**Emerging Trends and Technologies in Artificial Intelligence**

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**ABSTRACT**

With the faster growing technology, Computer Science emerging the different new technologies in different fields. Out of all fields, Artificial Intelligence is one of the newer technology which have emerging features like machine learning, Internet of Things (IoT), Robotics, etc. Here we have to mention chapter 1includes different trends in Artificial Intelligence, its types, How it works, Challenges in Artificial Intelligence, AI Based Cybersecurity, AI Analytics, Computer Vision Technology, Natural Language processing(NLP), AI for Code Generation, Predictive Analytics, its benefits, models, tools and techniques, Prescriptive Analytics, How Prescriptive Analytics works, advantages and disadvantages of Prescriptive Analytics .

Keywords: Artificial Intelligence, AI Analytics, Cybersecurity, NLP, Predictive Analytics, Prescritive Analytics.

* 1. **Introduction**

Artificial Intelligence is an emerging trend of Computer Science where it can process the creation and application of algorithm built into a dynamic computing environment. Basically it has three components:

* Computational systems
* Data and data management
* Advanced AI algorithms (code)
  1. **Trends in AI**

With the growing advancements in AI, it has progressing rapidly with several trends in the near future. Following are some trends:

**1.2.1 Explainable AI**

Explainable AI (XAI) specifies the ability of AI systems to analyse their decision-making process in a way that humans can understand. As AI systems become more enlightened and start making decisions that have a significant impact on people’s lives, it is becoming increasingly important to understand how these decisions are made. XAI will play a crucial role in ensuring that AI is used ethically and transparently.

**1.2.2 Edge AI**

Edge AI specifies the use of AI algorithms on local devices instead of sending data to the cloud for processing. This approach is becoming increasingly popular as it can reduce latency and improve efficiency. Edge AI especially for various applications such as self-driving cars, drones, and IoT devices.

**1.2.3 AI and Healthcare**

AI has extensive potential to reorganize healthcare. From early disease detection to personalized treatment plans, AI basically used for healthcare professionals make more accurate diagnoses and provides better patient care. AI especially ease to reduce the burden on healthcare systems by automating administrative tasks and freeing up doctors and nurses to focus on patient care.

**1.2.4Challenges in AI**

While the future of AI is auspicious, there are different challenges that need to be addressed.

**1.3How will Artificial Intelligence change the world**

From smartphones to chatbots, we are already using AI in our daily life. AI is evolving day by day. It observes our routine including our likes or dislikes and our purchases. Then AI specialists, or we can say AI developers, research all that data to train machines on how to learn from it and predict what we want.

Following are some predictions done by the USC researchers based on their analysis.

**1.3.1Heathcare**

The research analysis suggests that AI programs with computer vision will allotters and well-equipped hospitals to analyse data. Based on that analysis, doctors can customize health care according to individual patient’s genes.

AI will be able to diagnose major diseases like brain tumors and will suggest which cancer treatment will be suitable before it worsens. Several types of research are underway to develop AI-powered applications. Those applications are aimed to help doctors diagnose and treat patients with better medical care.

You can expect a different future in healthcare as it will adopt robots to interact with the patient. They will check the patient’s health condition and assess the need for a doctor’s appointment. AI will make our life simple with our clinical and healthcare history.

**1.3.2 Retail**

According to research, the adoption of ai-powered business intelligence in the decision-making process will make a huge impact on business growth and performance. In the future, AI-powered drones will deliver packages up to 5 pounds in less than 30 minutes.

Amazon has already started working on this project with proper safety and reliability measurements for package delivery. There is no fixed date for this delivery to get on the road, but you can expect the autonomous delivery of goods with drones in the next decade.

Apart from autonomous delivery, future retail with AI will get individualized with virtual racks. The racks will get customized according to previous history and purchases made by customer choice.

**1.3.3 Entertainment**

In the future, users will be able to order a movie that will be completely customized according to their desire. Even working independently, AI will assist humans in their own creative patterns like helping writers to avoid writer’s block by providing suggestions.

Furthermore, in the present era, Artificial intelligence is still in action in the form of Google Assistant, Siri, and Cortana. They are able to handle most home devices connected to the internet over voice commands.

**1.4 Top Artificial Intelligence Trends**

**1.4.1 DALL-E**

Earlier this year, Silicon Valley-based research lab OpenAI unveiled DALL-E, which surprised the internet.

