in air.

Data, Data Analysis and Artificial Intelligence

Data, Data Analysis, Artificial Intelligence are all inter linked so a small recapture from my first article, let us understand again as to what is Data ? Data is a happening (or not happening) of event or events which may enable or disable a further development of another event e.g. in weather, traffic, population etc. All Data analysis is based on statistics and probability of a related event happening or not happening. Let us repeat, Data and Data Analysis works on the Principle of Probability where the Probability or the Chance of something happening OR not happening is a probability and we endeavor to improve the probability (precision of the analysis) by extending and fine tuning the data.

Let us understand the difference between Data Analysis and Artificial Intelligence. I feel it is quite clear. There is Data which can be used by a human (an expert in the field of Data) who can do Data Analysis and is called a Data Analyst. Or the Data as well as the algorithm (formula), can be fed to a system (AI) which comes out with a Data Analysis. So, AI is a system and Data Analysis is an analysis done by a human or by the machine, AI.

It would bring an excitement about Data and it's significance if we look at the game of Roulette. Is it only chance or luck that makes you win OR is there data and a probabilistic win for you ? Let us see.

Can we define a bias for the casino based on the odds ?

Let us say, there are two Roulette games. One with 38 numbers and you win 35 for a jackpot and another one with 36 numbers and you win 34 for a jackpot. In the first case, there is a bias of (38-35)/38 = 7.9% and (36-34)/36 = 5.55% in the second case in favor of the Casino. So, on a long run, your chances of winning are higher in second

the second case in favor of the Casino. So, on a long run, your chances of winning are higher in second case than the first. Right ? So, data can be fantastic. It gives you a hint on how to improve your chances of winning in Roulette. Besides luck, it is also mathematics. Similarly, Data Analytics, come out with their predictions of Stock movements for companies based on Data which is backlog of orders, Industry demand, price levels and environment/ Govt policies.

Coming to Data Analysis, it is the job of the experts. There are many in different fields from weather to stocks and also Election Forecasts. All Data Analysts' look at precision of their forecast and there is a big competition amongst competitors to collect Data and make predictions for example of the election outcome based on Data. Irrespective of the election outcome, there are comparisons of predictions made by different Data Analysts. Off course, Data here is number of polling booths covered and people covered for interview and mostly the honesty of people responding to the interview. Data analysts normally ensure there is no personal bias while coming out with a Data Analysis.

Origin of AI

I see AI as a natural development of games mainly Chess, as mentioned earlier. AI enabled games learn from their mistakes (Data) and keep improving in their skills. Therefore, an average player can initially defeat an AI enabled game but with successive games it becomes more and more difficult to overpower the game. When we play a game and start winning, we call it "beginner's luck". In AI enabled games it is the process, the game becomes more and more intelligent as you play repeatedly.

I wondered sometimes why this initiation of Artificial Intelligence? Is it because we believe an average human uses 10 or 15% of his brain and the scientists want to improve the usage. I watched some movies where the story shows the power of the brain and I found these movies very interesting. These movies demonstrate the ability of brain to accomplish things which appear to be impossible. Some movies like Moneyball, Lucy, Limitless, Rain Man come to mind with their big relationship with AI, according to me. All these movies talk of two things with huge impact. Brain and Data, coming very close to discussion on AI, I feel.

AI and Human Beings

As the name implies Artificial Intelligence is a Computer or a set of Computers or a system behaving like a human being. If we start with Data and Data Analysis, we find that Artificial Intelligence is a next step to Data and Data Analysis.

If we have to create a system parallel to Human Intelligence, we need to try and see how the Human Intelligence works. On development of Human Intelligence, there are many inputs from DNA to Education to Parents to Friends to School to Teachers and their inputs to the Brain. I feel we can call these inputs as data. Depending on our inputs from Parents, Teachers, Friends etc., the brain starts developing an Intelligent response. I hope this is clear about development of brain in a human being.

