TECH intellect

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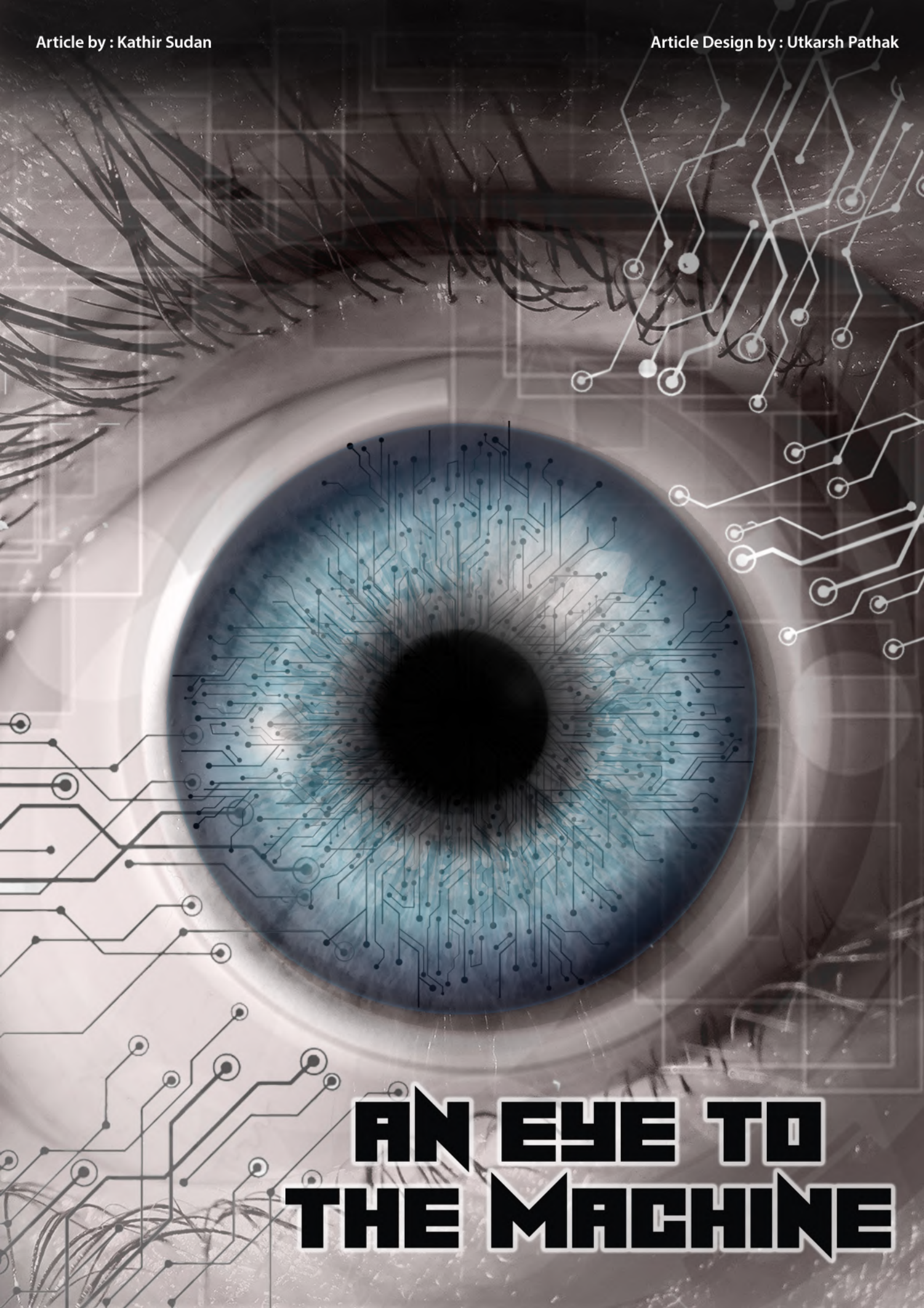


AN EYE TO THE MACHINE

"A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P if its performance at tasks in T, as measured by P, improves with experience E." – Tom M. Mitchell

The world has changed a lot in this last decade. Our lives have now become machine dependant since the machineswe use have simplified our lives to a great extent.
Sure, there are both pros and cons to this change of lifestyle but it has affected us in a way. Since the year 2000 we have seen a great increase of use of machines in our daily life. Mobile Phones have evolved to "Smart Phones" which have also eradicated some of the other devices used in the past, like a camera or an alarm clock. With the Rise of Machines, Machine Language has also come into existence. And with Machine Language, Artificial Intelligence has come into existence. Machine Language or a Machine Code is basically a computer programming language consisting of binary or hexadecimal instructions to which a computer can respond directly. The process of learning to work with Machine Language/Code is known as Machine Learning.

Machine learning is basically a field that uses statistical techniques to give computer systems the ability to "learn" i.e., progressively improve performance on a specific task, from data, without being explicitly programmed. The name Machine Learning was coined by Arthur Samuel in 1959.

When this term was originally coined, it was just a theoretical practice. But as we progressed on, "Machine Learning" went on to be one of the greatest assets of Mankind. It started to flourish in the 1990s. The field changed its goal from achieving artificial intelligence to tackling solvable problems of a practical nature. It shifted focus away from the symbolic approaches it had inherited from AI, and toward methods and models borrowed from statistics and probability theory.

There are various tasks included in Machine Learning which are divided into several categories as follows: -

I. Supervised Learning :

The computer is presented with example inputs and their desired outputs, given by a "teacher", and the goal is to learn a general rule that maps inputs to outputs. As special cases, the input signal can only be partially available, or restricted to a special feedback.

II. Semi-Supervised Learning :

The computer is given only an incomplete training signal; a training set with some (often many) of the target outputs missing.

III. Active Learning :

The computer can only obtain training labels for a limited set of instances (based on a budget), and also has to optimize its choice of objects to acquire labels for. When used interactively, these can be presented to the user for labelling.

IV. Unsupervised Learning :

No labels are given to the learning algorithm, leaving it on its own to find structure in its input. Unsupervised learning can be a goal in itself (discovering hidden patterns in data) or a means towards an end.

