

# Applications of Artificial Intelligence in Different Areas

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**Abstract:** In the future, intelligent machines will replace or enhance human capabilities in many areas. Artificial intelligence is the intelligence exhibited by machines or software. It is the subfield of computer science. Artificial Intelligence is becoming a popular field in computer science as it has enhanced the human life in many areas. Artificial intelligence in the last two decades has greatly improved performance of the manufacturing and service systems. Study in the area of artificial intelligence has given rise to the rapidly growing technology known as expert system. Application areas of Artificial Intelligence is having a huge impact on various fields of life as expert system is widely used these days to solve the complex problems in various areas as science, engineering, business, medicine, weather forecasting. The areas employing the technology of Artificial Intelligence have seen an increase in the quality and efficiency. This paper gives an overview of this technology and the application areas of this technology. This paper will also explore the current use of Artificial Intelligence technologies in the PSS design to damp the power system oscillations caused by interruptions, in Network Intrusion for protecting computer and communication networks from intruders, in the medical area medicine, to improve hospital inpatient care, for medical image classification, in the accounting databases to mitigate the problems of it and in the computer games.

**Key Words:** - *Artificial Intelligence, Intrusion Detection Systems, Neural Networks (computer), Power System Stabilizer.*

## I. INTRODUCTION

It is claimed that artificial intelligence is playing an increasing role in the research of management science and operational research areas. Intelligence is commonly considered as the ability to collect knowledge and reason about knowledge to solve complex problems. In the near Future intelligent machines will replace human capabilities in many areas. Artificial intelligence is the study and developments of intelligent machines and software that can reason, learn, gather knowledge, communicate, manipulate and perceive the objects. John McCarthy coined the term in 1956 as branch of computer science concerned with making computers behave like humans. It is the study of the computation that makes it possible to perceive reason and act. Artificial intelligence is different from psychology because it emphasis on computation and is different from computer science because of its emphasis on perception, reasoning and action. It makes machines smarter and more useful. It works with the help of artificial neurons (artificial neural network) and scientific theorems (if then statements and logics). AI technologies have matured to the point in offering real practical benefits in many of their applications. Major Artificial Intelligence areas are

Expert Systems, Natural Language Processing, Speech Understanding, Robotics and Sensory Systems, Computer Vision and Scene Recognition, Intelligent Computer Aided Instruction, Neural Computing. From these Expert System is a rapidly growing technology which is having a huge impact on various fields of life. The various techniques applied in artificial intelligence are Neural Network, Fuzzy Logic, Evolutionary Computing, and Hybrid Artificial Intelligence.

## II. AREAS OF ARTIFICIAL INTELLIGENCE

A. Language understanding: The ability to "understand" and respond to the natural language. To translate from spoken language to a written form and to translate from one natural language to another natural language.

- Speech Understanding
- Semantic Information Processing (Computational Linguistics)
- Question Answering
- Information Retrieval
- Language Translation

B. Learning and adaptive systems: The ability to adapt behavior bagged on previous experience, and to develop general rules concerning the world based on such experience.

- Cybernetics
- Concept Formation

C. Problem solving: Ability to formulate a problem in a suitable representation, to plan for its solution and to know when new information is needed and how to obtain it.

- Inference (Resolution-Based Theorem Proving, Plausible Inference and Inductive Inference)
- Interactive Problem Solving
- Automatic Program Writing
- Heuristic Search

D. Perception (visual): The ability to analyze a sensed scene by relating it to an internal model which represents the perceiving organism's "knowledge of the world." The result of this analysis is a structured set of relationships between entities in the scene.

- Pattern Recognition
- Scene Analysis

E. Modeling: The ability to develop an internal representation and set of transformation rules which can be used to predict the behavior and relationship between some set of real-world objects or entities.

- The Representation Problem for Problem Solving Systems.
- Modelling Natural Systems (Economic, Sociological, Ecological, Biological etc.)
- Hobot World Modeling (Perceptual and Functional Representations)

F. Robots: A combination of most or all of the above abilities with the ability to move over terrain and manipulate objects.

- Exploration
- Transportation/Navigation
- Industrial Automation (e.g., Process Control, Assembly Tasks, Executive Tasks)
- Security

- Other (Agriculture, Fishing, Mining, Sanitation, Construction, etc.)
- Military
- Household

G. Games: The ability to accept a formal set of rules for games such as Chess, Go, Kalah, Checkers, etc., and to translate these rules into a representation or structure which allows problem-solving and learning abilities to be used in reaching an adequate level of performance.

