Review Article

New Trends in Machine Learning Expected to Emerge in 2022

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Abstract

Machine learning has been extensively researched during the last two decades. This is often driven by the need to automate the process of knowledge acquired during the development of expert systems. Machine learning has lately received attention in the context of data mining and knowledge discovery. Much machine learning research has focused on classification learning. Inductive learning, which is one of the most mature and commonly used machine learning algorithms presently accessible, is given special emphasis. Machine learning covers the subject of how to develop machines that learn on their own. It is one of today's fastest-expanding technological topics, located at the crossroads of computer science and statistics, as well as at the heart of artificial intelligence and data science. The adoption of data-intensive machine-learning approaches may be seen as leading to more evidence-based decision-making in a variety of fields such as health care, manufacturing, education, financial modeling, police, and marketing. Emerging trends are highlighted, and problems in our everyday lives are handled using machine learning (ML) models such as Artificial Neural Networks, K-Nearest Neighbors, Logistic Regression, and Support Vector Machines. This study focuses on forthcoming developments and security paradigms in machine learning. The study discusses malware analysis and detection skills by comparing prior samples. The paper explores emerging trends and machine learning applications.

Keywords: Algorithm; Machine Learning; Internet

Introduction

The creation of algorithms via the process of machine learning helps robots get better at interpreting data and making decisions based on that data. Gaur, J., Goel [1] defines Some industry watchers predict that by the year 2024, machine learning will have reached a significant level of prevalence, with 2022 and 2023 being the years in which it will get the most attention. Applications of machine learning (ML) may be found in a wide range of businesses, including financial institutions, food and beverage establishments, manufacturing facilities, and even service stations. When it comes to the field of artificial intelligence, the following are some of the emerging trends in machine learning that are expected to emerge between now and 2022 and beyond.

Internet of things and machine learning

Most computer workers are excited about the initial ML advancements in IoT. A breakthrough in IoT will affect 5G adoption. 5G's network speed will allow systems to receive and send data more quickly. IoT devices link system machines to the internet. Every year, more IoT devices connect to the network, resulting in more data sharing.

Automated machine learning

Using automated machine learning, professionals may develop efficient and productive tech models. As a consequence, effective task-solving as advanced. AutoML is used to construct sustainable models that improve work efficiency [2], especially in the development business, where experts may design applications without programming expertise.

Improved cybersecurity

Technology has advanced significantly as a consequence of the majority of apps and appliances becoming intelligent [2]. However, there is a compelling need for task-solving more securely given that these smart appliances are always linked to the internet. Machine learning may be used by IT experts to build anti-virus models that will thwart potential cyberattacks and lessen risks.

Ethics in artificial intelligence

An increasing concern with the development of cutting-edge technologies like AI and ML is the lack of clear ethical norms for their use. The more advanced the technology, the more up-to-date ethics should be. Without ethics, machines will make judgments that aren't in everyone's best interest. proof of this may be found in the already available fleet of autonomous vehicles [3]. The failure of the autonomous vehicle may be traced back to the artificial intelligence (AI) system installed in the automobile.

Automation of natural speech understanding process

There is a great deal of talk regarding the viability of smart speaker systems for implementing smart home technologies. Smart speech assistants like Google Assistant, Apple's Siri, and Amazon's Alexa streamline the process by connecting to smart gadgets wirelessly for hands-free operation [1]. When it comes to identifying human speech, these machines are already quite accurate.

General adversarial networks

To train a generative model, GANs cleverly frame the task as a supervised learning problem with two sub-models: a generator model that is taught to produce new examples, and a discriminator model that attempts to categorize instances as genuine (from the domain) or false (from outside the domain) (generated). To ensure the generator model is creating credible instances [5], it is trained in an adversarial zero-sum game against the discriminator model until the discriminator model is misled around 50% of the time.

No-code machine learning and AI

In other words, no-code machine learning is the process of developing machine learning applications without relying heavily on code. Instead, you may use a visual, drag-and-drop interface to build a machine learning programmer that serves most purposes. It is from no-code software development that no-code machine learning has evolved. This is a novel idea that was proposed to cut down on programming labor. Users may "create" software applications without having to write any code at all by making use of pre-existing, specialized tools.

MLOps – Machine learning operationalization management

Before the advent of MLOps, several problems were always linked to the growth of machine learning, including scalability, the building of appropriate ML pipelines, the handling of sensitive data at scale, and effective team communication. The goal of MLOps is to eliminate these problems by standardizing how machine learning programs are deployed [4]. Although the stages of MLOps are comparable to those of conventional machine learning development, the business objective-first design of MLOps results in more transparency eliminates communication gaps and improves the system's capacity for expansion.

Reinforcement learning

In the process of reinforcement learning, the machine learning system learns from the interactions it has with its environment [1]. A mechanism of rewards and punishments may be implemented in the environment to provide the perceptions of the ML system with some degree of worth [6]. The training of animals via the use of positive reinforcement is an example of how the system will ultimately work toward the goal of achieving the maximum possible degree of reward or value. This has a lot of possibilities in terms of artificial intelligence for board games and video games. On the other hand, if the application's safety is the most important factor to consider, reinforcement ML may not be the best choice. Because the algorithm derives conclusions based on random behaviors, it may deliberately engage in dangerous decision-making while it is learning.

Few shot, one shot, and zero-shot learning

In few-shot learning, just a limited portion of the available data is used. Although it has several limitations, it has a broad range of applications in a variety of fields, including text classification, picture classification, and face recognition, among others [5]. Although it is a benefit of a functional model that it does not need a large amount of data, such a model cannot be used for really difficult issues. On the other hand, one-shot learning makes use of an even less amount of data. Nevertheless, there are some uses for it in the field of face recognition. For illustration purposes, a particular picture ID from a passport may be compared to an im-

age of a person taken by a camera. This just needs the use of data that is already available and does not require a large database of information to function well. At first glance, the idea of zero-shot learning may seem to be confusing. How might machine learning algorithms function if they had no starting data to work with? The goal of zero-shot machine learning systems is to look at a topic and use information about it to make an educated guess as to which category the topic should be filed in.

Conclusion

Machine Learning models, such as Logistic Regression, K-Nearest Neighbors, Support Vector Machines, and Artificial Neural Networks, are used to handle the problems posed by prospective trends and challenges. The use of machine learning in the medical profession, which analyses photos and videos, has shown to be quite beneficial. Using ML models, we were able to find a solution to the problem of web traffic in the communication network. One may say that Machine Learning is an essential subfield of Computer Science since it is responsible for finding solutions to the many issues that plague our modern society by using a wide variety of computational paradigms. In the not-too-distant future, various developments and applications, such as Multiple Video and Image Analysis and Communication, will be accomplished primarily via the use of machine learning models, which will tackle the common difficulties that people face in their everyday lives. Research of a variety of kinds may be conducted on security paradigms, with the end goal of making them simpler and more effective to use in practice.

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