Introduction to the Influence and Application of Artificial Intelligence in Project Management

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Abstract
Nowadays, accuracy, speed and flexibility in making decision and the ability to predict the future have an important role, all organizations and institutions make a competitive advantage by accessing to significant information at the moment and making accurate and rapid decision. One of the bridges to reach that goal is to recognize and use artificial intelligence in organizations and institutions. Artificial intelligence is one of the sciences that has made remarkable progress in science in the past decades. It is clear that this progress isn't limited to a particular science, but also includes all the sciences, even the humanities. Artificial Intelligence (AI) is a way to intelligent computers , generally ,in fact creating the ability of human insight and understanding in machines , is one the targets of this newborn phenomenon is that there is a long distance to reach , make a machine with thought and human understanding power .
About the influence and application of artificial intelligence in project management, every construction project is associated with risks and uncertainties, These include risks related to work allocation, project costs, and construction management. Machine learning is a section of artificial intelligence that has many applications in project management. Including the first category of problems in the project process, reducing project time, monitoring of structural safety, monitoring of project safety and workforce, structural analysis and prevention of earthquake crises, concrete and soil laboratory estimates are including artificial intelligence applications in project management. In this article we will concentrate on introduction to artificial intelligence and the impact and applications of artificial intelligence in project management.

Key words: artificial intelligence, history of the artificial intelligence, project management, application

Introduction

Artificial intelligence is made of two words intelligence and artificial. Intelligence is in the sense of mind function in communicating with the environment and artificially used as an adjective and trait for intelligence. The artifact is past participant, and here being Man-made is attributed to intelligence. But it is not the exact definition of the artificial intelligence. Intelligence in artificial intelligence is so different from the concept of it in other sciences like psychology and the related senses like speech and intellect. Artificial intelligence is one of the fundamental issues of mind psychology and the plan is to build a computing machine to perform the same tasks that human natural intelligence performs, it means that the machine performs the functions that require the human intelligence. Artificial Intelligence or Machine Intelligence is the vast area of intersection and center point of meetings of many old and new sciences, knowledge and

techniques. The purpose of artificial intelligence is generally building a machine that can think. But for categorizing and defining thoughtful machines, one must define intelligence. Also we need definitions of insight and understanding, and ultimately at the end we need a criterion for measuring and evaluating machine intelligence. Despite meeting the needs of the military industry has been the most important factor in the development of artificial intelligence, now the products of this branch of science used in the medical, robotics, weather forecasting ,topography, voice recognition, speech recognition And handwriting , games and software.(Ramadan Mahmodi Chelche 1395)
In general, the existential nature of artificial intelligence is in the sense of collecting information, inducing and analyzing experience to achieve knowledge or to make a decision by modeling and emulating of human intelligence, and this tool uses non – numeric algorithms to solve complex problems. Artificial intelligence tools are divided into sub -branches that can be used for modeling, depending on the type of problem.
Artificial intelligence is a very deep and complex science in the last century that generally studies information, how to collect and maintain them, use information and transfer them to machine, humans or animal. Nowadays method bases technologies and mathematical methods used for optimization, regression and classification in a wide range of fields. Like game, speech recognition, computer vision, complex and expert systems, exploration classification, medical diagnosis, etc.
Artificial Intelligence is the science and engineering of producing machinery or smart computer programs. Artificial intelligence algorithms include various branches of computer science and mathematics.

Artificial Intelligence or Machine Intelligence should be considered as vast area of intersection and meetings of many old and new sciences, knowledge and techniques. Bases and main ideas should be searched in philosophy, linguistics, mathematics, psychology, Neurology and physiology. And it has many applications in computer science, engineering, biology and medical sciences, communication sciences and many other sciences. Artificial intelligence refers to systems that can be similar to human intelligent behaviors, including understanding complex conditions, simulating intellectual processes and human reasoning procedure and successful response to them, learning and the ability to acquire knowledge and logic to solve problems.
Most articles about artificial intelligence have defined it as the knowledge and design of intelligent elements and agents. Researches which have been done to achieve such machines have been linked to many disciplines such as computer science, psychology, philosophy, neuroscience, perceptual science, control theory, probability, optimization and logic. To identify artificial intelligence, we have to know its differences with human intelligence. The human brain is made up of billions of cells and nerves, and these cells are intricately connected. The human brain simulation can be done through hardware or software. Initial research has shown that brain simulation is a mechanical and simple work. Artificial intelligence seeks to produce systems that can reveal these capability of reasoning, behavior, comparison, and conceptualization. What has been made so far has failed to reach this goal, but it has made a lot of efficiencies. (Alimi Motlagfar 1395)
Artificial intelligence is the study of ways to convert a computers into a machine that can do what humans can. Artificial intelligence is a branch of computer science that examines