In terms of artificial intelligence, this tool is getting considered one of the most advanced systems on the market for creating images. The system works as you can create hyperrealistic photographs or artwork by typing a description.

DALL-E is currently unavailable to the public. Researchers, academics, journalists, and artist testers are the only ones who can access to use this system.

The company has recently announced that it will invite more people to the event. As it moves from research to beta, the company plans to accept 1 million people from its waiting list.

**1.4.2 Google Imagen**

Imagen is a new text-to-image AI from Google Research. This system creates photorealistic images based on the input text.

Using text input, Google has demonstrated an artificial intelligence system that can generate images. Using AI, users can enter any descriptive text and have it turned into an image. Developed by the Google Brain Team, the Imagen diffusion model delivers “unprecedented levels of photorealistic precision and language understanding.”

The Imagen is currently not available publicly, but Google has shared several examples of how this AI system works. In order to evaluate the performance of the text-to-image model, Google created a benchmark named Draw Bench that is comprehensive and challenging. With this DrawBench, Imagen can get compared to VQ-GAN+CLIP, DALL-E 2, and Latent Diffusion Models. According to DrawBench, humans prefer Imagen compared to its rivals.

**1.4.3 Conversational AI**

Conversational AI is a trending technology that enables speech-based interaction between users and platforms. It is used for better engagement. It requires software such as speech recognition, speech synthesis, NL (natural language processing), and ML.

Back in 2021, research from Report Linker concluded that the conversational AI market size will grow from US$6.8 billion to US$18.4 billion by the year 2026.

This technology is mainly getting used in AI-based customer support service, continuous customer engagement, and chatbots.

**1.4.4 AI Based Cybersecurity**

The World Economic Forum recently declared cybercrime as a potential risk to global wealth and requested all countries to oppose it.

As cyberattacks are growing, AI is helping cybersecurity operation analysts to face them and stay ahead of threats. AI technologies like Threat Intelligence, ML, and NLP are learning continuously from millions of research papers and blogs to provide a rapid solution to cut down the attack.

As our life is incomplete without machines, we are becoming vulnerable to cybercrimes. The main reason behind this is that our devices are connected to the internet and giving an opportunity for the attacker to exploit its loopholes. To prevent this, AI can play a vital role in tracking suspicious activity by network traffic pattern analysis.

**1.4. AI Analytics**

AI analytics, with the help of ML algorithms, keeps monitoring and analyzing a large amount of data to automate the work normally done by the data analyst. In other words, analytics is a process of taking raw data as input and applying some data analysis methods to result in meaningful data patterns.

It is a subset of Business Intelligence that uses ML techniques to find new data patterns and relations between them. The goal behind this is not to replace human data analysts but to improve speed, performance, and productivity.

Augmented analytics is another form of analytics that could be the future of analytics. It uses AI and ML to monitor and discover data patterns without any help from data scientists. Sectors such as forecasting demand, predictive maintenance, and business monitoring are the businesses that leverage AI analytics the most.

**1.4.6 Computer Vision Technology in Businesses**

Computer vision is the most in-demand feature among businesses. According to a survey by Gartner, one-third of the technology service provider computer vision companies with AI technology are planning to invest $1 million or more in AI-based technology in the next two years.

The same survey concluded that an average of US$679000 will get invested in the computer vision industry. AI in the computer vision field deals with the machine to understand images and videos.

These AI algorithms with computer vision work similarly to human imagery. and are generally trained to track, observe and understand the object and learn patterns to identify and classify different objects using complex data sets.

**1.4.7 Natural Language Processing**

Natural Language Processing (NLP) is the heart of the text generation method. It allows the computer to understand the meaning of human spoken text or speech. AI assistants like Google Assistant, Siri, Alexa, and Microsoft’s Cortana are the best examples of NLP.

Tech AI companies like Google and Microsoft use the NLP-based BERT model for their search engine to work smoothly. This model helps technologies like AI assistants to understand what people are saying and respond accordingly.

The advanced feature of NLP like OpenAI’s Generative Pretrained Transformer, or GPT-3, is a machine learning model powered by neural networks that generate any text from internet data. The system produces large volumes of relevant and sophisticated machine-generated text with a small amount of input text.

It can create significant amounts of quality data with only a small amount of input text. The GPT-3 can get used to create articles, stories, news reports, poetry, and dialogue.