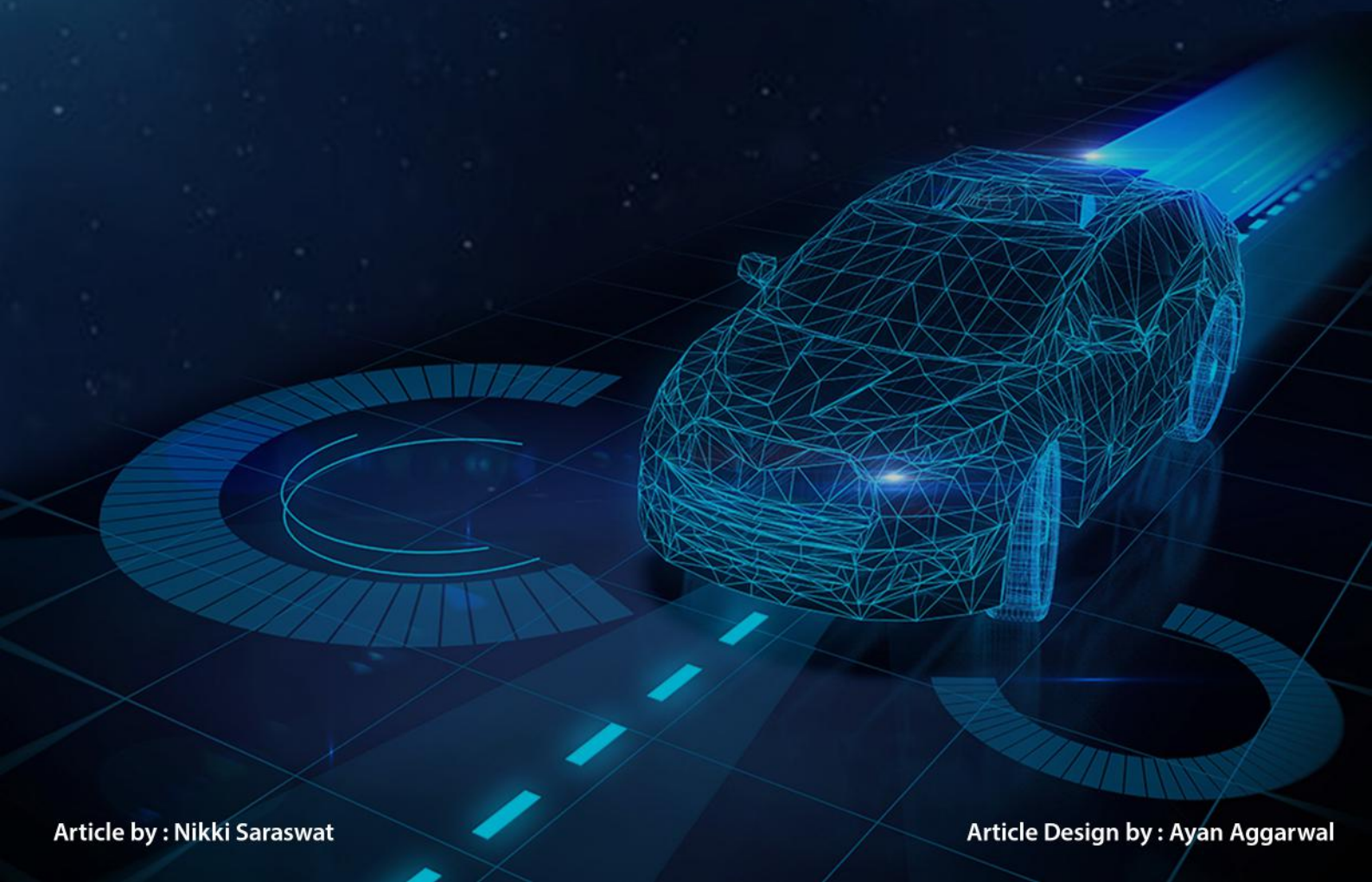
V. Reinforcement Learning :

Data (in form of rewards and punishments) are given only as feedback to the program's actions in a dynamic environment, such as driving a vehicle or playing a game against an opponent.

As mentioned earlier, machines have now become an integral part of our lives. This opens up more opportunities and increases scope for Machine Learning. Due to this AI (Artificial Intelligence) has started to come into the picture. This has opened up for more advancements for Human Race. An example of this scenario is how Mark Zuckerberg and his team of specialists at Facebook are trying to bring Artificial Intelligence to the general public.

It goes without saying that with the increase in technological advancements, scope for Internet of Things, Cyber-security, Artificial Intelligence and Cloud Computing has taken a drastic fly. Also, people are encouraged to learn about machines and with-it machine languages so as to keep up with the trends and also have a promising career in this field. Needless to say, there are yet a lot of problems to be solved by mankind, and it seems that machines are an ultimate the jest to them.

INTELLIGENT VEHICULAR NETWORK



Article by : Nikki Saraswat

Article Design by : Ayan Aggarwal

Is it possible to avoid accidents and save life from danger?

The world Health Organization (WHO) statistics depict that annually road accidents cause approximately 1.2 million deaths worldwide, one fourth of all deaths caused because of injury. In addition, about 50 million people are injured in traffic accidents annually. To avoid these fatal accidents new initiatives are been taken in the world. One such initiative is intelligent vehicular network or wireless vehicular network.

Recent advances in wireless technologies and installed systems extended the use of communication to new domains. Taking advantages of such technological advances, vehicles and equipment manufacturers have realized the opportunity of enhancing the surface transportation, by using the communication adequacy of the VANET to offer an Intelligent Transportation System (ITS) to the drivers. The major aim of this system to improve the driver's safety by informing them about dangers and situations they cannot see and also services such as broadcast of weather and traffic conditions. To support such variety of services, ITS will provide communication amongst vehicles, between vehicles and the roadway infrastructure and later to vehicles and wireless devices that are carried by drivers, pedestrians and bicyclists.

Vehicular communication networks (VCNs) are the foundation for the much anticipated ITs. By enabling vehicles to communicate with each other via inter vehicle communication network (IVC) networks as well as with roadside-to-vehicle communication (RVC), vehicular networks could promote safer and more well-organized infrastructures for transportation. The combination on board sensor structures and the dissemination of onboard localization methods(Global Positioning System or GPS) make vehicular network appropriate for active safety applications , including collision and warning systems , driver assistance, intelligent traffic management systems, and so forth.

