Applications of Artificial Intelligence in Real World

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***Abstract*— Artificial intelligence (AI) is one of the revolutions in the world of information technology which proposes lots of applications that shapes our way of living. This paper aims to report the latest advances in every aspect of artificial intelligence technology, including data mining, machine learning, evolutionary computation, neural network, computer vision and fuzzy logic and hence we are going to study different applications of AI because of this there are so many complicated works become easy and convenient.**

***Keywords*— Artificial intelligence (AI) Electromyography (EMG), Intelligent Transportation Systems (ITS).**

I. INTRODUCTION

Artificial intelligence (AI) is the intelligence exhibit in machinery, equipment or software. It is an academic field of study which studies the goal of creating brainpower and intelligence. Lots of AI researchers and textbooks define that an AI is the study and designing of intelligence agents, where an intelligence agent is a system that perceives its environment and do things that maximize its chances of success. Research on AI is highly technical and specific, and is intensely divided into sub parts that often are not able to communicate with each other. Some of the division is due to societal and educational factors: sub parts have grown up around particular institutions and the work of each and every researcher. AI research is also divided by several technical issues. Some sub parts focus on the solution of some specific problems. Others focus on one of several possible approaches or towards the accomplishment of particular applications.

The central goal of AI research includes reasoning, learning, planning, natural language processing, perception, knowledge and the ability to move and manipulate objects. Now day's popular approaches include computational intelligence, statistical techniques and traditional symbolic AI. There are a big number of tools used in AI, including searching of versions and mathematical optimization, methods based on probability and economics, logic and many others. The AI field is interdisciplinary, in which a lots of professions and sciences come together, including mathematics, computer science, psychology, linguistics, philosophy and neuroscience, as well as other specific fields such as artificial psychology.

II. RELATED WORK

In [1] Sang-Hui Park and Seok-Pil Lee illustrate a method to identify motion commands for control of a prosthetic arm by evidence accumulation based on artificial intelligence with multiple parameters known as an electromyography (EMG) pattern recognition method. The integral absolute value, variance, autoregressive (AR) model coefficients, linear cepstrum coefficients, and adaptive cepstrum vector are extracted as feature parameters from several time segments of EMG signals. The evidence accumulation procedure using the distances measured with reference parameters perform pattern recognition. A fuzzy mapping function is designed to transform the distances for the application of the evidence accumulation method. Results are presented to support the feasibility of the suggested approach for EMG pattern recognition.

In [2] Massimo Bertozzi, Alberto Broggi, Massimo Cellario, Alessandra Fascioli, Paolo Lombardi, and Marco Porta explain that in last few decades witnessed the beginning and development of a new sensibility to transportation efficiency. In particular, the need for capable and enhanced people and goods mobility pushed researchers to address the problem of intelligent transportation systems. This paper surveys the most advanced approaches to the (partial) customization of road following task, using on-board systems based on artificial vision. The functionalities of lane detection, obstacle detection and pedestrian detection are described and classified, and their possible application on future road vehicles is discussed.

In [3] Raj Reddy explains that over the last 50 years, there has been broad research into intelligent systems and robotics. Although much of the research has targeted precise technical problems, advances in these areas have led to systems and solutions that will profoundly impact society. Underlying most of the advances are the unprecedented exponential improvement of information technology. Computer scientists expect the exponential growth of memory and bandwidth to continue for the next 10 to 20 years, leading to terabyte disks and terabytes-per second bandwidth at a cost of pennies per day. The question is: what will we do with all this power? How will it affect the way we live and work? Many things will hardly change our social systems, the food we eat, the clothes we wear, our mating rituals, and so forth. Others, such as how we learn, work, and interact with others, and the quality and delivery of healthcare, will change profoundly. Here he presents several examples of using intelligent technologies in the service of humanity. In particular, he briefly discusses the areas of robotics, speech recognition, computer vision, human-computer interaction, natural language processing, and artificial intelligence. he also discuss current and potential applications of these

technologies that will benefit humanity—particularly the elderly, poor, sick, and illiterate.

In [4] Hsinchun Chen and Fei-Yue Wang describe, the tragic events of 11 September 2001, and the subsequent anthrax letter contaminations had drastic effects on many aspects of US society. Terrorism became the most significant threat to national security because of its real and potential damage to our infrastructure, economy, and people. In response to this challenge, federal authorities began actively implementing comprehensive strategies and measures to achieve three homeland security objectives:

- Prevent future terrorist attacks,
- Reduce the nation's vulnerability, and
- Minimize the damage and recovery from attacks that occur.