The NLP program automates the translation process between human-understandable language and computer language. To perform this operation, it manipulates unstructured data or words in the form of conversion and processes it.

**1.4.8 AI for Content Generation**

Today AI content creation platforms offer writing system-generated content like blog posts and marketing email copy. The process includes the human giving AI a prompt like keywords and a short description of their content needs. The machine then generates multiple pieces of content in a few seconds.

As a result, you will have many pieces of content in no time compared to human writers. There are multiple AI content generation tools available, and most are free to use. These tools are capable of writing all sorts of content.

**1.4.9 No Code Apps**

No-code AI platforms are taking place in this growing industry. It allows small companies to use various powerful technological tools only available to large enterprises.

Developing AI-based models from scratch requires time and knowledge in that area. That’s where no-code platforms come into the limelight. This platform simplifies the hard tasks by reducing the entry barrier.

Google Cloud auto ML, Google ML Kit, CreateML, MakeML, and Super Annotate are the most demanding no-code AI platforms you can take leverage with according to your need.

In the next, we can transforming data into future insights with Predictive Analytics.

**1.**5 **Predictive Analytics:**

Predictive analytics can help your organization forecast future outcomes based on historical data and analytics techniques such as machine learning.

We can define Predictive Analytics with a category of data analyticsaimed at making predictions about future outcomes based on historical data and analytics techniques such as statistical modelling and machine learning. The science of predictive analytics can generate future insights with a significant degree of precision. With the help of sophisticated predictive analytics tools and models, any organization can now use past and current data to reliably forecast trends and behaviours milliseconds, days, or years into the future.

**1.5.1 Predictive analytics in business**

Predictive analytics draws its power from a wide range of methods and technologies, including big data, data mining, statistical modelling, machine learning, and assorted mathematical processes. Organizations use predictive analytics to sift through current and historical data to detect trends and forecast events and conditions that should occur at a specific time, based on supplied parameters.

With predictive analytics, organizations can find and exploit patterns contained within data in order to detect risks and opportunities. Models can be designed, for instance, to discover relationships between various behaviour factors. Such models enable the assessment of either the promise or risk presented by a particular set of conditions, guiding informed decision-making across various categories of supply chain and procurement events.

**1.5.2Benefits of predictive analytics**

Predictive analytics makes looking into the future more accurate and reliable than previous tools. As such it can help adopters find ways to save and earn money. Retailers often use predictive models to forecast inventory requirements, manage shipping schedules, and configure store layouts to maximize sales. Airlines frequently use predictive analytics to set ticket prices reflecting past travel trends. Hotels, restaurants, and other hospitality industry players can use the technology to forecast the number of guests on any given night in order to maximize occupancy and revenue.

By [optimizing marketing campaigns with predictive analytics](https://www.cio.com/article/219941/7-ways-predictive-analytics-can-improve-customer-experience.html), organizations can also generate new customer responses or purchases, as well as promote cross-sell opportunities. Predictive models can help businesses attract, retain, and nurture their most valued customers.

Predictive analytics can also be used to detect and halt various types of criminal behavior before any serious damage is inflected. By using predictive analytics to study user behaviors and actions, an organization can detect activities that are out of the ordinary, ranging from credit card fraud to corporate spying to cyberattacks.

## 1.5.3 Predictive analytics use cases

Organizations today use predictive analytics in a virtually endless number of ways. The technology helps adopters in fields as diverse as finance, healthcare, retailing, hospitality, pharmaceuticals, automotive, aerospace, and manufacturing.

Here are a few ways organizations are making use of predictive analytics:

* **Aerospace:** Predict the impact of specific maintenance operations on aircraft reliability, fuel use, availability, and uptime.
* **Automotive:** Incorporate records of component sturdiness and failure into upcoming vehicle manufacturing plans. Study driver behavior to develop better driver assistance technologies and, eventually, autonomous vehicles.
* **Energy:** Forecast long-term price and demand ratios. Determine the impact of weather events, equipment failure, regulations, and other variables on service costs.
* **Financial services:** Develop credit risk models. Forecast financial market trends. Predict the impact of new policies, laws, and regulations on businesses and markets.
* **Manufacturing:** Predict the location and rate of machine failures. Optimize raw material deliveries based on projected future demands.
* **Law enforcement:** Use crime trend data to define neighbourhoods that may need additional protection at certain times of the year.
* **Retail:** Follow an online customer in real-time to determine whether providing additional product information or incentives will increase the likelihood of a completed transaction.