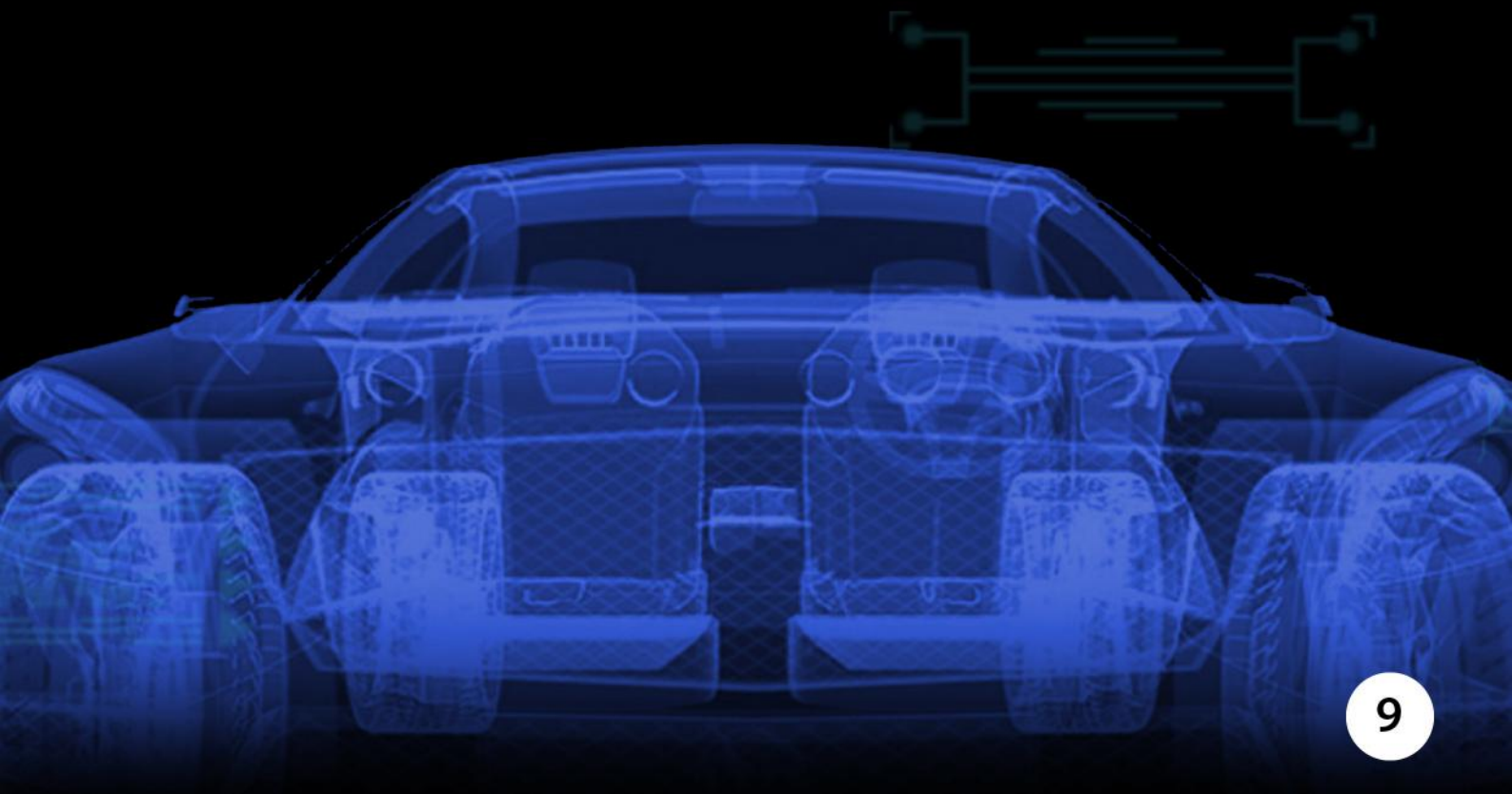
VANET is a sub form of Mobile Ad-Hoc Network or MANET that provides communication between vehicles and vehicles and road side base stations with an aim of providing efficient and safe transportation.

Vehicular ad hoc networks (VANET) should, upon implementation, collect and distribute safety information to massively reduce the number of accidents by warning drivers about the danger before they actually face it. Such networks comprise of sensors and onboard units (OBU) installed in the car as well as roadside units (RSU). The data collected from the sensors on the vehicles are displayed to the driver, sent to the RSU or even broadcasted to other vehicles depending on its nature and importance. The RSU distributes this data, along with data from road sensors, weather sensors, traffic control sensors, and so forth, to the vehicles and also provides commercial services such as parking space booking, internet access, and gas payment. The network makes extensive use of wireless communication to achieve the goal. We have seen most available wireless systems rely on a base station for synchronization and other services but using this approach means covering all roads with infrastructure.

It has been expected that VANET will form the biggest network ever implemented, and issues of stability, reliability, and scalability are of major concern.

By means of development and extension of wireless technologies, research efforts have been made in area of vehicular network. The objective is to increase driver safety and comfort by relaying required information from vehicle to vehicle. Future vehicles are expected to anticipate and avoid collisions, navigate the quickest route to their destination making use of up-to-the-minute traffic reports, identify the nearest available parking slot, and minimize carbon emissions.

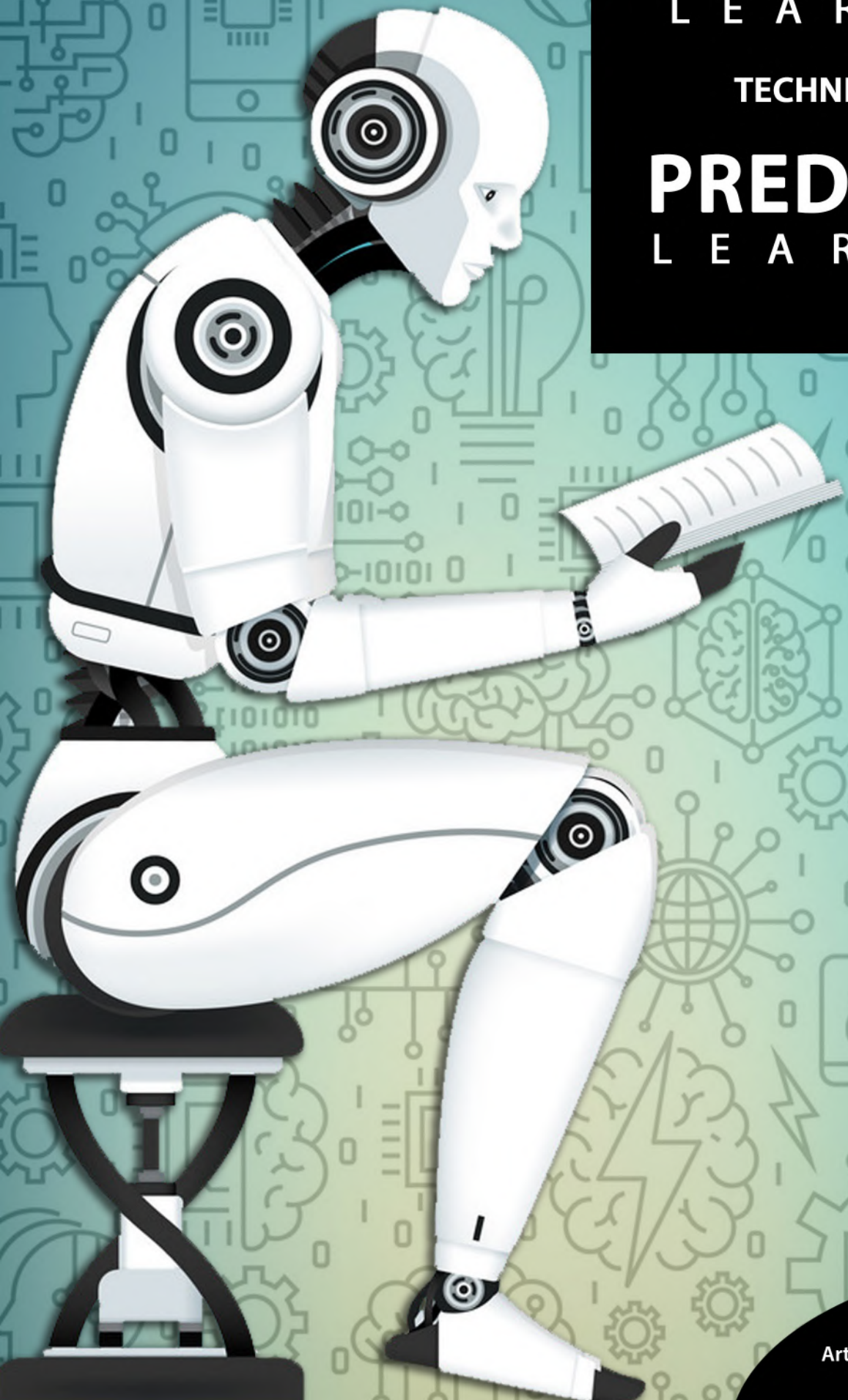
To achieve this, we need to define a set of communication parameters on the basis of which we can judge the suitability of a communication medium within a particular environment.



