

Utilization Of Artificial Intelligence (Ann) In Project Management Services: A Proposed Model of Application

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Abstract- Artificial Intelligence (AI) has become a prominent technology in recent years because of the growing need for automated systems that operate without human intervention. Artificial intelligence is flourishing right now, with a plethora of new models appearing in research and development phases across a range of areas, including science, economics, and engineering. Project management (PM) is a professional service that uses specific project management techniques to manage, control, and execute the planning, design, and construction of a project, from its beginning until its finale. The goal of PM is to control a project's schedule, cost, safety, and quality, this paper addresses the application of ANNs in project tasks relating to estimation of costs, risk, safety, as well as labor productivity, and optimal work environment. This review asserts that ANN was extremely effective in predicting the best potential solution. However, the accuracy of the data and the skill of the user are key factors in obtaining the precise solution. This paper serves as a starting point for scholars interested in project leadership and management in the exciting realm of artificial intelligence. This article addressed artificial intelligence-based systems, from their definition through their uses. Based on these studies, a three-stage model of input, process, and output was created. Three stages model of the AI model in the intensive unit was completed. Input included Cost Data, Evaluation data, productivity, Safety data). Output (Decision Making, Solutions, Risk Stratification, Prognosis, Management). The process included artificial intelligence (artificial neural network, machine learning, deep learning, and expert systems). The output, which was decision-making, included diagnosis, Solutions, risk stratification, prognosis, and management. Efforts of the management system. The aim of this study in project management is to keep a project's schedule, cost, safety, and quality under control as a result, the artificial neural network method is particularly effective in this scenario because it employs discrete and insufficient data to arrive at the best feasible solution. This research examines the use of artificial neural networks (ANNs) in construction activities related to cost, risk, and safety, as well as labor productivity and the optimal work environment. According to this study, ANN was extremely effective in predicting the best probable option.

Key words : Artificial Intelligence, Model of AI Application, Project Management, Canadian Enterprises.

INTRODUCTION

AI is made of a variety of ideas and methodologies used in IoT networks. Fuzzy logic and neural networks are two of the most important approaches used in artificial intelligence to make the system more trustworthy. AI is used to prevent highly clever personnel by utilizing seasoned and super systems based on supporting and training data. Through taught systems, AI enables efficient Machine-Machine communication. AI technology enables computers to become intelligent using educated data algorithms and software, enabling the machine to make decisions on its own. AI technology consists of a variety of techniques such as natural language processing and reasoning principles that are used to make systems smarter. AI is a branch of study that involves computers utilizing technology to provide the best answer to crucial real-time problems in a manner comparable to human beings. The process of presented intelligence is concerned with human qualities like as thinking and intellect, as well as the application of intelligence to specific situations to create an intelligent machine. AI technology is inextricably related to not just computer science principles, but also to psychology, philosophy, illustrates many forms of artificial intelligence technologies and their associated applications. An interactive AI is mostly utilized on websites across a variety of fields, for example, chatbots and intelligent personal assistants. When a user makes an automated request, such as an inquiry for company/organization data, the interactive AI technology supports the user. Functional AI plays a significant role in IoT systems and robotics. Robots/Internet of Things applications give the optimal solution based on functional AI. Analytic AI technology makes use of sentiment analysis and supplier risk assessment techniques. The analytical AI supplies the computer with emotions, such as various emotions for various situations. Text AI presented efficient AI by utilizing text recognition and speech-to-text conversion algorithms [14]. The trustworthy text AI is mostly used to convert speech to text, such as in voice recognized robots. Visual AI presents virtual reality/augmented reality using computer vision and augmented reality. Visual AI technology is mostly utilized in visualization-based applications. The AI demonstrates its influence across several areas and then offers a dependable system.

The researchers do experiments on common use datasets to test effectiveness of methods they developed. In this study, Z-Alizadeh Sani datasets in the University of California at Irvine (UCI) ML repository were used [9],[10]. In this study, after the data in the raw data set were normalized by minimum-maximum normalization techniques, classification was done by machine learning classification methods. Different models have been created using decision tree (DT), random forest (RF), support vector machines (SVM), k-nearest neighborhood (k-NN), multi-layer sensor (MLP) algorithms. Classification performances of these models are compared

In section 2, a literature research summarizing the studies in the field of CAD related machine learning is given. In section 3, the materials and methods of this study are mentioned and given in detail. In section 4, which is the application phase of the study, experimental results are presented. there are suggestions for evaluating the results obtained in the study and to guide future scientific studies. The objectives of this studies [17].

