



## THE CUTTING EDGE TECHNOLOGIES IN COMPUTER SCIENCE: A REVIEW

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**Abstract:** Technological gadgets, methods, and accomplishments that make use of the most recent and advanced IT advances are examples of cutting-edge technology. "Cutting edge" is a term commonly used to describe the most advanced and forward-thinking companies in the IT industry. The term "cutting-edge technology" is used to describe the most advanced and up-to-date technological features, as opposed to "bleeding-edge technology," which is so novel that it presents risks to consumers. While the term "technology" is most often associated with computer and electronic devices, it can refer to advancements in virtually any field. The author of this paper has properly cited the most up-to-date cutting-edge research.

**Keywords:** Cutting Edge, Medical Science, Cloud, Software, Computer graphics, AI, IOT

### INTRODUCTION-

In today's highly competitive market, data has quickly emerged as one of a company's most valuable resources for generating new business and expanding existing operations. Large, complex datasets are available from a variety of sources, and the success of an organization is dependent on how successfully it manages this data[1]. Data management enables businesses to gain a deeper understanding of consumers' existing patterns of behavior, tastes, and preferences by transforming structured, unstructured, and semi-structured data into valuable insights. This can be achieved, however, if the company begins to use important emerging technologies such as artificial intelligence and big data [2,22]. In order to achieve their aims and objectives, data-driven companies are concentrating on gathering as much timely information as possible. Data-driven businesses expand rapidly as a result of strategies centered on data analysis and utilization[3]. On the other hand, data-driven businesses face challenges like privacy leaks, data silos, inefficient data administration, a lack of data skills, data that is inaccessible, and difficulties locating the appropriate cutting-edge technology.

We anticipate a beneficial effect of AI on human civilization and the natural world. With the help of AI, we can tackle pressing, unresolved issues in a wide variety of domains, from narrowly focused business applications to issues of global significance [4]. Computer vision, natural language processing, and time series approaches are just a few examples of how AI can be used safely and effectively to benefit patient health[5].

We offer tailor-made, state-of-the-art AI solutions for even the most intractable issues. Zühlke boasts a top-tier team of experts in the fields of research and engineering that have worked on numerous successful AI solutions[6].

The use of AI is not a panacea. There is a substantial risk that AI will be used improperly, leading to biased and unfair

conclusions that will have detrimental effects on people's lives. This is why, from conceptualization to widespread implementation, we place a premium on developing state-of-the-art AI solutions that are secure, robust, and explainable in accordance with a set of ethical principles [7].

### PROMISING AREAS OF COMPUTER SCIENCE-

The following are examples of fields where state-of-the-art methods now enable users to provide mission-critical DSML systems for the future of business.

#### 1. Computer Vision

As computer vision (CV) has been receiving a lot of attention over the past few years, we've mentioned it a few times in our annual trends posts, the most recent time being in 2022. Computer vision is the ability of a system to derive insight from digital input such as photos, movies, and other forms of data, and it has been an essential component in the development of futuristic technology such as self-driving automobiles [8].

##### *Use Cases*

The production line at BMW employs CV to identify components with manufacturing faults in order to sort out faulty parts, which saves time and money while also cutting expenses.

Retailers use computer vision for intelligent store surveillance in order to watch their shelves, keep track of their inventory, and assess the sections of the store that receive the most foot traffic.

Using CV, manufacturers are able to revolutionize the shop floor by studying the behaviors of workers in real-time

video feeds in order to find any inconsistencies with pre-determined quality standards [9].

## 2. Deep Learning

Deep learning algorithms are naturally more advanced than traditional machine learning models, and they don't require any input from a person, therefore they are more scalable and powerful than traditional machine learning models[10]. Deep learning has taken over many important aspects of businesses, creating transformational enterprise machine learning solutions such as the recommendation engines used by Amazon and Netflix.

### Use Cases

Researchers have been able to use deep learning to almost completely anticipate how ice forms, which has considerably improved the accuracy of climate forecasting, particularly with regard to the prediction of wet or snowy conditions [11].