MACHINE LEARNING

TECHNIQUES FOR

PREDICTIVE LEARNING

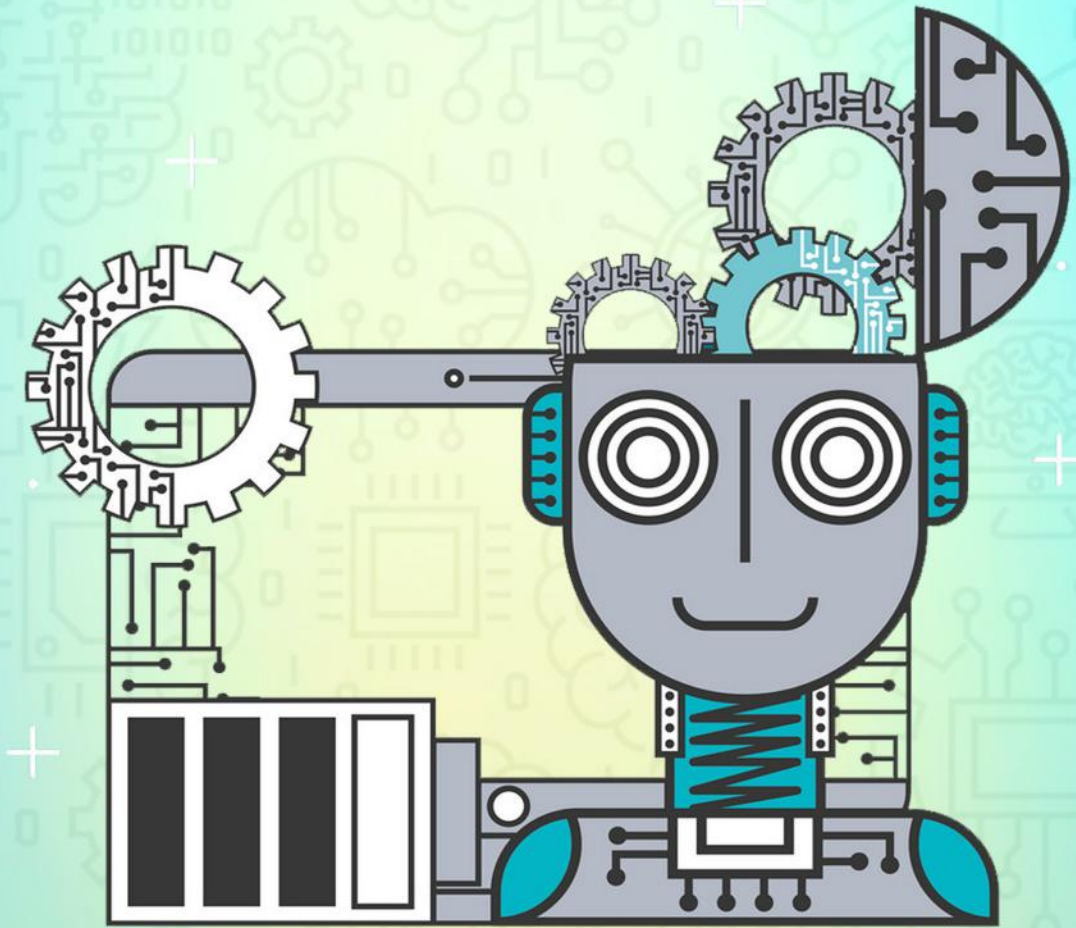


Article by : Aditya Jain
Article Design by : Jayita Parashar

In this modernized world of computers, machine learning proves to be a miracle for the society of programmers. It is bizarre watching machines learning like a human! Learning from the past experiences to provide highly accurate and most predictable data results is basically the ideology behind the development of machine learning. Machines nowadays are getting so much efficient that they can defy their own written codes to provide advanced data-driven decisions. Machine learning revolutionized from the study of recognition and explores the notion that algorithms can learn from itself and make predictions on data. Now, for shattering the common misconceptions that predictive analytics and machine learning is same thing it's suggested in some cases the later might overlap the first one and both prevail simultaneously.

Predictive learning is something in which a system, by performing various experiments tries to manipulate a model of its own environment. With predictive analytics, we can learn with a minimal pre-existing mental structure. Machines that analyze the data and utilize predictive learning are most valuable assets produced by humans.

Predictive analytics is driven by predictive modeling. Machine learning techniques allow one to design algorithms and provide maintenance to systems. All the work revolves around building a predictive model.



Types of predictive models include classification models and regression models. Classification models predict class membership and regression models predict number systems. The algorithms of these models perform statistical analysis and confine patterns and trends in data. Machine learning techniques created as models of predictive learning includes ensemble models, support vector machines, clustering algorithms, time series algorithms etc.