- 1) TO provide a proposed model application for the developing performance of project management methodology services by utilization artificial intelligence.
- 2) TO determine a starting point (Gap) for scholars interested in utilization artificial intelligence (ANN) in project management services in terms OF developing performance by proposed model application of this study

- 3) TO determine the direction for the use of artificial intelligence services in project management for the future

2. Artificial Intelligence

AI is the dominating study topic now due to its critical role in automating and smartening several fields. Most prominent AI robots are prepared and automated through controlled learning. The preparation of learning requirements emphasized information that was filtered from raw data to create learnable machines, and therefore clever and smart computers. AI demonstrates a self-adaptive computer capable of self-management, self-healing, self-diagnosis, and self-configuration. If information security continues to be a key problem in the future, AI offers a viable option for enhancing cyber security through the measurement of various assaults. AI allows the natural resolution of problems associated with various network threats through the creation of appropriate countermeasures. [12],[13],[14] studied and presented a significant method to cyber assault based on artificial intelligence. According to the Intelligence and National Security Alliance (INSA), a cyber-attack is a danger posed by a series of suspicious network, system, or information-related activities. Countering cyber-attacks is mostly made of two approaches: utilizing AI technologies and adopting a military intelligence mentality, therefore analyzing new issues identified by the expert community. The findings are produced via the use of intelligent approaches, which result in an increase in the security level of computer networks. The practicality of AI methods is evaluated, and it is concluded that even cyber intelligent approaches are incapable of resolving the issue. While selection and experimentation systems.

Artificial intelligence is defined as "a collection of theories and approaches for developing machines capable of simulating intelligence" (Krishnamoorthy, 2018). Computers or programmed capable of doing tasks normally associated with human intelligence and boosted by technology, specifically:

Reasoning ability

- Capability of processing large amounts of data
- Capacity to identify patterns and patterns that a person cannot detect
- Capacity for comprehending and analyzing these models
- Capacity for human interaction
- Gradual learning capacity and it is constantly improving its performance.

2.1. Neural Networks (Ann)

Engineering term, according to Garrett (1994). the artificial neural network (ANN) as "a computational process capable of acquiring, from one multivariate, represent, and compute mapping given a set of data, from one information space to another displaying that mapping." Artificial neural networking (ANN) is a type of artificial neural network that the method of attempting to imitate human behavior A computer system's brain. Data, as we all know in the brain, Neurons are responsible for data transport and processing. In One neuron unit in an artificial neural networking system One microprocessor unit has been substituted [17]. The first version the purpose of the ANN approach was to solve difficulties in the field of artificial intelligence. in the same way a human brain would. Pattern recognition with ANNs is quite successful. In the realm of soft computing, a categorization tool is used [18]. It serves as a learning tool that can be educated using the data available a structured input and output ANNs are extremely useful.

Adaptable to complex issues, with discrete solutions and a lack of data, making it impossible to solve by hand traditional ways the most widely used network type.

2.2. Machine Learning

It is a topic that is being discussed more and more in the field of artificial intelligence. This is still referred to as "statistical learning." The computer world, and specifically the field of m, refers to a process of development, analysis, and implementation. execution that results in the formation of structured processes. Simply described, it is a type of programmed that enables a computer or machine to execute automated learning to perform a variety of extremely complex activities. The goal is to enable the machine or computer to solve complex issues by digesting an enormous amount of data. This enables the analysis and visualization of correlations between two or more given conditions, as well as the prediction of their many ramifications [17].