Radiologists can use deep learning algorithms such as GANs to generate images that are so realistic, they can be used to train other models for detecting abnormalities in medical imaging.

## 3. Natural Language Processing (NLP)

Understanding and interpreting natural language, such as speech and text, is vital for gaining a customer's perspective with regard to your brand and the goods you sell. Natural language processing enables a computer to comprehend and communicate in natural language[12]. The market for NLP solutions is currently expanding at a rate of 29.4% per year, and they are already rather popular; nonetheless, it is only projected that their notoriety will continue to increase.

### Use Cases

The use of natural language processing (NLP) by global customer care teams to offer real-time translations has made it much easier to engage with customers located in different countries [13].

In order to verify that they are meeting the standards for compliance and audits, legal teams use natural language processing (NLP) for intelligent document analysis.

## 4. Explainable AI

Explainable artificial intelligence (XAI) may appear straightforward at first glance; after all, it's only the application of explanation methods (EMs) to explain to people how a machine learning model functions [14]. Local empirical models (EMs) explain how a model arrived at a particular decision, whereas global empirical models (EMs) illustrate how a model behaves in general.

However, there is a lot of intricacy involved with explainable procedures, and they are not a magic bullet. In particular, complicated deep learning algorithms are still exceedingly difficult to completely understand [15].

The applications of XAI are expanding along with its development.

### Use Cases

Explainable AI is used for bias detection by a bank to guarantee that a model used to decide whether or not a loan should be issued to an applicant is making fair decisions that are in accordance with national regulations.

The use of XAI concepts to machine learning models helps physicians comprehend what patterns or risk factors the model detected when determining whether or not a patient is at risk for a disease [16].

## 5. Causal AI

While explainable AI is concerned with providing an explanation for a model's results, causal AI looks more closely at the factors that led to a prediction being made. When trying to achieve a certain result, such as converting leads into customers, causal AI can be a useful tool for discovering which tactics are working and which are not. This can be a time-consuming and labor-intensive process [17].

Even though causal AI has been around for some time, it has recently garnered a lot of attention, particularly when Gartner named it one of the top 25 emerging technologies in the sector.

### Use Cases

AI can be used by B2C companies to precisely detect customer churn causes and optimize client retention.

App developers can employ causal AI to spot anomalies across the service chain and correct declining app performance with exact root cause tracing by using this information [18].

Farmers can utilize causal AI to enhance data-driven decision making by, for example, enhancing an algorithm that helps them anticipate crop output in order to understand why crop yield would be lower this year and offering recommendations to increase it.

AI that can differentiate between correlation and causation can also assist companies in minimizing the risk of their models producing biased results[19].

## IOT FOR HIGH-VELOCITY DATA AGGREGATION

The data lakes that are utilized for the analytics of Big Data have various entry points, such as social media, internal data flows from CRM/ERP systems, accounting platforms, and so on. However, the level of complexity increases by a factor of ten when we include Internet of Things sensors. It is necessary to swiftly aggregate and analyse this data in order to be able to derive useful insights from it[20]. Additionally, the quantity of data that is inserted should be kept at the lowest level possible that is still appropriate.

To improve the manner in which people interact with computers through the authoring of specialized algorithms is

the primary focus of current research and development efforts in the fields of artificial intelligence (AI) and machine learning (ML). These algorithms make it possible to automate the work that needs to be done repeatedly or to improve the results of jobs that have historically been greatly dependent on the talents of human workers. In 2017, there were many notable advances made in machine learning fields such as text translation, optical image recognition, and a variety of other projects[21].

The prediction engine at Amazon is supposed to deliver better service to the clients, but as of right now, its accuracy is rather low and is, at best, somewhere around 10%. At the tail end of 2017, AWS and Azure joined together to collaborate on the development of a next-generation artificial intelligence platform known as Gluon API. AWS and Azure hope that by allowing third-party developers to use their platforms, they will inspire AI developers of all skill levels to create AI algorithms that are cleaner and more effective[22].