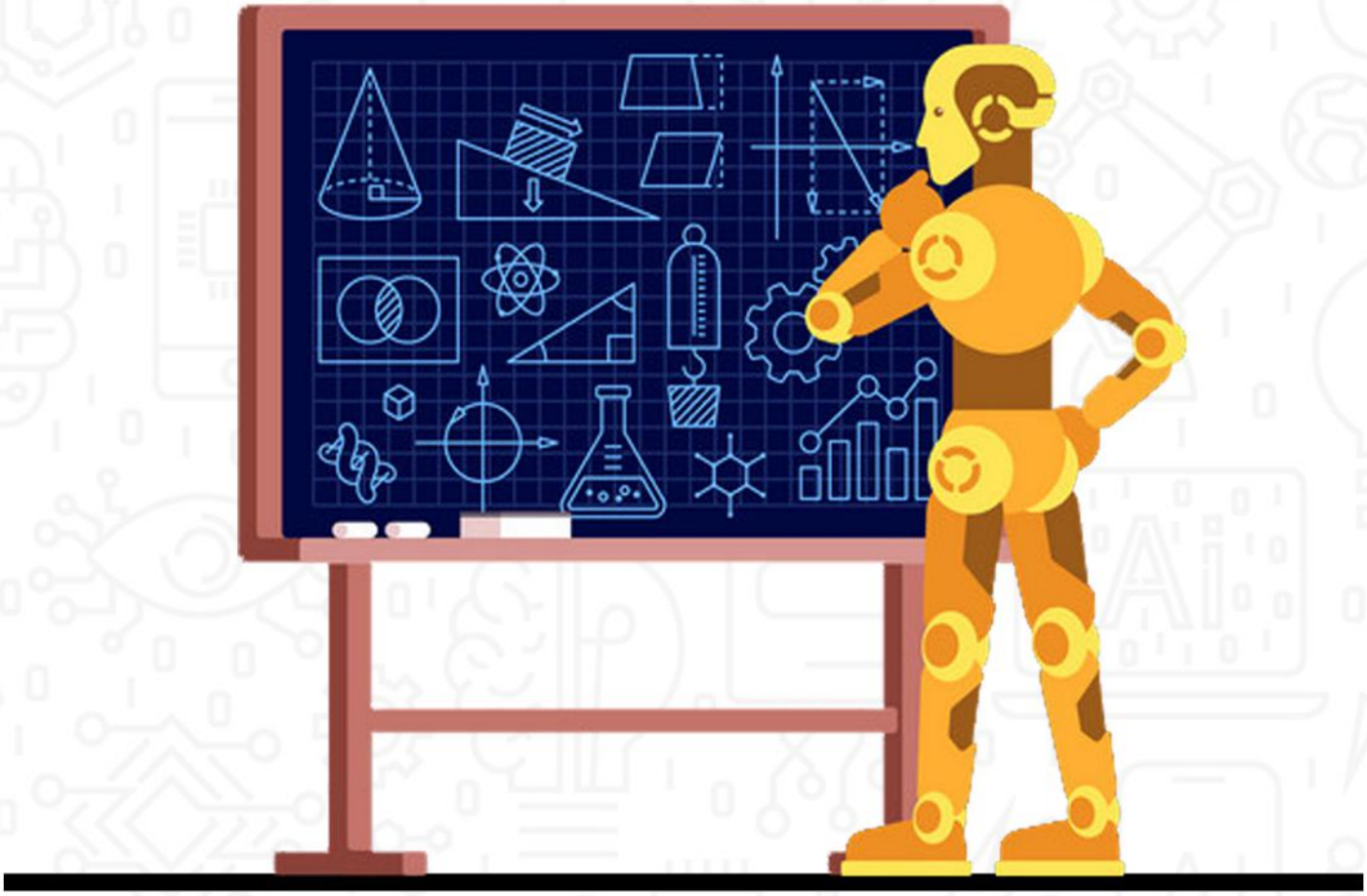
Time series algorithms sequentially plot data and are useful for forecasting continuous values over time. Ensemble models use multiple machine learning formulas to obtain better predictive performance than what could be obtained from the algorithm alone. Support vector machines (SVMs) are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Other classifier is outlier detection algorithms. These machine learning algorithms deal with flaws that do not conform to an expected pattern or standard within a data set. Clustering algorithms are predictive models that codify data into groups whose members are similar. Above mentioned all models are coordinately important but the most integral predictive models are decision trees, regressions and neural networks.

DECISION TREES:

Decision trees assist predictive analytics by dividing into various subsets. They are provided by algorithms that identify various ways of splitting data into branch like segments.

REGRESSIONS:

Regression is a statistical method used for finding relation between numerous variables. It is helpful in establishing relationships between heaps of data sets. It predicts the correspondence of data stacks.



NEURAL NETWORKS:

These are typically used to solve complex pattern recognition problems and are incredibly useful for analyzing large data sets. They are great at handling non-linear relationships in data- and work well when certain variables are used.

Applications of predictive analytics and machine learning are wide-ranging. Organizations with tons of data, high-profile machinery requires machine learning to meet objectives like enhancing data security and encryption of data. Predictive analytics is used most commonly for marketing operations, risk and fraud detection.

Banking firms use machine learning for prediction of total surplus amount of money and account holders. Retailers are using predictive learning and machine learning to better understand consumer behavior. Developing the right system for working of ML and predictive learning is utmost difficult and the coders specialized in it and data analytics, internet of things etc. prove to be the most valuable asset of the society. In conclusion, machine learning and predictive learning go hand in hand. In the upcoming era of technology, machine learning along with predictive analysis would overcome its all inadequacy and that day would soon arrive when machines would conquer all human manual jobs too.

MONEY MANAGEMENT WITH MACHINE

Article by : Lakshay Gupta

Article Design by : Vikrant Tufani

Wealth management has become a subject of deep interest amongst business owners which has resulted in the sprouting up of professional firms specializing in the same. When firms follow the route of professional wealth management services they have a time bound plan to be followed. For instance wealth management advisers know the time frame around which the markets demand for certain investments will be high and low and advise their clients accordingly. Hence, the firms have found efficient ways of investing and analysing the assets in order to foresee maximum profits.

What's inside?

AI and machine learning are giving wealth managers the edge in three particular areas :

1) Data Analysis
2) Forecasting
3) Risk Management

Instead of exploitation of AI to make basic investment portfolios, wealth managers are using AI to assist them offer higher recommendation to their shoppers. Future generation of quants is using AI to make subtle models that have the flexibility to be told and adapt to the market.

When firms follow the route of professional wealth management services they have a time bound plan to be followed. For instance wealth management advisers know the time frame around which the markets demand for certain investments will be high and low and advise their clients to trade in the capital markets accordingly. This way firms do not miss any opportunity of investing, buying or selling their assets and can make maximum earnings out of them.