## 1.5.4 Predictive analytics examples

Organizations across all industries leverage predictive analytics to make their services more efficient, optimize maintenance, find potential threats, and even save lives. Here are three examples:

### 1.5.4 (a) Rolls-Royce optimizes maintenance schedules and reduces carbon footprint

Rolls-Royce, one of the world’s largest manufacturers of aircraft engines, has [deployed predictive analytics](https://www.cio.com/article/188765/rolls-royce-turns-to-digital-twins-to-improve-jet-engine-efficiency.html) to help dramatically reduce the amount of carbon its engines product while also optimizing maintenance to help customers keep their planes in the air longer.

### 1.5.4 (b) DC Water drives down water loss

The District of Columbia Water and Sewer Authority (DC Water) is using [predictive analytics to drive down water loss](https://www.cio.com/article/191612/dc-water-hunts-lost-water-with-analytics.html) in its system. Its flagship tool, Pipe Sleuth, uses an advanced, deep learning neural network model to do image analysis of small diameter sewer pipes, classify them, and then create a condition assessment report.

### 1.5.4 (c) PepsiCo tackles supply chain with predictive analytics

PepsiCo is transforming its ecommerce sales and field sales teams with [predictive analytics to help it know when a retailer is about to be out of stock](https://www.cio.com/article/189647/pepsico-tackles-supply-chain-with-data.html). The company has created the Sales Intelligence Platform, which combines retailer data with PepsiCo’s supply chain data to predict out-of-stocks and alert users to reorder.

## 1.5.4 (d) Predictive analytics tools

Predictive analytics tools give users deep, real-time insights into an almost endless array of business activities. Tools can be used to predict various types of behavior and patterns, such as how to allocate resources at particular times, when to replenish stock or the best moment to launch a marketing campaign, basing predictions on an analysis of data collected over a period of time.

Some of the top predictive analytics software platforms and solutions include:

* [Alteryx Analytics Automation Platform](https://www.alteryx.com/alteryx-analytics-automation-platform)
* [Amazon SageMaker](https://aws.amazon.com/sagemaker/)
* [H20 AI Cloud](https://h2o.ai/)
* [IBM SPSS](https://www.ibm.com/spss)
* [RapidMiner](https://rapidminer.com/)
* [SAP Analytics Cloud](https://www.sap.com/products/technology-platform/cloud-analytics.html)
* [SAS Viya](https://www.sas.com/en_us/software/viya.html)
* [TIBCO](https://www.tibco.com/)

## 1.6 Predictive analytics models

Models are the foundation of predictive analytics — the templates that allow users to turn past and current data into actionable insights, creating positive long-term results. Some typical types of predictive models include:

* **Customer Lifetime Value Model:**Pinpoint customers who are most likely to invest more in products and services.
* **Customer Segmentation Model:** Group customers based on similar characteristics and purchasing behaviours.
* **Predictive Maintenance Model:** Forecast the chances of essential equipment breaking down.
* **Quality Assurance Model:** Spot and prevent defects to avoid disappointments and extra costs when providing products or services to customers.

## 1.6.1 Predictive modelling techniques

Model users have access to an almost endless range of predictive modeling techniques. Many methods are unique to specific products and services, but a core of generic techniques, such as decision trees, regression — and even neural networks — are now widely supported across a wide range of predictive analytics platforms.

Decision trees, one of the most popular techniques, rely on a schematic, tree-shaped diagram that’s used to determine a course of action or to show a statistical probability. The branching method can also show every possible outcome of a particular decision and how one choice may lead to the next.

Regression techniques are often used in banking, investing, and other finance-oriented models. Regression helps users forecast asset values and comprehend the relationships between variables, such as commodities and stock prices.

On the cutting edge of predictive analytics techniques are neural networks — algorithms designed to identify underlying relationships within a data set by mimicking the way a human mind functions.

## 1.6.2 Predictive analytics algorithms

Predictive analytics adopters have easy access to a wide range of statistical, data-mining and machine-learning algorithms designed for use in predictive analysis models. Algorithms are generally designed to solve a specific business problem or series of problems, enhance an existing algorithm, or supply some type of unique capability.

Clustering algorithms, for example, are well suited for customer segmentation, community detection, and other social-related tasks. To improve customer retention, or to develop a recommendation system, classification algorithms are typically used. A regression algorithm is typically selected to create a credit scoring system or to predict the outcome of many time-driven events.

