Chapter 24
Artificial Intelligence and Machine Learning Algorithms

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ABSTRACT

With the recent development in technologies and integration of millions of internet of things devices, a lot of data is being generated every day (known as Big Data). This is required to improve the growth of several organizations or in applications like e-healthcare, etc. Also, we are entering into an era of smart world, where robotics is going to take place in most of the applications (to solve the world's problems). Implementing robotics in applications like medical, automobile, etc. is an aim/goal of computer vision. Computer vision (CV) is fulfilled by several components like artificial intelligence (AI), machine learning (ML), and deep learning (DL). Here, machine learning and deep learning techniques/algorithms are used to analyze Big Data. Today's various organizations like Google, Facebook, etc. are using ML techniques to search particular data or recommend any post. Hence, the requirement of a computer vision is fulfilled through these three terms: AI, ML, and DL.

INTRODUCTION ABOUT ARTIFICIAL INTELLIGENCE& MACHINE LEARNING

Computer Vision is a subdivision of computer science which is integrated with the usual mining, analysis and consideration of constructive information. In simple words, computer vision means "How machines can/ a machine sees/ solves problems without a human-being". In the past decade, this area is too popular and has still attracted several research communities to develop machines better than human being (in terms of work-efficiency, thinking-level or solving problems). For example, Sophia is a recent and enhanced robot which is being developed by the Hong Kong based company Hanson Robotics. It is the first robot

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to come to get the Saudi Arabia citizenship in 2016. So, it can be said that the computer vision domain is the becoming the upcoming field of research that can solve various problems related to virtualization. The computer vision has been expanding and emerging with the new and advanced technologies or concepts (like Blockchain, Internet of Everything, etc.) and applications that utilize different computer vision techniques. Among all existing technologies (in recent years), over a hundred applications/ many organizations have moved to the practice and execution of Artificial Intelligence techniques.

Machine Learning techniques required in their business/ to give boost to the aim of computer vision. Hence, to fulfil the vision of smart worlds/ requirements, artificial intelligence, and machine learning allows tools/ applications to become more accurate (in terms of values) in predicting results (without being explicitly programmed). For artificial intelligence algorithms, several inferences, rules and logic that were used in the systems which were created using traditional techniques of Artificial Intelligence are not meeting the today's requirement of the changing world. In divergence, systems that focus on the analysis and detection the patterns that are existing in dataset for classification, clustering, regression, are becoming the overriding system of AI. In addition to the existing mechanisms, the domain of AI can be further taken into the form of three main groups like Artificial Slight intellect, Artificial Overall Intelligence, and Artificial Super Intelligence. On the other way round there are numerous categories of existing techniques of Machine Learning (ML) algorithms used in fulfilling the objective of computer vision like supervised (regression, decision tree, random forest, classification) and unsupervised (Clustering, Association Analysis, Hidden Markov Model (HMM), etc.) and semi-supervised. In simple words, computer vision is the science and technology of machines that a machine sees (without a human-being). Computer vision is an exploration extent that comprises numerous methods to approach several graphic problems. In recent years, over a hundred applications/ many organizations have been replaced by Artificial Intelligence, Deep Learning and other Machine Learning techniques to give boost to the aim of computer vision. Hence, to fulfil the vision of smart worlds/ requirements, artificial intelligence, and machine learning allows tools/ applications to become more accurate (in terms of values) in predicting results (without being explicitly programmed).

BACKGROUND

Artificial Intelligence (AI)

It is a division of Computer Science which tracks technology, i.e., generating the computers or machineries that behave as intelligent and rational as human beings. In general, the definition of Artificial Intelligence includes the designing and creation of systems that can understand the human intelligence and behave accordingly in an environment provided. It will include the learning, planning etc. to behave the system rationally. AI not only creates the intelligent systems or expert systems but it also expand to the biologically observable. In addition to this the father of AI named as John McCarthy, "The science and engineering of creating intellectual machines, specifically intellectual system programs".

In other words, Artificial Intelligence (AI) is a means of constructing a computer, a robot controlled by computer, or software that contemplates intelligently, similar to a human/individual. Artificial Intelligence accomplish its aims by deeply studying the structure and thinking process of an individual brain to find out the ways of learning, planning, decision capability, and taking action in a particular situation. In the previous years, Artificial Intelligence has increased acceptance due to growing people's