DATA ANALYTICS

IBM Watson consumer Insight for Wealth Management helps you deeply perceive consumer behaviours and supply a data-driven approach to personalised money recommendation. This approach includes:

- Maximize productivity with pre-built dashboards, or by desegregation powerful new insights into your favourite CRM system.
- Reinforce consumer loyalty with counselled retention methods, and predict consumer attrition up to thirty days before.
- Generate progressive revenue with targeted product recommendations and a deeper understanding of individual consumer preferences.

FORECASTING

Machine learning patents grew at a 34% Compound Annual Growth Rate (CAGR) between 2013 and 2017, the third-fastest growing category of all patents granted.

International Data Corporation (IDC) forecasts that spending on AI and ML will grow from $12B in 2017 to $57.6B by 2021.

Deloitte Global predicts the number of machine learning pilots and implementations will double in 2018 compared to 2017 and double again by 2020.

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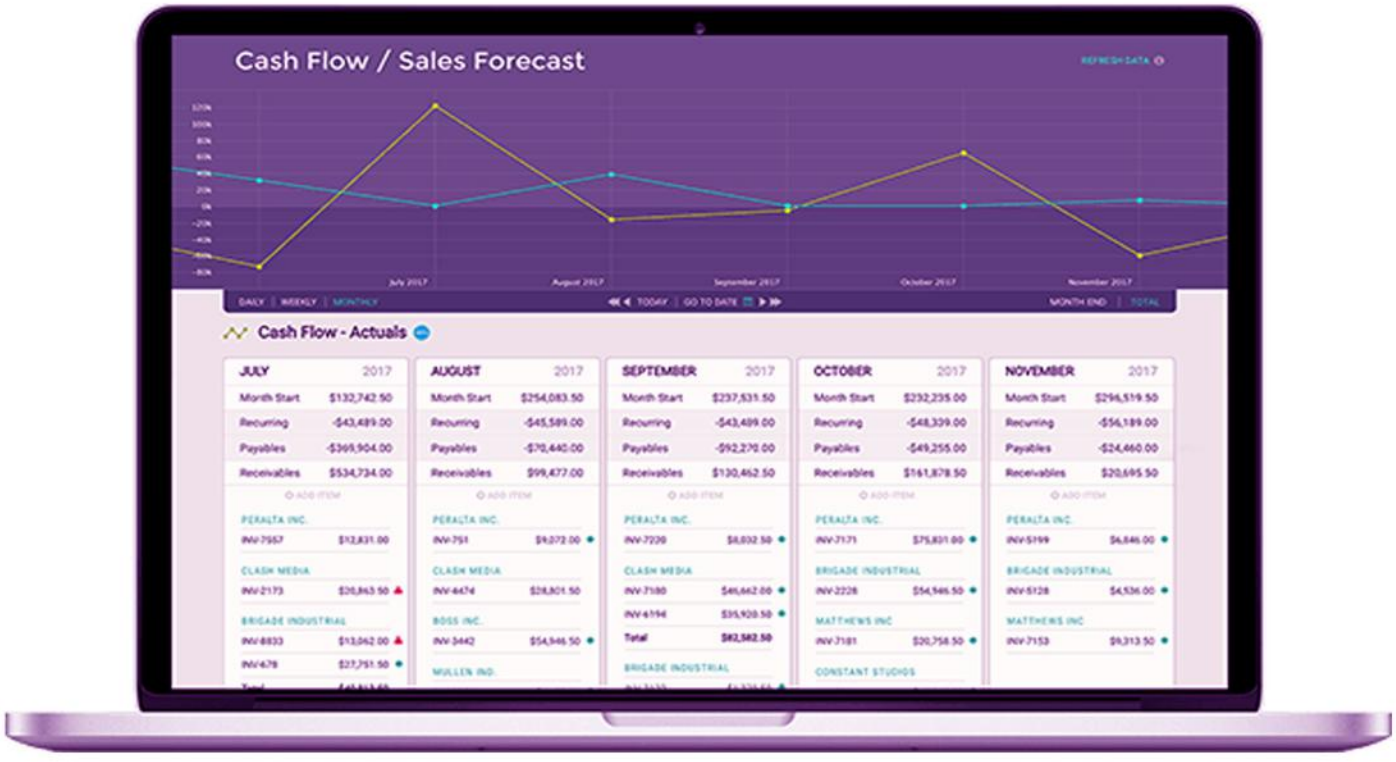
Man
Machine
Material
Method
Measurement
Money
Maintainence
Management



RISK MANAGEMENT

When it involves dominating the economic system, a helpful idea to plan the boundaries of the flexibility of AI is Danielsson and Shin's (2002) classification of risk on a spectrum from exogenous to endogenous. Exogenous risk comes from outside the economic system, as associate asteroid would possibly hit the planet. Endogenous risk is made by the interaction of the entities that conjure the economic system, each with their own talents, biases, resources and objectives. Enjoying the lottery wherever the chances of winning area unit one during a million is exogenous risk. Exogenous risk is measurable and quantitative and ends up in applied mathematics distributions that we will use to exercise management. Endogenous risk is typically neither measurable nor quantitative and doesn't lend itself to easy applied mathematics representations, being consequently way more difficult to deal with with formal analytical tools.

AI is ideally suited to coping with exogenous risk. It finds endogenous risk abundant tougher as a result of it cannot train against unknown knowledge. Whereas most risk within the economic system is made by the people that conjure the system, and that is endogenous, such risk is incredibly laborious to model. Consequently, most management processes assume risk is exogenous. Such assumptions don't seem to be problematic once involving the management of risk in continual outcomes wherever every call is inconsequential enough to be effectively exogenous; the price of failure is low, and objectives area unit short term. Associate example is that the every day risk management of proprietary traders.

There has, however, been substantial progress in overcoming these challenges, and it'll beyond any doubt continue as a huge quantity of investment pours into the sector. The longer term of AI and machine learning for risk management is, in a word, bright.