### **APPLICATION AREAS OF CUTTING EDGE TECHNOLOGIES OF COMPUTER SCIENCE**

Below is the list of areas where cutting edge technology has given most effective performance-

#### **Business analytics**

Syncsort, a company that specializes in providing solutions for Big Data, recently conducted a survey on the difficulties and problems that enterprise businesses experience when dealing with Big Data. The fact that approximately 70 percent of respondents cited the consequences with ETL is one of the most important things that came out of that poll[23]. This indicates that they struggle to process the incoming data quickly enough to maintain their data lakes current and relevant.

Polished data processing workflows are necessary for real-time and predictive analytics, which are required to provide a solid ground for on-point business analytics. More than 75 percent of respondents to a survey conducted by Syncsort acknowledged that they need to be able to process data more quickly[24].

#### **Cloud Storage**

Cloud storage is an absolute necessity for data lakes because only by utilizing the computing capabilities provided by the cloud is it possible to realize the full potential of business intelligence and Big Data analytics systems[25]. The costs associated with storing the data, however, will increase proportionally with the size of the data in question. The costs of data storage continue to be significant despite the efforts of numerous cloud service companies such as Amazon Web Services and Google Cloud Platform to cut such costs. Concerns regarding data safety are also raised as a result of the fact that many departments will soon have access to the cloud. Strict security policies will need to be implemented in order to protect the data that is stored at the workplace.

#### **Cyber forensics**

A lot of preconceived notions about how, where, and when we work, shop, and play have been overturned as a result of COVID-19. Since the beginning of the epidemic in late 2019, Digital Commerce 360 reports that the volume of online purchases has increased by more than 50.5%, while peer-to-peer payments on our network have more than doubled, and subscriptions to digital streaming services have passed the one billion mark[26].

The increasing significance of using digital payment methods is a theme that runs across the majority of the post-pandemic behavioral trends. To put it another way, the engine that drives today's global economy is the secure, dependable, and rapid movement of digital money between individuals, businesses, and governments[27]. This includes everything from digital downloads costing \$0.40 to cross-border corporate transactions costing \$4 million.

Networks such as Visa, who have the necessary technology, experience, and alliances, are primarily responsible for ensuring that pandemic relief can be efficiently distributed by governments or that life-saving drugs can be purchased by individuals.

To suggest that the process of safeguarding the circulation of money around the world is a difficult one would be an understatement, particularly at this moment. Sadly, criminal organizations regarded the pandemic as a good chance to attack human and technical vulnerabilities and took advantage of the situation. On the subject of human fallibility, 78 percent of people who receive unwanted links click on them, and 51 percent of people admitted to using the same password for the most of their online activities. Both of these statistics point to the vulnerability of humans[28]. During this time, 81 percent of worldwide firms witnessed an increase in the severity of cyberthreats, and 79 percent of those organizations experienced downtime during peak seasons due to a cyber event.

There is a significant amount of focus on the most cutting-edge developments in the fields of finance and payments, such as tap to pay, cryptocurrency, and purchase now, pay later, to name a few examples. What receives less attention are the tools, platforms, and services that assure any new form of money movement is safe, secure, and private. Examples of this include bitcoin, ethereum, and other cryptocurrencies [29].

It's not often that we let people in on what goes on behind the scenes at Visa, but the improvements we're making to our security systems, processes, and technologies are important enough that they deserve some attention[30]. Why? Because it's vital, and to tell you the truth, it's sort of cool too (if we do say so ourselves).

### **MULTILAYERED,CUTTING-EDGE CYBERSECURI**

The protection of Visa's assets and the provision of clients and partners with layers of proactive defense and offense are the two aspects of cybersecurity that we consider when making decisions. For instance, Visa's more than 1,000 full-time cybersecurity specialists employ natural processing to analyze petabytes of data, which enables them to safeguard

Visa's network from malware, zero-day attacks, and insider threats. In addition, Visa's petabytes of data are constantly being updated. Models that use machine learning can identify the most likely locations of network vulnerability and implement fixes for them, adding an additional layer of security. Visa's security team is responsible for monitoring, scanning, and checking client systems for suspicious activity and vulnerabilities[31].