In [5] Daniel B. Neill explains the US healthcare system faces many challenges, including skyrocketing costs, high rates of drug-resistant and hospital-acquired infections, and failures of care delivery leading to preventable adverse health events. Overtreatment, poor execution of care and failure to adopt best practices for preventive care and patient safety has huge and directly measurable impacts on both healthcare costs and patient outcomes. On the other hand, both the increasing availability of electronic health data and the ongoing development of methodological approaches to analyze these data suggest the potential for the use of artificial intelligence and machine learning methods to improve the quality and lower the cost of patient care.

In [6] Yolanda Gil, Ewa Deelman, Jim Blythe, Carl Kesselman, Hongsuda says Grid computing is emerging as key enabling infrastructure for science. A key challenge for distributed computation over the Grid is the synthesis on-demand of end-to-end scientific applications of unprecedented scale that draw from pools of specialized scientific components to derive elaborate new results. In this paper, they outline the technical issues that need to be addressed in order to meet this challenge, including usability, robustness, and scale. They describe Pegasus, a system to generate executable grid workflows given a high-level specification of desired results. Pegasus uses Artificial Intelligence planning techniques to compose valid end-to-end workflows, and has been used in several scientific applications. they also outline our design for a more distributed and knowledge-rich architecture easy way to comply with the journal paper formatting requirements is to use this document as a template and simply type your text into it.

III. APPLICATIONS

Electromyographic (EMG) Pattern Recognition

Using the Electromyography (EMG) technique, evaluation and recording of electrical activity produced by skeletal muscles has been performed. In EMG technique an instrument used called an electromyography, which produces a record called an electromyogram. The electrical potential which is generated by muscle cells, when these cells are neurologically or electrically activated has been detected by an electromyography. The signals can be analyzed to detect medical abnormality, activation level, or recruitment order or to analyze the biomechanics of human or animal movement.

Road Vehicles

In recent year the problems concerning traffic mobility, safety, and energy consumption have become more serious in most developed countries. The activities to solve these problems have triggered the interest toward new fields of research and application, such as automatic vehicle driving, in which new techniques are investigated for the entire or partial automation of driving tasks. A recently defined comprehensive and integrated system approach, referred to as Intelligent Transportation Systems (ITS), links the vehicle, the infrastructure, and the driver to make it possible to achieve more mobile and safer traffic conditions by using state-of-the-art electronic communication and computer-controlled technology.

In fact, ITS technologies may provide vehicles with different types and levels of "intelligence" to complement the driver. Information systems expand the driver's knowledge of routes and locations. Warning systems, such as collision avoidance technologies, enhance the driver's ability to sense the surrounding environment. Driver assistance and automation technologies simulate the driver's sensor-motor system to operate a vehicle temporarily during emergencies or for prolonged periods.

Robotics for Elder Care

As the life expectancy of the world's population increases, soon, the over age group will likely have minor disabilities impacting its quality of life, which we can group into three broad categories: sensory, cognitive, and motor. Fortunately, robotic and intelligent systems can remedy these disabilities. Robots are also paving the way for many rescue missions, traveling through smoldering ruins to places rescuers can't reach.

Natural Language Processing

Natural language processing provides tools for indexing and retrieval, translation, summarization, Document clustering, and topic tracking, among others.14 taken together, Such tools will be essential for successfully Using the vast amount of information being added to digital libraries.

Speech Recognition: The Reading Tutor

In the world over a billion of people can't read or write and it's likely that as lots of two billion are functionally uneducated means they can't able to understand the meaning of the sentences they read. Advances in speech-recognition and synthesis technologies provide an opportunity to create a computer-based solution to illiteracy. The solution involves an automated reading tutor that displays stories on a computer screen and listens to children read aloud using speech-recognition technology.

Robotics for Rescue

Natural and manmade disasters lead to unique requirements for effective collaboration of human and robotic systems. Often disaster locations are too dangerous for human exploration or are unreachable. Additional constraints such as the availability of rescuers, extreme temperatures, and hurricane-force winds result in significant delays before human rescuers can start searching for victims. In most cases, rescuers need to retrieve victims within 48 hours to enhance survival rates.