2.3. Deep Learning

The term "Deep Learning" refers to a subfield of Machine Learning. It is a subset of machine learning-based artificial intelligence. To grasp the concept of Deep Learning, it's necessary to first grasp the concept of machine learning. Typically, deep learning occurs in two stages. The first step is to estimate a model using data, referred to as observations, that are available and in finite quantities throughout the system's design phase. [18] Model estimate entails resolving a practical problem, such as translating a speech, estimating a probability density, identifying the presence of a cat in a photograph, or operating an autonomous car. This phase is referred to as "learning" or "training." It occurs prior to the model being used in practice. The second step relates to the production setting: the model is determined; additional data can then be submitted to reach the desired output. In practice, certain systems can continue to learn after they are put into production, if they have a mechanism for measuring the quality of the outcomes produced.

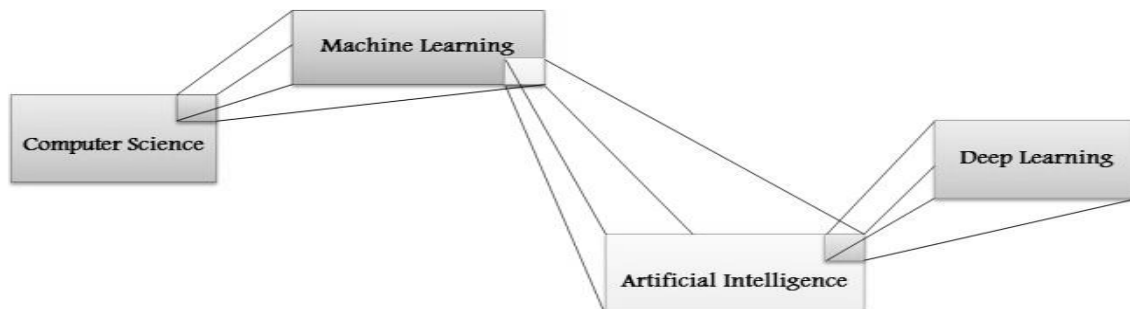


Fig. 1. Deep Learning's place in the world of computing

Deep learning has achieved remarkable outcomes in a variety of fields:

- 1) Image, text, voice, and facial recognition
- 2) Segmentation in the profession, comprehension of a scene, a text...
- 3) Image, text, speech, artwork, and human face generation
- 4) Self-driving automobile, self-driving robot.
- 5) Road monitoring, pedestrian.

We might still provide many more unique examples, but what must be noted is that deep learning enables a machine to learn a precise task through observation of a vast number of examples.

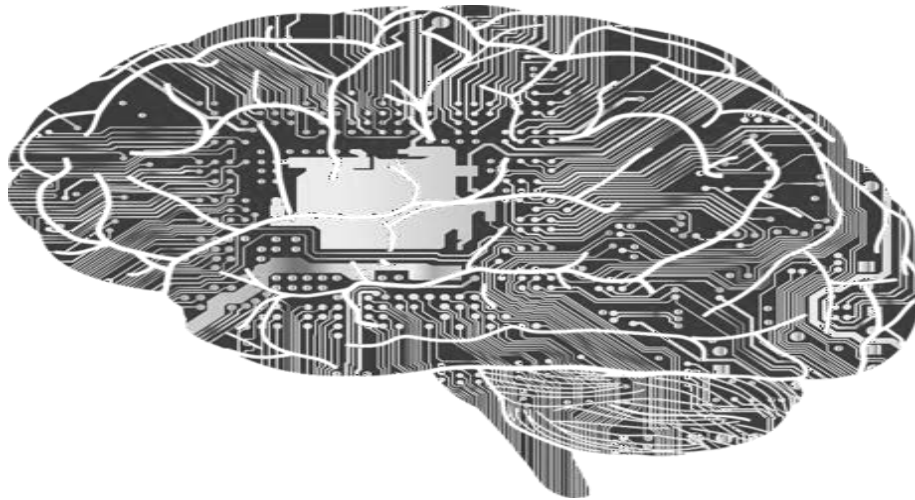


Fig 2: Artificial Intelligence (ANN) (Deep Learning)