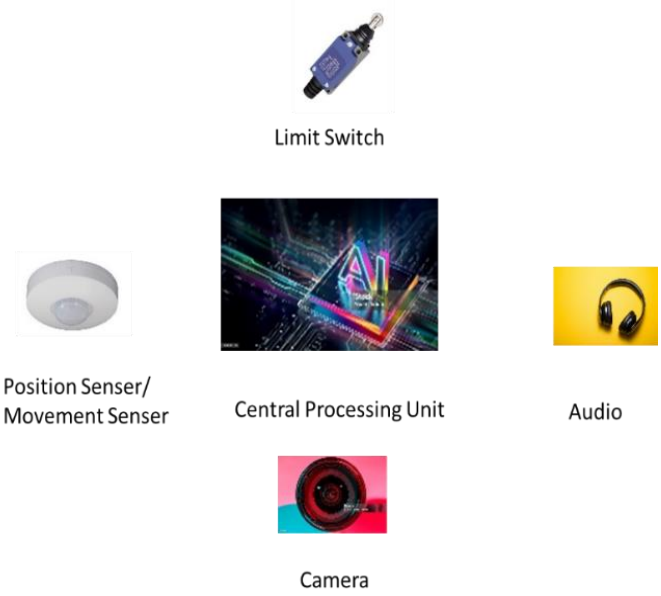
This means, as has been proven, that if we leave an individual child without human supervision, he/she becomes similar to the ones who take care of him with their inputs, or shall we call it data? Remember Mogli, the child with characters of a wolf because a wolf was taking care of Mogli?

Let us see how the mind works; the Left and the Right parts? I feel It might be clear when we talk about the 5 senses every normal individual is gifted with.

Smell, Taste, Touch, See, Hear ! And all these senses are connected to The Brain.

If we have to create an equivalent of a Brain, we must have a Central CPU and this CPU must be connected to indicators. Next part is having an algorithm (which like parents, teachers, friends in a human case) telling the system about what is good or bad OR what is right and what is wrong.

Brain



Artificial Intelligence

Artificial Intelligence system is created by having a processor and connecting it with indicators for collection of data. This is what we have done in the AI picture.

It is clear that while we, so far, have equivalents of Eye and ear as a Camera and Audio and we have an approximation of touch as a proximity sensor or limit switch we still may not have exact equals to the human senses like taste and smell as indicators though we are pretty close. I don't know if we can say that so far, AI is able to match human on the left brain i.e. intellectual work. Since some aspects of the human sense are still not matching, AI is lacking "emotionally" compared to human beings. So, can we say, AI has a Brain but not the Heart ? This is what comes to my mind. So, AI can do very complex analysis but human feelings and expressions like laughing, crying, loving, understand sarcasm or joke or anger, we are not there. So AI is largely the left brain.

What all is possible with AI ?

AI is under wide usage by Governments and Corporates today. AI is used for creation of Factories and Infrastructure from Airports to Railway Stations to Ports, even to War. I feel the guided missiles and bombs extensively use AI for precision targeting.

When we come to factories, AI, as the Industry experts say, is a lever in the fourth revolution of the Industry. Having started with Steam, To Electricity, To Automation and Line production to the present where Data, Data Analysis,

Artificial Intelligence, Machine Learning are used extensively leading the Manufacturer to create faster, test faster, improve output with less man power. While earlier (in the Third Revolution) we had line production for manufacture of same Automobiles, now different Automobiles with different shades etc. can be produced on the line. This responds better to the market but at higher establishment cost.

So, coming to the Industry labor, extensively, worldwide, the force is now highly competent on Computers and Networking. So, it is clear that the skill requirement of labor is changing but hopefully not the numbers through new technologies because I see an expansion of manufacturing with higher consistency and, efficiency and output.

Types of Artificial Intelligence

There are many classifications depending on the basis of classification. If we have to classify AI on capability, we can allocate these to following categories

1. **Narrow AI (Weak AI):**
    - Designed to perform specific tasks.
    - Examples: Virtual assistants (Siri, Alexa), recommendation systems (Netflix, Amazon), image recognition software.
2. **General AI (Strong AI):**
    - Possesses the ability to understand, learn, and apply intelligence across a wide range of tasks, akin to human cognitive abilities.
    - Currently theoretical and not yet realized.
3. **Super intelligent AI:**
    - Surpasses human intelligence across all domains.