Some of the cybersecurity work, such as ethical hacking attempts made by our in-house engineers or triangulating fraud attempts, IP addresses, and GPS data to arrest criminals, sounds like something out of a Jason Bourne movie. This includes triangulating fraud attempts, IP addresses, and GPS data. On its own, vulnerability testing has helped clients prevent nearly \$31 million worth of fraudulent activity in FY21 [32]. Other tasks, such as responding to inbound client incidents, are less exciting but are nonetheless critically vital. Using the Visa Account Intelligence technology, which uses artificial intelligence and machine learning to detect fraudulent activity before it occurs, Visa was able to assist in the prevention of nearly \$2.2 billion worth of attempted client fraud [33].

## **MEDICAL SCIENCE**

Over the course of the past few decades, advances in technology have completely revolutionized the medical industry. Researchers all across the world are working tirelessly to find answers to some of the world's most perplexing questions, and the development of novel therapeutics and surgical techniques has already helped save countless lives. Innovative medical technologies make it possible to diagnose, monitor, and treat a variety of medical illnesses such as diabetes, cancer, and opioid addiction in a more effective manner[34]. And because significant research efforts are being made at universities and businesses all over the world, it won't be too much longer before new medical practices are adopted by the general public and begin to alter the lives of those who utilize them.

### **DEVELOPING A SENSE OF TOUCH IN PROSTHETIC ARMS**

There are currently over 30 million people in need of prostheses around the world, and experts predict that number will only increase. Such changes have helped to the rise of the artificial limbs industry that's predicted to approach \$2.76 billion by 2024[35]. Tech breakthroughs assist those with limb loss to easily handle daily problems. Modern robotics and AI have allowed for the creation of prostheses that not only allow for limited movement but also provide the wearer with a sense of touch[36].

In 2018, the artificial limbs industry was worth \$1.9 billion, but that number is expected to rise to \$2.76 billion by 2024, thanks to the 30 million individuals throughout the world who need prostheses.

The cutting-edge LUKE Arm, created by U. of U. scientists, is an example of such an advancement. The fundamental feature of this gadget is the Utah Slanted Electrode Array (USEA), which comprises of 100 microelectrodes that read signals emitted by the user's nerves in the forearm area[37].

Using a secret technique, it can also transmit data to the brain, allowing the wearer to experience tactile sensations. Even fragile items like eggs and grapes were safely picked up by a volunteer while wearing the device. Subject to FDA clearance, the project team hopes to begin home trials as soon as possible.

Similarly amazing is the prosthetic hand made by engineers at Newcastle University in the United Kingdom. Cameras on the device scan the immediate vicinity for targets, and the mechanism subsequently moves to reach for them[38]. Because of this, the user may execute a wide variety of tasks with ease, as everything occurs "within a couple of milliseconds and ten times faster than any other limb now on the market," as explained by the university.

And researchers from many European institutions have developed a way for amputees to experience something very similar to a normal sense of touch. The state-of-the-art bionic hand gives its user a sense of proprioception, or the awareness of the body's limbs' positions without visual cues[39]. Without having to look at the thing, the user may determine its size and shape. This is made possible by the constant stream of electrical impulses that travel from the stump to the brain. Using this apparatus, volunteers were able to accurately judge the dimensions and contours of four items with a precision of 75.5%.

### **RESPONSIVE ARTIFICIAL LEGS HELP USERS MOVE WITH EASE**

Research is also heavily focused on creating synthetic legs. Dr. Tommaso Lenzi of the Bionic Engineering Lab at the University of Utah is putting a prosthetic limb with a knee replacement through its paces[40]. The device is responsive, thus it changes its behavior depending on the user's posture and activity. It's only 800 grams, yet it enables amputees get around with ease because to artificial intelligence and sensors that can react to their surroundings.