computational requirements like perception, reasoning and learning, and provide a system for doing that. Artificial intelligence is the combination of computer science, physiology and philosophy. In John McCarthys opinion The definition of artificial intelligence is the science and engineering of smart machines, especially smart computer programs. Artificial intelligence is a science that has made remarkable progress in science in the past decades. It is clear that this progress is not limited to a particular science, but it encompasses all the sciences, even the humanities. One of the most significant cases in the humanities is advanced search engines and explorers that have accelerated researches. Herbert Simon's definition of artificial intelligence is the creation of capacity to perform tasks on computer that are generally known as human characteristics. These capacities include: reasoning, concept exploration, generalization, learning, etc.

After decades of progress and evolution, artificial intelligence (AI) is rooted in our daily lives and its affected the architecture and reliability. Usage of artificial intelligence in sustainable architecture includes building designing by utilizing efficient and productive energy, predicting and minimizing energy consumption, planning to reduce its effects on the environment and climate, as well as to improve the safety and comfortability of the life. Due to the significant increase in Internet speed and access and computers and data storage devices price reduction in recent years, (BD) plays a major supplementary role in artificial intelligence these days. Computer algorithms and code have been developed to extract and analyze data. BD has improved artificial intelligence methods and functions in various fields such as sustainable architecture. (Rezaii 1395)

Artificial intelligence in construction industry in Iran, known as the Comprehensive Smart Building Management System, is a system used to control and manage the smart mechanical, electrical and electronic building facilities and equipment. In fact, by applying a set of electronic components in any construction , in any size and dimensions we can control and manage consumption and cost of energy, maintenance and repair , passive defense and crisis , remote control, security and safety and environmental impacts . As the birth of this system backs to 1934, it is necessary that the improvement of this system in Iran must be proportion with global development and is essential to find and use appropriate solution by trade association and specialized construction industry and government support.

Artificial intelligence is referred to an intelligence that one machine divulge from itself in different situations. In other words, artificial intelligence is system that can do similar interactions like human intelligent behaviors including understanding complex conditions, simulating intellectual processes and human reasoning procedures and successful response to them, learning and ability to gain knowledge and logic to solve problems. Choosing the best option in project management, especially in large development projects, usually has a complex essence and has many uncertainties. so the main project management authorities , the success of the project management depends on the implementation of the three element includes management of people involved in project system streaming and the use of tools. In the meantime, tools and systems are directly within the field of engineers and executives, while the other two are in the management field and indirectly use the outputs of tools and techniques. Techniques have a key role in the successful implementation of project management.

Artificial intelligence research revived in the early 08s by expert systems. At first it was an important success. Once a specialist called, XCon collected $ 18 million annually (year 1986). By the time the system considered very expensive to continue. The main negative point and disadvantage of these smart systems was their complexity in their update and vulnerability. This was the beginning of the second winter for artificial intelligence. But after this period, the field of artificial intelligence not only did not disappear but also began to develop with names such as computational intelligence, inferential systems, and etc. In the last few decades of the modern age the artificial intelligence which has been developed, the ability to calculate rapidly, especially parallel computing, created new subfields such as deep learning, machine learning, artificial intelligence and etc.

Research Method

This research is a functional type performed by descriptive method and analysis. To collect the data and required information, desk research and the documents analysis has been used, and finally, according to the obtained information, the findings are reviewed analyzed and finally an introduction to Identification and recognition of the application of artificial intelligence in project management has been presented. National construction and architecture conference in urban management of 15th century.