Despite its strength, Pure Machine Learning has several shortcomings. The first is that a human expert must sort the data to exclude any irrelevant information that could clog the system or penalize it. For instance, if you believe that the owner's age has no effect on the price of the apartment, there is no use in providing this information to the algorithm since if you give the system too much information, it may perceive relationships where none exist. Then comes the second question (which follows the first): how do you recognize a face? You could feed the algorithm a wealth of information about the subject (gap between the eyes, forehead height, etc...), but it would be less adaptive and precise as a result. Thus, in 2010, the concept of Deep Learning was born: to take inspiration from how our brain functions (through networks of neurons) to advance the analysis and learn how to extract the data itself! Thus, deep learning is based on what are known as deep artificial neural networks, which are composed of a collection of neurons (which are small calculators that execute mathematical operations) that transmit themselves numbers in response to their connections, all the way up to output neurons [18]. Deep Learning is capable of recognizing faces, synthesizing words, and even driving an autonomous automobile because of its architecture

2.4. Artificial Intelligence is comprised of Machine Learning and Deep Learning.

Artificial Intelligence as we currently understand it is a weak form of AI, in contrast to Strong Artificial Intelligence, which does not yet exist [18] Machines are now capable of reproducing human behavior, but without consciousness. Later on, their powers may develop to the point where they develop consciousness, sensitivity, and spirit. Contrary to popular belief, Machine Learning and Deep Learning are not Artificial Intelligences. For instance, knowledge graphs and rule engines are both examples of Artificial Intelligences, but neither Machine Learning nor Deep Learning. The term "Deep Learning" refers to a subfield of Machine Learning. Artificial Intelligence has advanced significantly in recent years because of the rise of Cloud Computing and Big Data which provide low-cost computing power and access to massive amounts of data. As a result, the machines are no longer programmed; they acquire knowledge.

Machine Learning, or machine learning, is the ability of computers to repeat behavior using a huge amount of data. When presented with a variety of instances, the algorithm learns which decision to make and builds a model. The machine can automate tasks based on the circumstances. These estimations are insufficient, and it would enough to mention the price of the apartment to estimate the price of a new flat of unreferenced area. By adopting this logic, we provide the basis for machine learning. Thus, we may develop statistical curves that approximate the data and facilitate generalization, as well as algorithms that can handle large amounts of data [18].

Machine learning is a wide field that encompasses many algorithms. Among the most well-known are:

- Linear, multivariate, polynomial, regularized, and logistic regressions: they are curves that approximate the data (see diagram above)
- The Naive Bayes algorithm: based on prior occurrences, the algorithm calculates the likelihood of a forecast (El [18]. For instance, what is the most likely price of an apartment measuring 87.6m²?
- Clustering: Using mathematics, we will organize the data into packets with the goal of keeping the data as close to each other as feasible within each packet. It is primarily used to make recommendations for films that are "near" to ones you have already viewed!
- Decision trees: we arrive at a result by answering a particular number of questions and following the branches of the tree that contain the answers (with a probability score)
- Advanced algorithms based on a variety of statistical techniques: Random Forest (a forest of voting decision trees), Gradient Boosting, Support Vector Machine...

3. PREPOSE MODEL OF APPLICATION

There stages process of input, process and output was developed, and the study results were categorized in one of the three stages; this model was based on the methods of previous studies [20].