### **EXOSKELETONS ALLOW DISABLED PEOPLE TO REGAIN INDEPENDENCE**

The capacity to walk, run, and climb is often taken for granted. They are able to go about their regular activities without any assistance. On the other hand, not everyone is so fortunate. Age and medical conditions like MS and stroke can make it difficult for a person to simply take a few steps, let alone stand up straight[41].

As a result of the over 130 million people who require a wheelchair worldwide, the medical exoskeleton industry is projected to reach \$578 million by 2024[42].

More than 130 million people, according to the Wheelchair Foundation's estimations. Because of the constant pressure, certain regions of the skin can become infected if you use a wheelchair. The medical exoskeleton industry has grown as a result of these limitations and the need for improved mobility options, and is expected to reach \$578 million by 2024. There are a number of items on the market that help patients lead better lives. Wheelchairs help people get around, but they still can't move in the same ways that people who aren't disabled do. For this reason, more and

more businesses are creating exoskeletons to help people become considerably more physically active[43].

For example, the Canadian firm B-Temia created a wearable robotic exoskeleton called Keeogo to aid people with mobility and neurological impairments. People with knee or hip arthritis, for instance, can utilize the system to take the pressure off their knees, alleviate pain, and ensure steady footing[44]. Increased knee support, a more efficient gait, and the ability to maintain activity for longer are all positive outcomes for those with MS. Also, B-exoskeletons Temia's can help those with Parkinson's illness make their movements more expansive and fluid.

### Software engineering

Technology solutions, equipment, products, services, processes, or accomplishments that make use of the most recent and advanced IT developments are examples of cutting-edge technology (also known as leading-edge or state-of-the-art technology)[45]. The most progressive companies in the information technology sector rely on cutting-edge innovations in technology to achieve their business, technological, and programming goals.

### Examples of Cutting-Edge Technologies

Let's take a look at some state-of-the-art technologies and the ways in which they're helping businesses of all sizes.

Entertainment, medicine, banking and finance, automotive, repair and maintenance, quality assurance, design and assembly, immersive training, vehicle and aviation simulators are just some of the industries that have taken advantage of AI, ML, AR, and VR technology [46].

- AI has been shown to increase clinical efficiency and accuracy, increase the speed of diagnosis, improve patient outcomes, and speed up patient recovery through the use of precision medicine and robotic surgery [47].
- In telecommunications, the newest software technologies implied in self-optimizing networks (SONs) like Netflix allows gaining insight into customer behavior and predicting industry trends, improving and specifying customer experiences, and optimizing 5G network performance;[48]
- In healthcare, chatbots and NLP applications able to understand and classify clinical documentation help eliminate long wait times at the doctor's office and tedious paperwork; Sixty-six percent of telcos, according to McKinsey's experts, plan to implement AI and ML into their operations within the next two years, up from just 37 percent in 2021[49].

With the help of AI and ML-based chatbots and workflow automation solutions, the insurance and financial industries have been able to digitalize their claims processing, personalize their customers' experience and create user-based insurance services, improve risk analysis, and better detect fraud and money laundering, all of which have contributed to the differentiation of their services in a competitive market[50].

- The energy sector implemented AI and ML cutting-edge technology along with the new ways of producing, storing, delivering, and using energy, resulting in substantially better KPIs, operational outcomes, and total profitability than even just 5 years ago, with Tesla as a key player[51]. Climate change concerns, shifting commercial forces, and rapid technological development have all played a role in this shift. Artificial intelligence (AI) and machine learning (ML) are now being used by energy corporations around the world to create intelligent power plants, reduce consumption and costs, create predictive maintenance models, optimize field operations, and enhance energy trading.

### Single-Tenant Cloud Solutions

Speaking about the hottest tech trends, the first place Fively will give to the use of single-tenancy, which we will integrate in our SaaS (software-as-a-service) software delivery models[52]. It is a cutting-edge cloud architecture of 2022 in which a single instance of a software application and associated infrastructure serves only one customer (tenant) (tenant). In this case, the hosting provider assists in controlling the software instance, giving a single tenant practically complete control[53]. As a result, each piece of software may be tailored specifically for the new tenant, and following installation, most tenants can adjust settings to make the program work optimally in their setting.