## 1.6.3 Predictive analytics in healthcare

Healthcare organizations have become some of the most enthusiastic predictive analytics adopters for a very simple reason: The technology is helping them save money.

Healthcare organizations use predictive analytics in several ways, including intelligently allocating facility resources based on past trends, optimizing staff schedules, identifying patients at risk for a costly near-term readmission and adding intelligence to pharmaceutical and supply acquisition and management.

Healthcare consortium Kaiser Permanente has used predictive analytics to create a [hospital workflow tool](https://www.cio.com/article/220507/kaiser-permanente-reduces-patient-mortality-with-predictive-analytics.html) that it uses to identify non-intensive care unit (ICU) patients that are likely to rapidly deteriorate within the next 12 hours. NorthShore University HealthSystem has [embedded a predictive analytics tool](https://www.cio.com/article/220343/identifying-high-risk-patients-with-predictive-analytics.html) in patients’ electronic medical records (EMRs) that helps it identify which chest pain patients should be admitted for observation and which patients can be sent home.

## 1.7 How should an organization begin with predictive analytics?

While getting started in predictive analytics isn’t a snap, it’s a task that virtually any business can handle as long as one remains committed to the approach and is willing to invest the time and funds necessary to get the project moving. Beginning with a limited-scale pilot project in a critical business area is an excellent way to cap start-up costs while minimizing the time before financial rewards begin rolling in. Once a model is put into action, it generally requires little upkeep as it continues to grind out actionable insights for many years.

Another futuristic trend in Artificial intelligence is Prescriptive analytics which mean Prescriptive analytics is the use of advanced processes and tools to analyze data and content to recommend the optimal course of action or strategy moving forward.

**1.7.1 Two factors driving the growth of prescriptive analytics.**  
Historically, prescriptive analysis required major infrastructure investments and hard-to-find data science expertise to develop proprietary algorithms. Today, cloud data warehouses can now cost-effectively deliver the storage, power, and speed you need. And modern AutoML tools (automated machine learning) make it easy for you to build, train, and deploy custom machine learning models.

Prescriptive analytics is a type of data analytics that attempts to answer the question "What do we need to do to achieve this?" It involves the use of technology to help businesses make better decisions through the analysis of raw data. Prescriptive analytics specifically factors information about possible situations or scenarios, available resources, past performance, and current performance, and suggests a course of action or strategy. It can be used to make decisions on any time horizon, from immediate to long-term. It is the opposite of descriptive analytics, which examines decisions and outcomes after the fact

* Prescriptive analytics is a form of data analytics that tries to answer "What do we need to do to achieve this?"
* It uses machine learning to help businesses decide a course of action based on a computer program’s predictions.
* Prescriptive analytics works with predictive analytics, which uses data to determine near-term outcomes.
* When used effectively, it can help organizations make decisions based on facts and probability-weighted projections instead of conclusions based on instinct.
* Prescriptive analytics isn't foolproof, as it's only as effective as its inputs.

## 1.7.2 How Prescriptive Analytics Works

Prescriptive analytics tries to answer the question "How do we get to this point?" It relies on [artificial intelligence](https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp) (AI) techniques, such as machine learning (the ability of a computer program without additional human input), to understand and advance from the data it acquires, adapting all the while.

Machine learning makes it possible to process a tremendous amount of data available today. As new or additional data becomes available, computer programs adjust automatically to make use of it, in a process that is much faster and more comprehensive than human capabilities could manage.

Prescriptive analytics works with another type of data analytics, predictive analytics, which involves the use of statisticsand modelling to determine future performance, based on current and historical data. However, it goes further: Using the predictive analytics' estimation of what is likely to happen, it recommends what future course to take.

## 1.7.3 Advantages and Disadvantages of Prescriptive Analytics

### Advantages

Prescriptive analytics can cut through the clutter of immediate uncertainty and changing conditions. It can help prevent fraud, limit [risk](https://www.investopedia.com/terms/r/risk.asp), increase [efficiency](https://www.investopedia.com/terms/e/efficiency.asp), meet business goals, and create more loyal customers. When used effectively, it can help organizations make decisions based on highly analyzed facts rather than jump to under-informed conclusions based on instinct.

Prescriptive analytics can simulate the probability of various outcomes and show the probability of each, helping organizations to better understand the level of risk and uncertainty they face than they could be relying on averages. Organizations that use it can gain a better understanding of the likelihood of [worst-case scenarios](https://www.investopedia.com/terms/s/scenario_analysis.asp) and plan accordingly.