THE ERA OF MACHINES

Article by : Prerna Pandey

Article Design by : Shivam Talwar

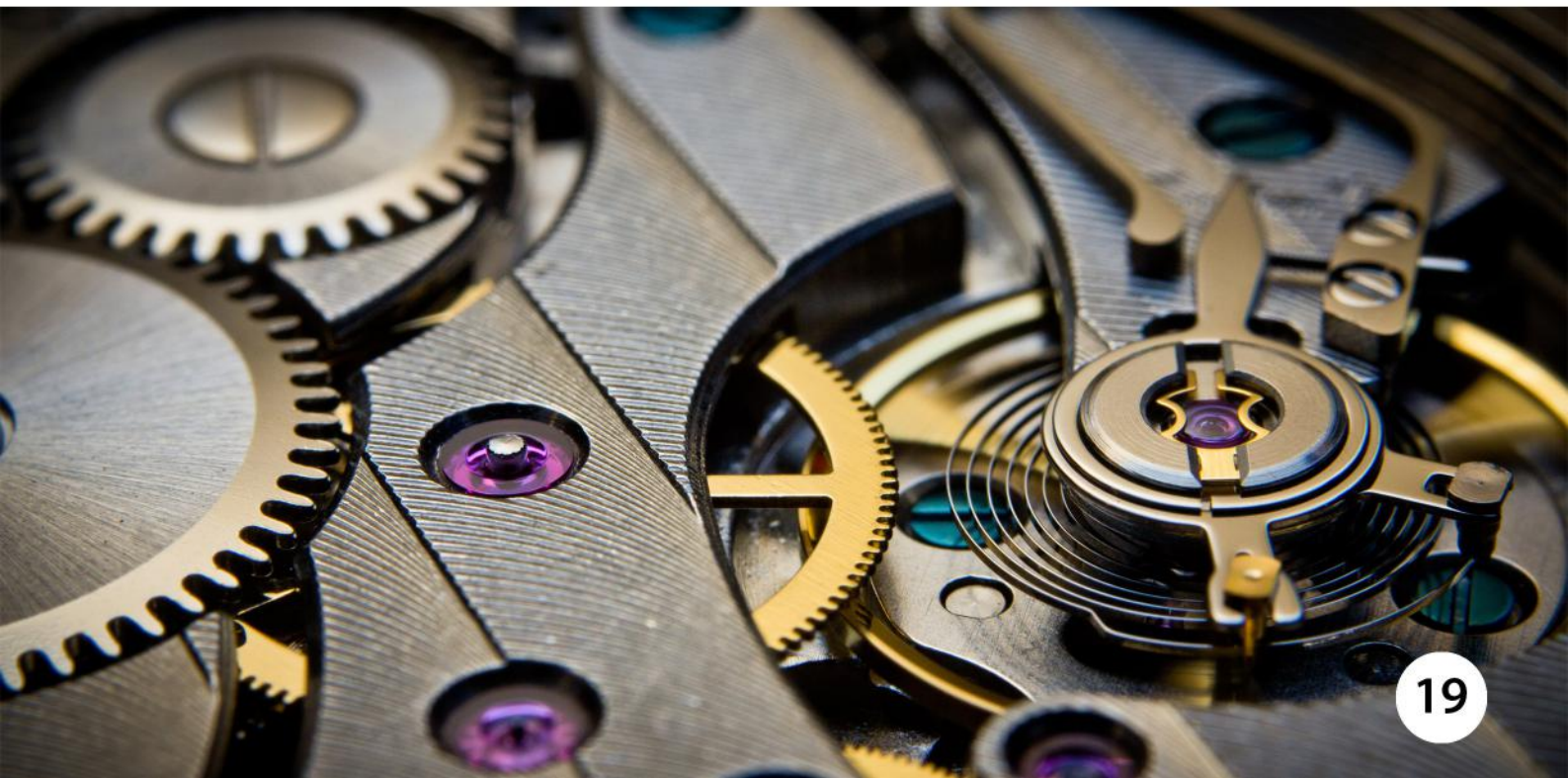
Late nineteenth century and early twentieth century is referred to as the Machine Age or "The Era of Machines". Also called the Second Machine Age, it is approximately between 1880 and 1945: the pinnacle time between first and second world wars.

At the Machine Age, many substantial and revolutionary machines came into existence which focused on doing cerebral tasks. It changed the perception of machines and how they were utilised in the past and impacted the same for future too. These new mechanical forms and forces offered themselves as signs of unprecedented human development which signalled a new peak in communications, transportation and mass production of goods. Many called this "new divinity". "The word America conjures up ideas of something ultra-perfect, rational, utilitarian and universal" wrote El Lis-sitzky in 1925.

THE COMMODITIES OF MACHINE ERA

Manual labour that took plenty of time could be done in no time due to the significant development of machinery that took place in the 1800s and 1900s.
The major development that took place was in the field of Farming. These machineries became cheaper and hence, became available for smaller farming families helping them in making steady income.

Also, a lot of evolution was seen in the motors and engines. Internal Combustion Engines, Steam Engines, Gas Turbines and Electric Motors also came into existence during this period. The long hours and manual labour that was taken during travelling was reduced considerably when railroad, automobiles and aircrafts were introduced.



Wars and national safety took another turn with the birth of tanks, submarines and modern battleships. Radiograph, phonograph and printing press were also inaugurated. Electrification based on hydro and thermal electric power production plants and distribution systems was also adopted. Little household related machines like Vacuum Cleaners and Washing machines also came into the picture. In addition to this, powerful earthmoving equipment, skyscrapers and other such things also became popular.

SOCIAL IMPACT

With the inauguration of such revolutionary machines in the market brought the rise of advertising and consumerism. Import and Export business increased significantly. National and International broadcasting of information took place through news and films. The development of printing press helped in the wider spread of newsletters and magazines. Propaganda through Audios, newsletters and videos became popularized increasingly.