The following are some benefits that can be realized by using single-tenancy models:

#### Greater user participation and agency

Since performance is dependent on a single instance, rather than multiple instances belonging to different tenants, single-tenant instances have been shown to be more transparent and trustworthy[54]. They also offer several other benefits, including:

More flexibility in meeting renters' unique needs

All of a customer's data is isolated, and software and hardware instances may be tailored to their specific needs, all thanks to this state-of-the-art system[55].

Information is not shared with other possible tenants of the same service provider. Data is saved in a separate instance, so if one tenant's account is breached while using the same service provider, the data of the other tenants is safe. Simple management and backup options.

In the event of data loss due to a disaster, customers can swiftly activate recovery thanks to isolated backups. There's a chance that moving away from a host environment might be easier with a single-tenant architecture[56].

#### Remote Work Applications Development

Covid-19 pandemic-related travel bans and other restrictions are making it harder for business owners to keep operations running in outlying places. Our state-of-the-art solution to

this issue is the creation of a remote work application, which enables all of the company's personnel to operate at the required location while remaining in the headquarters, and to provide advice to colleagues, partners, or customers who are physically present at the site of operation[57]. This technology not only gives you a birds-eye view of all service activities, but also gives you full control over all services and resources located on your premises.

Benefits of adopting Fively's remote work application solutions include:

Service of a high standard in a shorter time frame

High-definition video conferencing, crystal-clear audio, and a suite of collaborative tools allow for seamless, productive meetings between your headquarters team and customers at your remote location, allowing for in-depth conversations and seamless transactions as though everyone were in the same room the whole time[58].

Our remote work applications feature state-of-the-art technology, allowing for a wide range of internal and external communication options, including but not limited to the following: • the virtual flexible pool of workers, who have access to features like dynamic content, touchscreen displays, HD video, and intelligent telephony[59].

New cutting-edge business technology allows for the creation of a virtual pool of expertise. Knowledge employees that are centrally located, geographically scattered, or working remotely can all contribute to a company's ability to seize sales opportunities thanks to streamlined multichannel delivery and accessibility[60].

Get in touch with the relevant subject matter experts right away so they can impart their knowledge to your company's internal and external clients in B2B and B2C interactions.

### **Marketplace and Collaboration Platforms Development**

Specialists at Fively use cutting-edge technologies to improve results for our clients, and the growth of omnichannel online marketplaces is expected to be a major industry focus in the year 2022. Because of the interoperability of the apps and web services, corporate activities across the board can be considerably optimized. In addition, they assist in working with similar markets to develop shared items with broader alternatives or limited-edition deals, diversify your product line, and cultivate a robust business community[ 61].

When a customer makes use of specialized marketplace solutions, they gain:

- Obtain an Individualized Business and Specialty Answer

To help you attain your strategic marketplace business goals, expand your operational reach, and boost revenues, we offer experienced strategic consultation on marketplace and collaboration development before development even begins [62].

In order to reengineer dated applications, reorganize inefficient company processes, and boost overall productivity, we develop cutting-edge platforms for collaboration, partner management, and inter-business process management [63].

In order to make portals functional and adaptable, Fively integrates third-party services; • plunge into an immersive virtual experience.

To reliably inform your audience and improve their overall experience, this cutting-edge platform allows you to record, send, and keep audio and video communications of the highest possible quality indefinitely[64].

### **Operating system**

In contrast to bleeding-edge technology, which is so novel that it could potentially be unreliable for consumers, cutting-edge technology refers to characteristics of technology that are now in use and have been fully developed[65]. Although it is most usually used to refer to computer and electrical technology, the term "technology" can refer to any form of technology, including that utilized in the automotive, medical, engineering, and a wide variety of other fields.

The phrase "cutting-edge technology" is commonly employed in the context of marketing, which lends the term a certain degree of ambiguity[66].