### Disadvantages

But prescriptive analytics is not foolproof. It is only effective if organizations know what questions to ask and how to react to the answers. As such, it's only effective if its inputs are valid. If the input assumptions are invalid, the output results will not be accurate.

This form of data analytics is only suitable for short-term solutions. This means businesses shouldn't use prescriptive analytics to make any long-term ones. That's because it becomes more unreliable if more time is needed.

**Pros**

* Prevents fraud, reduces risk, and increases efficiency among other things.
* Simulates outcomes and shows probably of each.

**Cons**

* Only as effective as the inputs.
* Not suitable for long-term predictions/solutions.
* Some big data providers provide results while others don't.

## 1.7.4 Types of Data Analytics

Data analytics is an automated process that uses algorithms. It analyzes raw data and allows the user to make conclusions about that information. Prescriptive analytics isn't the only type of data analytics. There are several others that we discuss below.

### Descriptive Analytics

Descriptive analyticsuses historical data and interprets it in a way to better understand any changes that take place in a business. Key data sets that are commonly used in descriptive analytics are changes in price, patterns in sales growth, user data, and subscriber-related revenue.

This form of big data tries to answer the question "What happened?" Having said that.business leaders can use this information to recognize their strengths and weaknesses. This allows them to make better decisions and enhance their business strategies.

Descriptive analytics can be a useful business solution when used in conjunction with other forms, such as prescriptive analytics.

### Diagnostic Analytics

This type of data analytics tries to ask the question "Why did this happen?" As such, it requires much more diverse data inputs. But there's a little guesswork involved because businesses use it to find out why certain trends pop up. For instance, it tries to figure out whether there's a relationship between a certain market force and sales or if a certain ad campaign helped or hurt sales of a particular product.

## 1.7. Examples of Prescriptive Analytics

Numerous data-intensive businesses and government agencies can benefit from using prescriptive analytics. This includes companies in the financial services and health care [sectors](https://www.investopedia.com/terms/s/sector.asp), where the cost of human error is high. For instance, prescriptive analytics could be used to:

* Evaluate whether a local fire department should require residents to evacuate a particular area when a wildfire is burning nearby.
* Predict whether an article on a particular topic will be popular with readers based on data about searches and social shares for related topics.
* Adjust a worker training program in real-time based on how the worker is responding to each lesson

The following are examples where prescriptive analytics can be used in various settings.

### Prescriptive Analytics for Hospitals and Clinics

Prescriptive analytics can be used by hospitals and clinics to improve the outcomes for patients. It puts health care data in context to evaluate the cost-effectiveness of various procedures and treatments and to evaluate official clinical methods.

It can also be used to analyze which hospital patients have the highest risk of re-admission so that [health care providers](https://www.investopedia.com/articles/markets/030916/worlds-top-10-health-care-companies-unh-mdt.asp) can do more, via patient education and doctor follow-up to stave off constant returns to the hospital or emergency room.

### Prescriptive Analytics for Airlines

Suppose you are the [chief executive officer](https://www.investopedia.com/terms/c/ceo.asp) (CEO) of an airline and you want to maximize your company’s profits. Prescriptive analytics can help you do this by automatically adjusting ticket prices and availability based on numerous factors, including customer demand, weather, and gasoline prices.

When the algorithm identifies that this year’s pre-Christmas ticket sales from Los Angeles to New York are lagging last year’s, for example, it can automatically lower prices, while making sure not to drop them too low in light of this year’s higher oil prices.

At the same time, when the algorithm evaluates the higher-than-usual demand for tickets from St. Louis to Chicago because of icy road conditions, it can raise ticket prices automatically. The CEO doesn’t have to stare at a computer all day looking at what’s happening with ticket sales and market conditions and then instruct workers to log into the system and change the prices manually. Instead, a computer program can do all of this and more—and at a faster pace, too.

### Prescriptive Analytics in Banking

Bankingis one of the industries that can benefit from prescriptive analytics the most. That's because companies in this sector are always trying to find ways to better serve their customers while ensuring they remain profitable. Applying prescriptive analytical tools can help the banking sector to:

* Create models for customer relationship management
* Improve ways to cross-sell and upsell products and services
* Recognize weaknesses that may result in losses, such as anti-money laundering(AML)
* Develop key security and regulatory initiatives like compliance reporting

### Prescriptive Analytics in Marketing

Just like banking, data analytics is very critical in the marketing sector. Marketers can use prescriptive analytics to stay ahead of consumer trends. Using past trends and past performance can give internal and external marketing departments a competitive edge.

