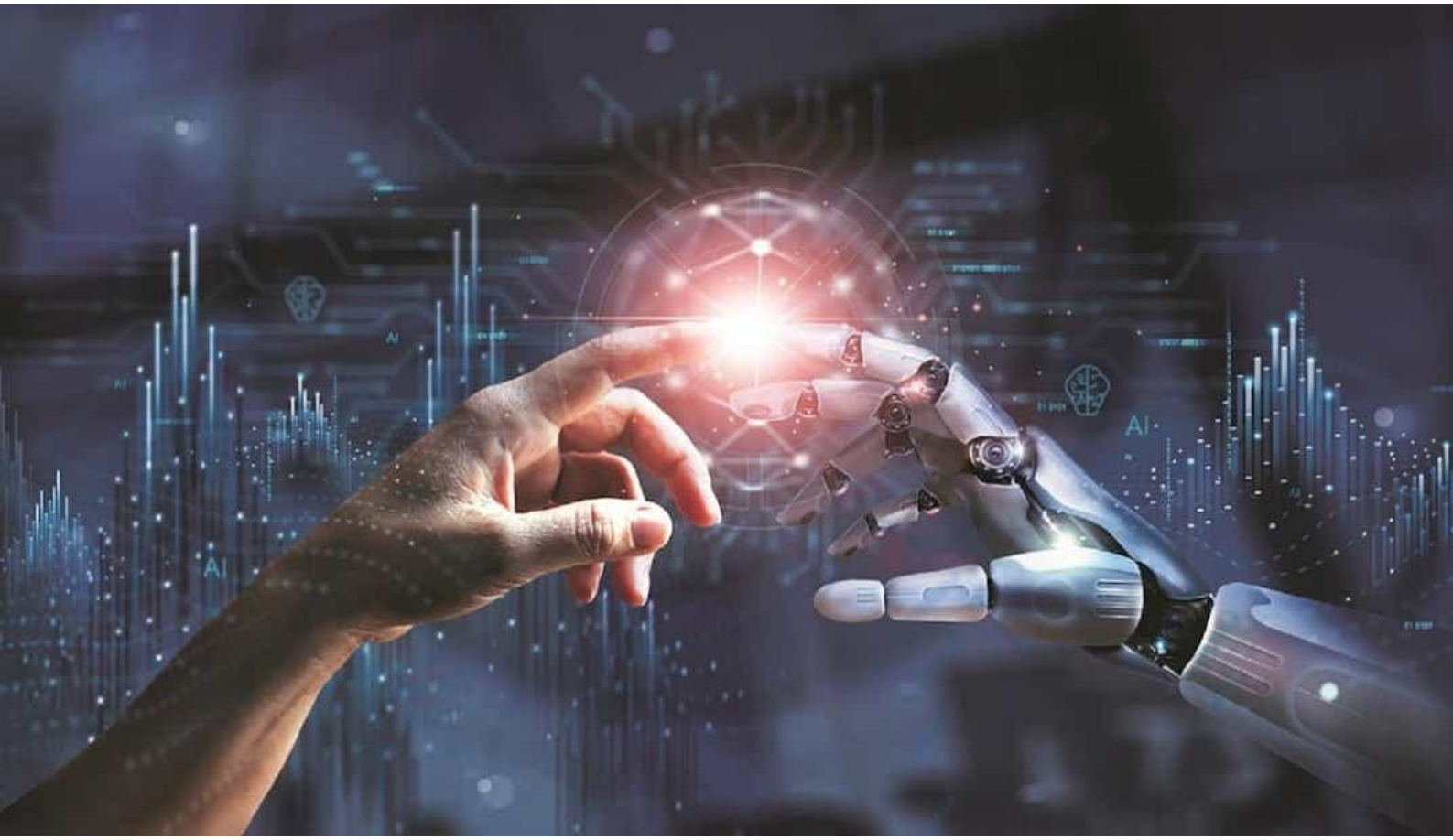
AI
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How does artificial intelligence (AI) work?

As the hype around AI grows, vendors are making efforts to promote how AI is used in their products and services. Often, what they call AI is just a component of technologies like machine learning. AI requires specialized hardware and software infrastructure to write and train machine learning algorithms. Although no single programming language is synonymous with AI, Python, R, Java, C++, and Julia have features that are popular among AI developers.