Artificial Intelligence for Homeland Security

State and local law enforcement agencies, likewise, have become more vigilant about criminal activities that harm public safety and threaten national security. Researchers in the natural, computational, and social sciences as well as engineering, medicine, and many other fields have responded to the government's call for science and technology to help enhance its capabilities in fighting the new counterterrorism war. Information technology is cited as an indispensable part in making our nation safer.2 IT can support intelligence and knowledge discovery by collecting, processing, analyzing, and developing applications for terrorism- and crime-related data.3 Federal, state, and local authorities can use the results to make timely decisions, select effective strategies and tactics, and allocate appropriate resources to detect, prevent, and respond to future attacks.

Using Artificial Intelligence to Improve Hospital Inpatient Care

The US healthcare system faces many challenges,
including skyrocketing costs, high rates of drug-resistant and hospital-acquired infections, and failures of care delivery leading to preventable adverse health events. Overtreatment, poor execution of care, and failure to adopt best practices for preventive care and patient safety have huge and directly measurable impacts on both healthcare costs and patient outcomes.1,2 On the other hand, both the increasing availability of electronic health data and the ongoing development of methodological approaches to analyze these data suggest the potential for the use of artificial intelligence and machine learning methods to improve the quality and lower the cost of patient care.

Electronic health records (EHR) have become more available due to the guidelines of the Health Information Technology for Economic and Clinical Health (HITECH) Act, which offers incentives to healthcare providers to adopt EHR to advance clinical processes and improve outcomes. Meanwhile, health insurance providers and nonprofits such as the Health Care Cost Institute have committed to providing health insurance claims data with the goal of reducing costs while improving the quality and availability of coverage. Such sources provide detailed, time-stamped, and highly multivariate data for a large patient population, enabling the use of AI techniques to connect care practices and outcomes. However, the data's size and complexity—as well as the variability in content and format between different providers, data types, and care settings—create huge challenges. Additionally, the potential danger of the violation of patients' privacy has signifi cant moral and legal ramifi cations, requiring extreme care in the use of health data.

Grid Computing

Grid computing is the collection of computer resources from multiple locations to reach a common goal. The grid can be thought of as a distributed system with non-interactive workloads that involve a large number of files. Grid computing is distinguished from conventional high performance computing systems such as cluster computing in that grid computers have each node set to perform a different task/application.

Our focus to date has been workflow composition as an enabling technology that can publish components and compose them together into an end-to-end workflow of jobs to be executed on the grid. Our approach to this problem is to use Artificial Intelligence planning techniques, where the alternative possible combinations of components are formulated in a search space with heuristics that represent the complex tradeoffs that arise in Grids.

Artificial Neural Network (ANN)

ANN is a computational structure designed to mimic biological neural networks. It consists of computational units called neurons, which are connected by means of weighted interconnections. The weight of an interconnection is a number that expresses the strength of the associated interconnection. The main characteristic of ANNs is their ability to learn. The learning process is achieved by adjusting the weights of the interconnections according to some applied learning algorithms. Therefore, the basic attributes of ANNs can be classified into Architectural attributes and Neurodynamic attributes. The architectural attributes define the network structure, i.e., number and topology of neurons and their interconnectivity. The neurodynamc attributes define the functionality of the ANN.

But, despite of successful implementation of ANN in solving various problems, if we consider it from the perspective of artificial intelligence it lacks one very important aspect of human brain. The aspect is, after finishing the learning a neural network gives the same output to same input without referencing the current context unlike human brain that takes decision according to the problem as well as according to the context (here context means emotional state) the problem arose in. If we talk about human brain, it takes the decision depending upon the current conditions (sensed by five senses), experience and state of mind (something related with emotions). While, if we talk about ANN, it takes decision on the basis of current conditions (as in human brain) and training quality (somewhat similar to experience) only. It does not take emotions into consideration while taking a decision. Think about a human being without emotions.

IV. CONCLUSIONS

Artificial Intelligence and the technology are one side of the life that always interest and surprise us with the new ideas, topics, innovations, products etc. The innovations in artificial intelligence can make easy and effortless life of people in real world. At the end, we've been in this research through the AI and its applications as Electromyography, People Care, Robotics, Homeland security, Artificial Neural Network, Grid Computing and so on. In future the application can also be more advanced and can cover lots of other field also.

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