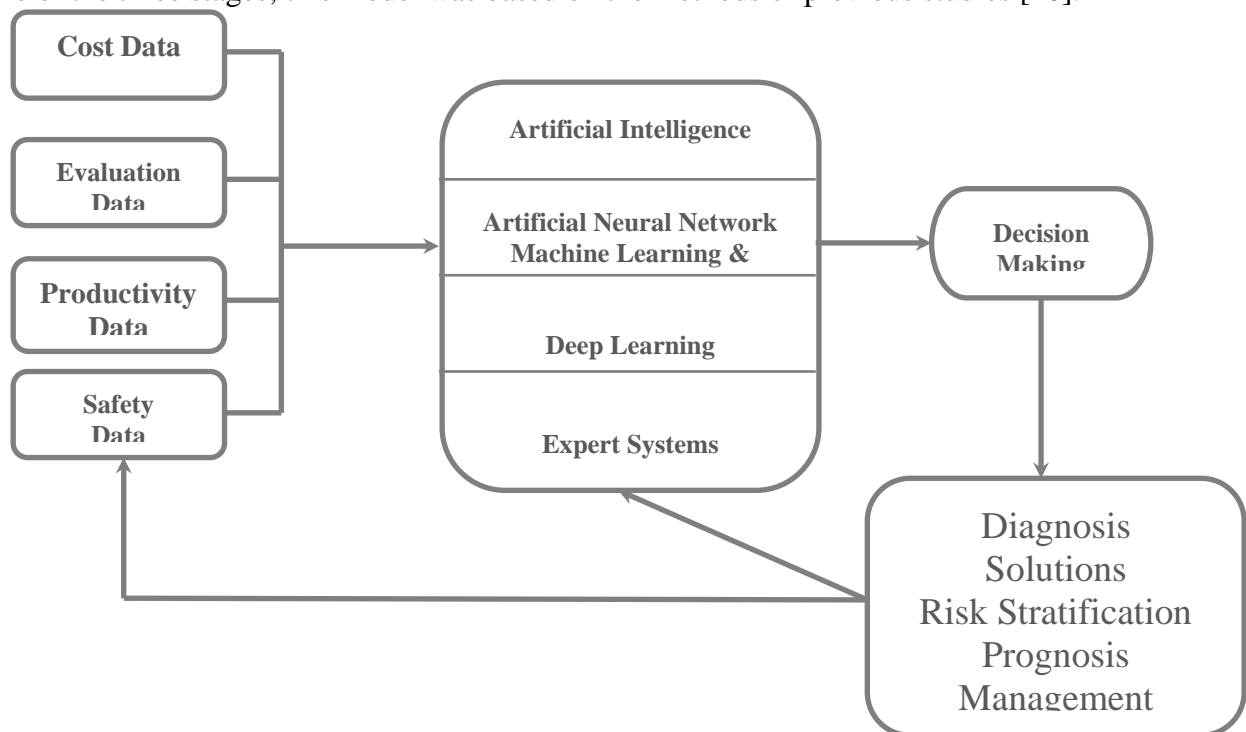


Fig 3. Model of Application

Table 1. A three-stage model of application

1) Input	<ul style="list-style-type: none"> ➤ P. Evaluation Data ➤ P. Cost Data ➤ P. Productivity data ➤ P. Safety data
2) Process	<ul style="list-style-type: none"> ➤ Artificial Intelligence ➤ Artificial Neural Network ➤ Machine Learning & Deep Learning ➤ Expert Systems
3) Output	<ul style="list-style-type: none"> ➤ Decision Making ➤ Solutions ➤ Risk Stratification ➤ Prognosis ➤ Management

intelligence, the researcher examined the offered model with them and came up with the following perspective after weighing their opinions. This study does not seek to assess the opinions of specialists or to employ analysis programs. The objective is to offer a model based on the opinions of experts in project management and artificial intelligence to improve project performance.

3.1. APPLICATION OF ARTIFICIAL INTELLIGENCE FACTORS IN PROJECT MANAGEMENT

A three-stage model of input, process and output was created. model of AI model in intensive unit was completed

A. Input (Cost Data, Evaluation data, productivity, Safety data).

1. Project Cost

Cost estimation is a critical task for project management. The accuracy of the cost estimation is critical to the quality of PROJECT management. PM costs are extremely volatile, and the volatility is caused by a variety of uncontrollable variables. The formulation of a regularization neural network and the presentation of a neural network architecture for cost estimation of projects are discussed. As an illustration, the model is used to forecast the cost of a reinforced-concrete structural unit. The new computational model is mathematically sound, which makes cost estimation more reliable and predictable over time. Additionally, the output of the regularization neural network estimation is independent of the training examples. It is independent of the neural network's architecture, the learning parameters, or the number of training iterations required.

2. Project Evaluation

To address the shortcomings of current business valuation models, a unique model, a growth value model, was developed using an income-asset hybrid method and the application of quintiles. artificial neural networks. This model is significantly strengthened by the central assumption that shareholders equity growth rates are mean reverting. This results in the discounted present value of owners' equity convergent

to a bounded value in the infinite future. The empirical findings have major implications for the property development and construction industries' business valuation. To begin, they include the fact that the company valuation models used by the two businesses are considerably distinct from those used by other industries. These two companies' enterprise valuations can be greatly overstated if the business valuation methodology for the entire industry is used. Second, they feature price-to-book value ratio curve patterns that demonstrate that the growth value model is extremely beneficial and effective in a variety of industries only when the return on equity ratio is more than zero.