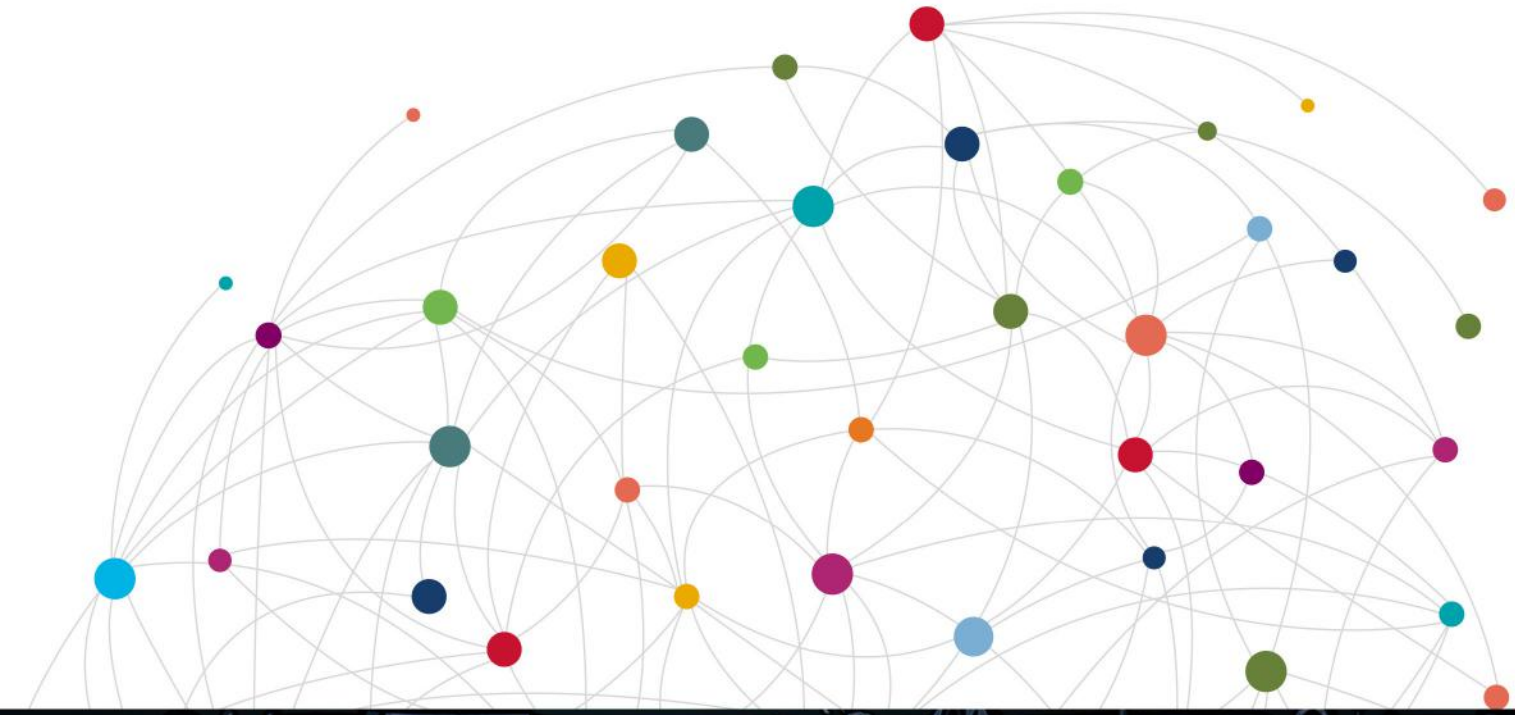
On the other side of this coin were all the adverse influences that came in the society due to the increase in machines. Major effect was that machines were used instead of the labours which led to the unemployment of many people. Corporate exploitation of labor increased which led to the creation of trade unions.

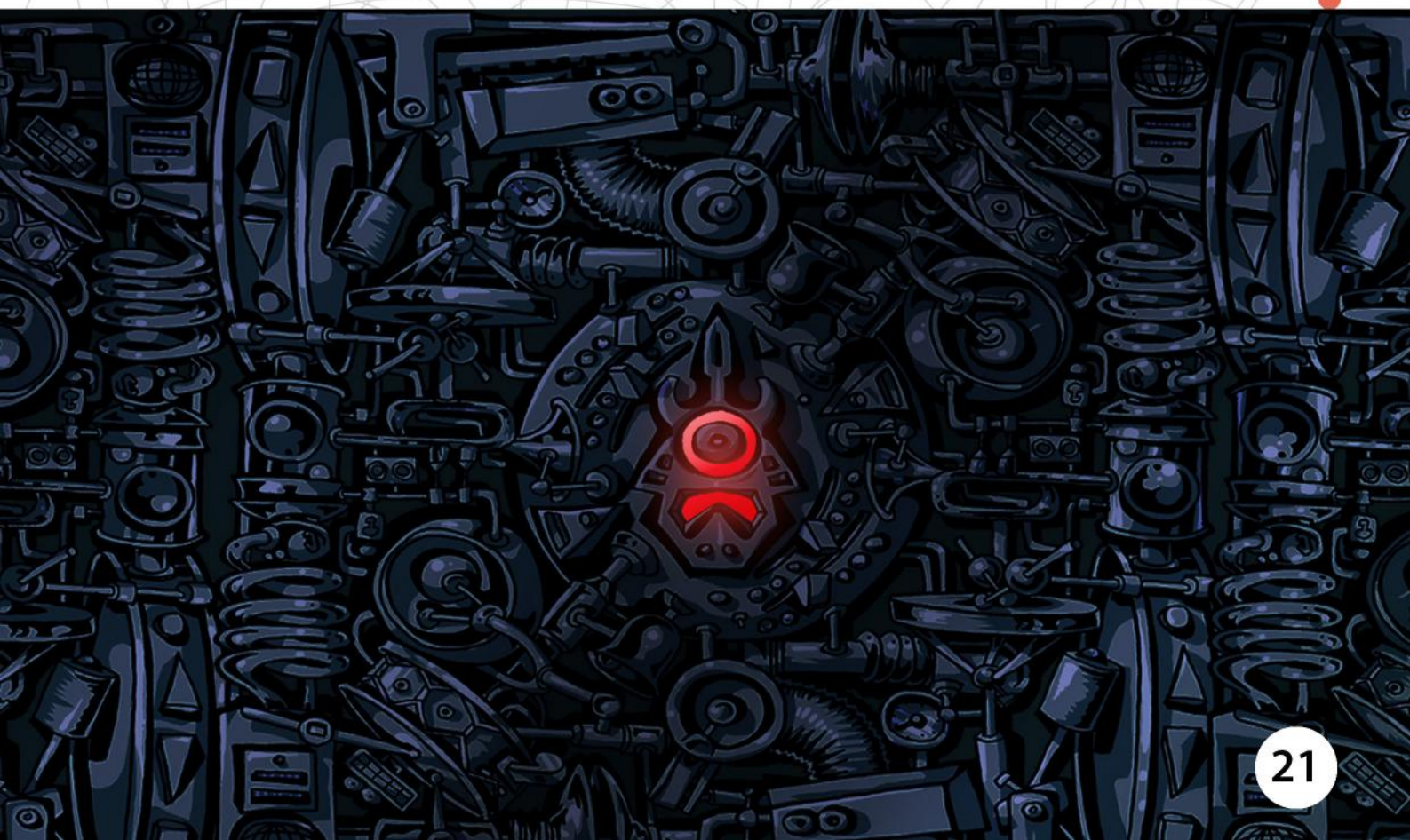
ENVIRONMENTAL IMPACT

The exploitation of resources increased proportionally with the increase in machine-use. Machinery were used at a large scale with little concern for the ecological consequences. Synthetic dyes, Artificial Flavouring and toxic substances were being produced at a large scale and were consumed without testing it's effect on the health or the environment. Non renewable resources also became a rage in these times

"The great problem of our time is to restore modern man's balance and wholeness: to give him the capacity to command the machine he has created instead of becoming their helpless accomplice or passive victim; to bring back in the heart of our culture, that respect for the essential attributes of personality, its creativity and autonomy, which western man lost at the moment he displaced his own life in order to concentrate on the improvement of machinery."

-Lewis Mumford, leading theorist and critic





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