### **Computer graphics and multimedia**

These days, graphics and multimedia are most likely the technologies that are discussed the most in the realm of computer science. This technique is currently widely embraced by the majority of computer-based applications in order to bridge the gap between a human user and a machine. Through this, numerous forms of media are integrated into and utilised inside a computer-based program in order to improve the application's readability for the average person. This multi-media presentation includes things like text, sound, video, graphics, and animation, among other things [67]. The students will be introduced in this paper to the many concepts that are associated with these media and how those concepts are used in computer-based applications. The students will get familiarity with a variety of multimedia implementation approaches, such as data compression, as well as several multimedia standards as a result of this activity.

### **Computer graphics in CAD**

The use of computer graphics in the design process, in particular for engineering and architectural systems, is a significant application of this technology. In certain design programs, the items being designed are initially displayed in a wireframe outline form. This form reveals both the external and internal characteristics of the objects being designed. A multiwindow environment is often something that is provided to the designer as part of the software package for CAD applications[68]. Each window has the

capability of displaying magnified parts or alternative perspectives of the same thing. Logic circuits, electrical circuits, and electronic circuits frequently have standard shapes that are specified by the design package. Automatically made links have been established between the various components.

## ANIMATIONS ARE OFTEN USED IN CAD APPLICATIONS

. The performance of a vehicle can be evaluated more accurately with the assistance of real-time animations that use wire frame displays. The designer is able to visualize the internal components of the car while it is in motion thanks to the use of wire frame models. After the object designs have been finished, the next step is to apply accurate lighting models and surface rendering. CAD allows for the control of the manufacturing process as well as the final product[69].

When planning the layout of the buildings, interactive graphical approaches are used.

Additionally included are three-dimensional interior layouts as well as lighting.

The architects and designers are able to take a "virtual walk" of the structure thanks to virtual reality technologies[70].

### 1. Presentation Graphics

It can be used to make graphics for reports or 35-mm slides that can be viewed on projectors.

Bar charts, line graphs, surface graphs, pie charts, and displays illustrating correlations between parameters are some examples of presentation graphics. The presentation may benefit from the addition of more captivating three-dimensional graphics[71].

### 2. Computer Art

Applications of computer graphics can be found in many different types of art, including fine art and commercial art. The fine artists make use of several software applications, including CAD software, drawing programs, texture mapping, and 3D modeling tools. The term "automatic art" refers to the work produced using a pen plotter in conjunction with specialized software. In order to create a wide variety of 2D and 3D shapes, as well as stereoscopic image pairings, "Mathematical Art" can be generated through the use of mathematical functions, fractal techniques, the Mathematica program, in jet printers, and several other types of systems. The practice of commercial art also makes use of these methods[72].

Rendering images of a product uses techniques that mimic photorealism as closely as possible. Additionally, animations are utilized often in advertising, and the production of television ads takes place frame by frame. Film animations need 24 frames for every second of the animation sequence that they are shown on. Morphing, in which one item transforms into another, is a method of graphics that is frequently used in many different types of ads[73].

### 3. Entertainment

Methods using computer-generated imagery (CG) are currently utilized often in the production of movies, music videos, and television shows. A great number of popular television shows make frequent use of computer graphics techniques. Graphics elements can be mixed with live action [74].

### 4. Education and Training

As a teaching tool, a computer-generated model of a physical, financial, or economic system is frequently utilized. For certain types of instructional uses, specialized computer systems are developed. Training of ship captains, aircraft pilots, and so on are some examples. Some simulators don't have video screens at all, although the vast majority of simulators come with graphics screens for visual operation. A few of them offer little more than the administrative interface[75].

## CONCLUSION

The market for AI is moving at a breakneck speed, and data science approaches (especially those that are regarded as "cutting edge") are continuously developing and becoming more advanced. Enterprises have the potential to unlock new capabilities and establish a competitive advantage if they keep up with the latest developments in DSML technologies. Your team has to have access to a data science platform that will enable them to access cutting-edge approaches and embed confidence and transparency into their models from the very beginning in order for them to successfully exploit these techniques.

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