3. Project Productivity

The technology forecasts projects productivity using artificial neural networks, historical data, and feedback from experienced superintendents hired by a leading general contractor. Additionally, it outlines a study conducted to ascertain the factors affecting labor productivity, a survey conducted to gather pertinent data, and the design, training, and implementation of artificial neural networks at the participating organization. Numerous alternative neural network structures were studied; the three-layered network with a fuzzy output structure was chosen as the optimal configuration. Due to the subjective nature of much of the data, it was determined that this structure gave the most suited model. Also included is a quick summary of the computer implementations and the general experience with system development. When compared to an existing statistical model produced by the same contractor, it was discovered that the strategy improved the quality of the estimations obtained.

4. Project Safety

It is critical to implement safe work practices on-site in order to limit the number of incidents. To maintain a safe working environment, is there a slip-trip classification approach based on smart ANNs that integrates a smart sensor with an ANN? It was trained to recognize slips and trips that occur because of a person walking in a workplace. It promotes proactive and collaborative efforts to prevent construction accidents by detecting the sort of near miss, such as a slip or trip, and the precise time it occurs. A triaxial accelerometer installed in a smart phone is used to measure the variance in energy released by a worker. This study is valuable to scholars since it quantifies a near miss through the use of acceleration. Additionally, it is relevant to practitioners since it gives a computerized instrument that captures every second of a near-miss occurrence. A test was conducted by collecting the three-axis acceleration

B. The process

Included artificial intelligence (artificial neural network, machine learning, deep learning, and expert systems.

C. The output,

Which was decision making included diagnosis, Solutions, risk stratification, prognosis, and management. Efforts of the management system. There are three phases, each of which is split into subcategories (Figure 1 & Tab)

4. FINDING AND DISCUSSION

Based on information from the managers, it is feasible to develop an artificial intelligence model that predicts if a project has a high risk of being managed traditionally or not. Furthermore, the development of software systems that can automatically classify the risk of projects on the part of various project managers is being explored as a method for achieving high project performance [2],[3]. Furthermore, decreasing the frequency of lab testing and the cost consequences of this is a significant problem in project management. Artificial intelligence can anticipate laboratory tests with high accuracy, as well as forecast the likely information in a project [6]. In addition, a variety of monitoring technologies have been created to keep track of the risks. Using this technique, it would be possible to identify issues before they are discovered by authorities, which would be an appealing and useful alternative. In addition, identifying hot spots and growing epicenters utilizing data mining techniques, air traffic maps, mobile phone contacts, social media data, and other available resources would be a straightforward job to complete [7],[9]. When AI can identify or workers the most vulnerable individuals based on their customized and physiological features, it has the potential to enhance [8],[10]. Besides the above, consider the function of artificial intelligence (including but not limited to machine learning, deep learning, etc.). Based on a three-stage model of input, process, and output developed for this study and aimed at improving project performance and providing more benefits to managers, workers, and other stakeholders in the Canadian enterprise, the most prominent current AI applications in projects. There are three phases, each of which is split into subcategories (Figure 1 & Table 1).

5. CONCLUSION

Artificial Intellect (AI) endows machines with the same intelligence as a human being, including the ability to learn, train, and execute. This article examined the components of AI-based systems and the many types of AI systems. The essential AI training methods are provided, and the differences between them are illustrated with examples. Finally, this study discussed the major obstacles and prospects associated with the project management of AI and other technologies. Machine learning and deep learning are extremely powerful tools that enable a variety of tasks, such as data classification, teaching a programmed from experiments, and developing an evolutionary programmed that is constantly improving. Thus, even with a small sample size and data that are subject to the subjectivity of the observer, these two tools remain relatively precise despite some limitations. Deep learning and machine learning will be generalized "in all decision-making electronics," such as cars and planes, and will enable data to be sorted without the assistance of a human expert, as the algorithm will discover its own correlations. To use facial recognition as an example, the DL algorithm will decide for itself whether to consider the difference between the eyes (between the pixels) or whether this information is insufficiently decisive in comparison to others (and this is indeed the case).

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