- Particular Games (Chess, Go, Bridge, etc.)

### III. ARTIFICIAL INTELLIGENCE APPLICATIONS IN MACHINE LEARNING

Smart production systems require innovative solutions to increase the quality and sustainability of manufacturing activities while reducing costs. In this context, artificial intelligence (AI)-driven technologies, leveraged by. Key Enabling Technologies (e.g., Internet of Thing, advanced embedded systems, cloud computing, big data, cognitive systems, virtual and augmented reality), are ready to generate new industrial paradigms. In this regard, in the 1990s, defined artificial intelligence as “artificial intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs”. Generally, the term “AI” is used when a machine simulates functions that humans associate with other human minds, such as learning and problem solving.

On a very broad account, the areas of artificial intelligence are classified into 16 categories. These are reasoning, programming, artificial life, belief revision, data mining, distributed AI, expert systems, genetic algorithms, systems, knowledge representation, machine learning, natural language understanding, neural networks, theorem proving, constraint satisfaction, and theory of computation [9–. Inthe21stcentury, AI has become an important area of research in all fields: Engineering, science, education, medicine, business, accounting, finance, marketing, economics, stock market, and law, among others [12–18]. The range of AI has grown enormously since the intelligence of machines with machine learning capabilities Shas created profound impacts on business, governments, and society [19]. They also influence the larger trends in global sustainability. Artificial intelligence can be useful to solve critical issue for

sustainable manufacturing (e.g., optimization of energy resources, logistics, supply chain management, waste management, etc.). In this context, in smart production, there is a trend to incorporate AI into green manufacturing processes for stricter environmental policies [20]. In fact, as said in March 2019 by Hendrik Fink, head of Sustainability Services at Price water house Coopers, “If we properly incorporate artificial intelligence, we can achieve a revolution with regard to sustainability. AI will be the driving force of the fourth industrial revolution” [21]. Thus, sub fields of AI, such as machine learning, natural language processing, image processing, and data mining, have also become an important topic for today’s tech giants. The subject of AI generates considerable interest in the scientific community, by virtue of the continuous evolution of the technologies available today.

#### IV. METHODOLOGY

The methodological approach used mixes bibliometric, content analysis, and social network techniques. In this study, a state-of-the-art research was conducted through the SCOPUS and Web of Science databases. For the publication time span, the time from 1999 to 2019 was considered with the intent to understand how the level of attention towards the topic has changed before and after the introduction of Industry 4.0. The research methodology chosen for this study was a systematic literature review [25]. The main phases of the study were as follows:

Phase 1: Research and Classification. The present phase was divided into three steps:

Step 1: Identification;

Step 2: Screening; and

Step 3: Inclusion. In phase 1, bibliometric data was collected (step 1).

Then, a screening of the overall result was carried out to identify which documents can be taken into consideration, in line with the research are as deemed interesting and relevant (step 2). At the end of this step, the last step (step 3) aimed to select the documents to be analyzed in detail

Phase 2: Analysis. Once phase 1 was completed, the next phase was phase 2, which was the analysis of the results. The approach used for the bibliometric analysis included:

- The use of indicators for the parameters studied; and
- SNA (social network analysis) for the keywords.

Phase 3: Discussion. At the end of the second phase, a third and final one followed, where the results were discussed, and conclusions were drawn.

#### V. CONCLUSION

The fields of artificial intelligence give the ability to the machines to think analytically, using concepts. Tremendous contribution to the various areas has been made by the Artificial Intelligence techniques from the last 2 decades. Artificial Intelligence will continue to play an increasingly important role in the various fields. This paper is based on the concept of artificial intelligence, areas of artificial intelligence and the artificial intelligence techniques used in the field of Power System Stabilizers (PSS) to maintain system stability and damping of oscillation and provide high quality performance, in the Network Intrusion Detection to protect the network from intruders, in the medical area in the field of medicine, for medical image classification, in the accounting databases, and described how these AI techniques are used in computer games to solve the common problems and to provide features to the games so as to have fun. There is bright future in the analysis of Network Intrusion Detection and there is also definite future in the area of Power System Stabilizers.

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