Exists primarily in speculative discussions and science fiction. Professor Geoffrey Hinton, a British Canadian Scientist who won the Noble prize in Physics in 2024, displays big concern for Super Intelligent AI which can beat humans. This he foresees can be a reality in next 5 to 20 years. This off course can happen with the development of AI and if this happens, bad actors can use these to influence people negatively, to create wars, to intervene and change governments during elections. Some part of this, we are already experiencing.

Testing of AI systems

There are many experts who believe that monitoring IQ is not so important since it changes with age in humans. I feel it is very very important to find out the IQ of the AI if we fear that Superintelligence is possible. So a variety of questions are asked to the system and it's response is monitored. In order for it to actually work like a human, some questions are asked which test the system's ability to apply many aspects in the question to actually monitor the IQ of the system.

Ethical and Societal Concerns in Using Artificial Intelligence-

Enormous possibilities are there including many which can be challenged legally. It is completely possible to monitor some one's face and speech and CREATE a speech through AI which can be fake and dangerous. One example of this close disaster was a fake news showing a bomb blast at Pentagon with photos.

These fake news can be extremely challenging in a divided world.

We hear about agencies in the world which try to impact the Elections in democracies in the world. How do they work ? Basically by fake news with video outputs of fake speeches to create a disharmony.

There is also a thought of development of AI systems which can turn rogue and start destroying mankind. This I feel is not possible since the system is created by an intelligent human and the system should listen to this person except if many AI machines or Systems work in a connected system and on a combined level outscore the IQ of a human being OR if the AI models achieve Superintelligence levels as Geffrey Hinton fears. He conceives that if an AI system starts developing itself based on Data inputs, at some time it may become super intelligent to beat a human mind and can become a tool in the hands of bad people, something like a sci-fi movie. Open AI CEO Samuel Altman was removed by the board on such allegations of developing a system which possibly could challenge the mankind. He got extensive support from Microsoft and was reinstated but I feel strong laws must be developed for proper development of AI systems.

So, while AI offers immense benefits, it also raises significant ethical and societal challenges that must be addressed to ensure responsible and equitable deployment.

1. Bias and Fairness- AI systems can inadvertently perpetuate or amplify existing biases present in training data, leading to unfair outcomes in areas like hiring, law enforcement, and lending. Ensuring fairness involves careful data selection, algorithmic transparency, and ongoing monitoring.
2. Privacy- The vast data requirements of AI pose risks to individual privacy. Safeguarding personal information and implementing robust data protection measures are essential to prevent misuse and unauthorized access.
3. Job Displacement- Automation driven by AI can lead to job displacement in certain sectors, necessitating strategies for workforce reskilling and transitioning to new roles that leverage human-AI collaboration.
4. Accountability and Transparency- Determining accountability for AI-driven decisions, especially in critical applications like healthcare and autonomous vehicles, is crucial. Transparent algorithms and clear lines of responsibility help build trust and ensure ethical usage.
5. Security- AI systems themselves can be targets for malicious attacks, such as adversarial examples that deceive machine learning models. Enhancing the security and robustness of AI systems is vital to prevent exploitation.
6. Ethical Use- Ensuring that AI is used ethically involves establishing guidelines and regulations that promote beneficial uses while restricting harmful applications, such as autonomous weapons or intrusive surveillance.

7. Autonomy and Control- Balancing the autonomy of AI systems with human oversight is essential to maintain control and prevent unintended consequences. This includes developing mechanisms for human intervention and decision-making in critical scenarios.

Conclusion

I have observed that mostly the developments of AI are from the points of companies making profit from it. We have also seen AI in wars where AI based drones are used to destroy the perceived enemy. Quite unfortunate but true.

I feel, we have a long list of the environment challenging the sustainability in the world from availability of Clean water, Clean air, Forest Burns, Floods and droughts, the Arctic melting and increasing the sea level, Plastic floating in Society, River and Sea, thereby choking the drainage and I wonder if the following is possible. Can we not have the Industry to invest in AI and drive profits with the developments but the Governments must invest in AI for improving sustenance. And this policy should be mentioned in the Election Manifesto of all parties fighting elections in all democracies. For example, what will the Government do to improve quality of Air, Plant more Trees, Improvement in availability of drinking water etc.

So, the world of Data and AI is exciting. We have enormous opportunities but also tremendous challenges. We need to come out with right developmental laws and use AI to it's tremendous advantage.