Generally, AI systems work by ingesting large amounts of labeled training data, analyzing correlations and patterns in the data, and using these patterns to predict future situations. This way, given examples of text, chatbots can learn to generate authentic-like conversations with people. Image recognition tools can also learn to recognize and describe objects in images by considering millions of examples. New and rapidly advancing generic AI technology allows you to create realistic text, images, music, and other media.

Artificial intelligence programming focuses on cognitive skills such as:

- **Learn:** This aspect of AI programming focuses on taking data and creating rules to turn it into actionable information. Rules, called algorithms, provide step-by-step instructions for computing devices to accomplish a particular task.

- **Logic.** This aspect of AI programming focuses on selecting the appropriate algorithm to achieve the desired result.

Computer Vision and Image Processing: A Paper Review

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ABSTRACT

Computer vision has been studied by many perspectives. It expands from raw data recording into techniques and ideas combining digital image processing, pattern recognition, machine learning and computer graphics. The extensive usage has attracted many scholars to integrate with many disciplines and fields. This paper provides a survey of the recent technologies and theoretical concept explaining the development of computer vision mainly related to image processing using different areas of their field application. Computer vision helps scholars to analyze images and video to obtain necessary information,understand information on events or descriptions, and beautiful pattern. It used the method of multi-range application domain with massive data analysis. This paper contributes to recent development on reviews related to computer vision, image processing, and their related studies. We categorized the computer vision mainstream into four group, e.g., image processing, object recognition, and machine learning. We also provide brief explanation on the up-to-date information about the techniques and their performance

I. Introduction

Computer vision has been expanded into the vast area of field ranging from recording raw data into the extraction of image pattern and information interpretation [1]. It has a combination of concepts, techniques, and ideas from digital image processing, pattern recognition, artificial intelligence and computer graphics [2]. Most of the tasks in computer vision are related to the process of obtaining information on events or descriptions, from input scenes (digital images) and feature extraction. The methods used to solve problems in computer vision depend on the application domain and the nature of the data being analyzed.

Computer vision is a combination of image processing and pattern recognition[2],[3]. The output of the Computer Vision process is image understanding. Development of this field is done by adapting the ability of human vision in taking information. Computer Vision is the discipline of extracting information from images, as opposed to Computer Graphics [4]. The development of computer vision depends on the computer technology system, whether about image quality improvement or image recognition. There is an overlap with Image Processing on basic techniques, and some authors use both terms interchangeably [4],[5].

The primary purpose of Computer Vision is to create models and data extracts and information from images, while Image Processing is about implementing computational transformations for images, such as sharpening, contrast, among others[4]. It also has similar meaning and sometimes overlapping with In Human and Computer Interaction (HCI)[6]. HCI coverage focus on full design, interface and all aspects of technologies related to the interaction between human and computer. HCI is then developed as a separate discipline (which is the field of interdisciplinary science) which discusses the interrelationships between human-computer mediated by technology development including human aspects. Functionally, computer vision and human vision are the same [7], with the

Natural Language Processing

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Abstract- Natural language processing is widely discussed and researched topic nowadays. As it is one of the oldest area of research in machine learning it is used in major fields such as machine translation speech recognition and text processing. Natural language processing has brought major breakthrough in the field of computation and AI. Various algorithms used for Natural language processing are mainly dependent on the recurrent neural network. Different text and speech processing algorithm are discussed in this review paper and their working is explained with examples. Results of various algorithms show the development done in this field over past decade or so. We have tried to differentiate between various algorithms and also its future scope of research. The Gap analysis between different algorithms is mentioned in the paper as well as the application of these various algorithms is also explained. Natural language processing has not attained perfection till date but continuous improvement done is the field can surely touch the perfection line. Different AI now use natural language processing algorithms to recognize and process the voice command given by user.

Index terms-EOS: End of sentence, GO: Start decoding, PAD: Filler, Seq2Seq, UNK: Unknown; word not in vocabulary

I. Introduction

Andrew Ng has long predicted that as speech recognition goes from 95% accurate to 99% accurate, it will become a primary way that we interact with computers. The idea is that this 4% accuracy gap is the difference between annoyingly unreliable and incredibly useful. Thanks to Deep Learning, we're finally cresting that peak.

Nowadays artificial intelligence is widely discussed buzzword and is in under rapid development. Basically artificial intelligence is a computer program that can do something smart like a human, it is actually machine mimicking human to perform task in his absence and sometimes in better as well as efficient way, broadly speaking.