By employing prescriptive analytics, marketers can come up with effective campaigns that target specific customers at specific times like, say, advertising for a certain demographic during the Super bowl. Corporations can also identify how to engage different customers and how to effectively price and discount their products and services.

## What Does Prescriptive Analytics Mean?

Prescriptive analytics is a form of data analytics that helps businesses make better and more informed decisions. Its goal is to help answer questions about what should be done to make something happen in the future. It analyses raw data about past trends and performance through machine learning (so very little human input, if any at all) to determine possible courses of action or new strategies generally for the near term.

## Why Is Prescriptive Analytics So Important for Businesses?

Prescriptive analytics is very important for businesses because it allows them to look at their past performance and ask themselves "What do we need to do to get to this point?" It is critical for businesses that are in need of a turnaround, especially those that are struggling with low performance metrics. Using this type of data analytics allows them to come up with strategies and a suitable course of action and, perhaps, how long it may take for them to achieve these goals.

**References**

[1] Corsi, C. Smart sensors: Why and when the origin was and why and where the future will be. Proc. SPIE 2014, 8993, 899302.

[2]Von Krogh, G. Artificial intelligence in organizations: New opportunities for phenomenon-based theorizing. Acad. Manag. Discov. 2018.

[3]Kobbacy, K.A.H.; Vadera, S.; Rasmy, M.H. AI and OR in management of operations: history and trends. J. Oper. Res. Soc. 2007, 58, 10–28.

[4]Shabbir, J.; Anwer, T. Artificial intelligence and its role in near future. arXiv 2018. arXiv:1804.01396.

[5]Nichols, J.A.; Chan, H.W.H.; Baker, M.A.B. Machine learning: applications of artificial intelligence to imaging and diagnosis. Biophys. Rev.

2018, 11, 111–118.

[6] Abduljabbar, R.; Dia, H.; Liyanage, S.; Bagloee, S.A. Applications of artificial intelligence in transport: An overview. Sustainability 2019, 11, 189.

[7]Al-Sahaf, H.; Bi, Y.; Chen, Q.; Lensen, A.; Mei, Y.; Sun, Y.; Tran, B.; Xue, B.; Zhang, M. A survey on evolutionary machine learning. J. R. Soc. N. Z

2019, 49, 205–228.

[8]Avola, D.; Foresti, G.L.; Piciarelli, C.; Vernier, M.; Cinque, L. Mobile applications for automatic object recognition. In Advanced Methodologies and

Technologies in Network Architecture, Mobile Computing, and Data Analytics; IGI Global: Hershey, PA, USA, 2019; pp. 1008–1020.

[9]Aloufi, S.; Zhu, S.; El Saddik, A. On the Prediction of Flickr Image Popularity by Analyzing Heterogeneous Social Sensory Data.Sensors 2017, 17,

631.

[10]Bahri, S.; Zoghlami, N.; Abed, M.; Tavares, J.M.R.S. Big data for healthcare: a survey. IEEE Access 2019, 7, 7397–7408.

[11]Liakos, K.; Busato, P.; Moshou, D.; Pearson, S.; Bochtis, D. Machine learning in agriculture: A review. Sensors 2018, 18, 2674.

[12]Mohammadi, V.; Minaei, S. Artificial intelligence in the production process. In Engineering Tools in the Beverage Industry; Elsevier: Amsterdam,

The Netherlands, 2019; pp. 27–63.

[13]Woschank, M.; Rauch, E.; Zsifkovits, H. A review of further directions for artificial intelligence, machine learning, and deep learning in smart

logistics.Sustainability 2020, 12, 3760.

[14]Zhong, S.; Zhang, K.; Bagheri, M.; Burken, J.G.; Gu, A.; Li, B.; Ma, X.; Marrone, B.L.; Ren, Z.J.; Schrier, J. Machine learning: new ideas and tools in

environmental science and engineering. Environ. Sci. Technol. 2021, 55, 12741–12754.

[15]Chang, F.C.; Huang, H.C. A survey on intelligent sensor network and its applications. J. Netw. Intell. 2016, 1, 1–15.