Machine learning is subset of AI. The intelligence of machine is improved using machine learning as through learning algorithms and analysis of different types of data. Deep learning and neural networks are subset of machine learning. Deep learning algorithms do analysis of different data sets through algorithm again and again and improves the machine knowledge according to the output obtained.

Natural language processing is an integral area of computer science in which machine learning and computational linguistics are broadly used. This field is mainly concerned with making the human and computer interaction easy but efficient. Machine learns the syntax and meaning of human language, process it and gives the output to user. The area of NLP involves making computer systems to perform meaningful tasks with the natural and human understandable language.

The reason why natural language processing is so important in future is it helps us to build models and processes which take chunks of information as input and in form of voice or text or both and manipulate them as per the algorithm inside the computer.

Thus the input can be speech, text or image where output of an NLP system can be processed Speech as well as Written Text.

Different algorithms developed to increase the efficiency of processing the language in text form which we are going to discuss here are:

- Long short term memory
- Sequence 2 Sequence model
- Named Entity Recognition model
- User preference graph model
- Word Embedding model
- Feature based sentence extraction using fuzzy inference rules.
- Template based algorithm using automatic text summarization

Similarly language can be processed even if the input is in speech form. For that various algorithms are developed and the best of them all are:

- Word Recognition

Introduction to artificial neural networks

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The coupling of computer science and theoretical bases such as nonlinear dynamics and chaos theory allows the creation of 'intelligent' agents, such as artificial neural networks (ANNs), able to adapt themselves dynamically to problems of high complexity. ANNs are able to reproduce the dynamic interaction of multiple factors simultaneously, allowing the study of complexity; they can also draw conclusions on individual basis and not as average trends. These tools can offer specific advantages with respect to classical statistical techniques. This article is designed to acquaint gastroenterologists with concepts and paradigms related to ANNs. The family of ANNs, when appropriately selected and used, permits the maximization of what can be derived from available data and from complex, dynamic, and multidimensional phenomena, which are often poorly predictable in the traditional 'cause and effect' philosophy. *Eur J Gastroenterol Hepatol* **19:1046–1054**

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Introduction

The aim of this article is to discuss the possible advantages derived from the use of artificial neural networks (ANNs), which are some of the more advanced artificial intelligence tools today available, as an appropriate means of answering the emerging issues and 'demands' of medical science, and in particular of gastroenterology.

We are currently facing a paradox of sorts in which the amount of progress in the quality of the delivery of medical care in the everyday routine context of gastrointestinal diseases in the 'real world' is far from being proportional to the amount of scientific knowledge built up in basic science.

Different explanations can be given for this paradox. The increasing amount of clinical, laboratory, and diagnostic imaging information data requires more and more specific tools able to gather and recompose this information, and these tools are not easily available today as the traditional statistical reductionistic approach tends to 'see' things individually, to simplify, and to look at one single element at a time.

The increasing complexity of clinical data requires the use of mathematical models that are able to capture the key properties of the entire ensemble, including the linkages and hubs. The advancement of knowledge and the progress of understanding the nature of bodily rhythms and processes have shown that complexity and nonlinearity are ubiquitous in living organisms. These rhythms arise from stochastic, nonlinear biological mechanisms interacting with fluctuating environments. We need, for this reason, a special kind of mathematics that has, historically, remained east away from the medical context.

In simple words, we have a problem of quantity and quality of medical information, which can be more appropriately addressed by the use of new computational tools such as ANNs.

What are artificial neural networks?

ANNs are artificial adaptive systems that are inspired by the functioning processes of the human brain [1]. They are systems that are able to modify their internal structure in relation to a function objective. They are particularly suited for solving problems of the nonlinear type, being able to reconstruct the fuzzy rules that govern the optimal solution for these problems.

The base elements of the ANN are the nodes, also called processing elements (PE), and the connections. Each node has its own input, from which it receives communications from other nodes and/or from the environment and its own output, from which it communicates with other nodes or with the environment. Finally, each node has a function *f* through which it transforms its own global input into output (Fig. 1). Each connection is characterized by the strength with which pairs of nodes are excited or inhibited. Positive values indicate excitatory connections, the negative ones inhibitory connections [2,3]. The connections between the nodes can modify themselves

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A Review of Deep Machine Learning

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Keywords: Deep learning, Deep belief networks, feature learning, unsupervised learning, Boltzmann Machine, neural nets

Abstract. The rapid increase of information and accessibility in recent years has activated a paradigm shift in algorithm design for artificial intelligence. Recently, Deep Learning (a surrogate of Machine Learning) have won several contests in pattern recognition and machine learning. This review comprehensively summarises relevant studies, much of it from prior state-of-the-art techniques. This paper also discusses the motivations and principles regarding learning algorithms for deep architectures.

1. Introduction

Deep learning (deep structured learning, hierarchical learning or deep machine learning) is a branch of machine learning based on a set of algorithms that attempt to model high-level abstractions in data by using multiple processing layers with complex structures, or otherwise composed of multiple non-linear transformations [1-6]. Deep learning is part of a broader family of machine learning methods based on learning representations of data. An observation (e.g., an image) can be represented in many ways such as a vector of intensity values per pixel, or in a more abstract way as a set of edges, regions of particular shape, etc. Some representations make it easier to learn tasks (e.g., face recognition or facial expression recognition [7]) from examples. One of the potentials of deep learning is replacing handcrafted features with efficient algorithms for unsupervised or semi-supervised feature learning and hierarchical feature extraction [8, 9].

Studies in this area attempts to make better representations and create models to learn these representations from large-scale unlabeled data. Some of the representations are inspired by advances in neuroscience and are loosely based on interpretation of information processing and communication patterns in a nervous system, such as neural coding which attempts to define a relationship between various stimuli and associated neuronal responses in the brain [10].

Various deep learning architectures such as deep neural networks, convolutional deep neural networks, deep belief networks and recurrent neural networks have been applied to fields like computer vision, automatic speech recognition, natural language processing, audio recognition and bioinformatics where they have been shown to produce state-of-the-art results on various tasks. Alternatively, *deep learning* has been characterized as a buzzword, or a rebranding of neural networks [11, 12]. Deep learning could be characterized as a class of machine learning algorithms that Use a cascade of many layers of nonlinear processing units for feature extraction and transformation. Each successive layer uses the output from the previous layer as input. The algorithms may be supervised or unsupervised and applications include pattern analysis (unsupervised) and classification (supervised).

Are based on the (unsupervised) learning of multiple levels of features or representations of the data. Higher level features are derived from lower level features to form a hierarchical representation. Are part of the broader machine learning field of learning representations of data.

Learn multiple levels of representations that correspond to different levels of abstraction; the levels form a hierarchy of concepts [1].

Robotics and Artificial Intelligence

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ABSTRACT

Artificial intelligence and robotics are very recent technologies and risks for our world. They are developing their capacity dramatically and shifting their origins of developing intention to other dimensions. When humans see the past histories of AI and robotics, human beings can examine and understand the objectives and intentions of them which to make life easy and assist human beings within different circumstances and situations. However, currently and in the near future, due to changing the attitude of robotic and AI inventors and experts as well as based on the AI nature that their capacity of environmental acquisition and adaptation, they may become predators and put creatures at risk. They may also inherit the full nature of creatures. Thus, finally they will create their new universe or the destiny of our universe will be in danger.

KEYWORDS

AI, Destiny of Universe, Intelligence, Robotics

1. INTRODUCTION

Artificial intelligence describes the work processes of machines that would require intelligence if performed by humans (Wisskirchen et al., 2017). The term 'artificial intelligence' thus means 'investigating intelligent problem-solving behavior and creating intelligent computer systems.

There are two kinds of artificial intelligence:

- **Weak Artificial Intelligence:** the computer is merely an instrument for investigating cognitive processes – the computer simulates intelligence.
- **Strong Artificial Intelligence:** The processes in the computer are intellectual, self-learning processes. Computers can 'understand' by means of the right software/programming and are able to optimize their own behavior on the basis of their former behavior and their experience. 4 This includes automatic networking with other machines, which leads to a dramatic scaling effect.

According to the Robot Institute of America (1979) a robot is: "A reprogram able, multi-functional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks" (Bansal et al., 2017). A more inspiring definition can be found in Webster. According to Webster a Robot is: "An automatic device that performs functions normally ascribed to humans or a machine in the form of a human." A robot can be defined as a programmable, self-controlled device consisting of electronic, electrical, or mechanical units. More generally, it is a machine that functions in place of a living agent. Robots are especially desirable for certain work functions because, unlike humans, they never get tired; they can endure physical conditions that are uncomfortable or even dangerous; they can operate in airless conditions; they do not get bored by repetition; and they cannot be distracted from the task at hand.

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