History

Prior to the emergence of electronic sciences, artificial intelligence was proposed by philosophers and mathematicians like Bool who presented the theories of Hyder Bob. In fact, research on artificial intelligence formally goes back to the early 20th century when Warren McCold and Pietru strated the first activities in this fieldIn the process of their research, in addition to examining the function of the human brain; They also utilized from the logic analysis of propositions and statements belonging to Russell and Whitehead. Perhaps if we go back, we can consider Kant as the cause of artificial intelligence, because it was Kant that by reducing the human logic to the kant philosophy, acts as a computer software, and fully explained the intellect and the power of man as a device whose intellect, brain and function were a predetermined program. Humans act within their framework and there is no escaping passage beyond the intellect and logic.

In 1943, the invention of electronic computers, artificial intelligence challenged scientists. Technology seemed to be able to simulate smart behaviors. Despite the disagreement of a group of thinkers with artificial intelligence who have been doubtful about its efficiency, only after four decades, we see the birth of chess player machines and other smart systems in various industries. The name of artificial intelligence was invented in 1965 as a new knowledge. The activities of this science had been started since 1960. But the first person to use artificial intelligence (John Makarti), who has been called the (father of science and knowledge of smart machines) and his work comes back in the middle of the 20th century. With the emersion of artificial intelligence, from point of view to action, people like (Turing) produced a computer which they think it has a mind like human mind. By making more computers, it has led people like Herbert Simon from the University of Carnegie Mellen to claim that now we have computers that they have the ability to think. Or his colleague Alan Newwell by comparing the output of the processed computer data with humans, claims that we have discovered that intelligence is only the type of use of physical symbols.

Conclusion	Reference	Topic	Authors	Year
Using artificial intelligence in different parts of construction industry can happen by providing new techniques .	International construction conference and Architecture and sustainable urban development	providing a model for using artificial intelligence in construction industry or utilization of multi criteria decision techniques	Morteza Sarmadi	1392
	Second international management and IT conference	Artificial intelligence	Ramazan Mahmodi Chelche	1395
Artificial intelligence is the result of the intersection of the old and new sciences that should be used in construction	National construction and architecture conference in urban management of 15th century	Artificial intelligence in construction management	Mohsen Sardari Mohammad Hadi Asadi	1397
Artificial intelligence in BD can increase productiveness	National convention of science and modern technology in water ,energy and environment	Application of artificial intelligence in construction	Reza Rezaii Afshin Shaham Motaghi Somaye Motaghi Sepehr Sammak	1398
There are solvable and unsolvable problems which can solve by artificial intelligence	The first in international industrial engineering ,management and accounting conference	Application of artificial intelligence in human resources management	Nasrin Jamali Monfared ,Seyyed Ahmad Shibat Alhamda	1399
Using smart machines production surface and their different usage in various industries	The second international modern researches in electrical engineering ,computer , mechanic , mechatronic conference in iran and Islamic world	Artificial intelligence	Mahdi Alimi Motlagfarre Arezo Piray Zahra Rezaii	1400
Application of artificial intelligence in project management areas	National Conference on Applied construction Engineering and Modern Achievement	Application of Artificial Intelligence Network in Development Project Management	Shahrzad Khalilian Vahid Shah Hosein Said Kia	1400

In 1978, Ron Slumman tried to establish a new philosophy with the advent of artificial intelligence by writing a book called Computer Revolution in Philosophy. Most of the initial research work on artificial intelligence was on the performance of games or proving mathematical theorems with the help of computers.
At first it seemed that computers would be able to do this only by using a large number of exploring and searching for problem solving routes and then choosing the best way. We can refer to the intelligent identity of an artificial tool (man-made, unnatural, and synthetic). (Ramadan Mahmoodi Chelche)
Some people may consider the Egyptian Pyramids or the Great Wall of China as a construction. However, they often agree that the project management has begun in the modern sense of the US military project in Manhattan that led to make a nuclear bomb. Manhattan project included different specialties in different places. The Manhattan project lasted nearly three years and costs about $ 2 billion in 1946. During the project, the army found that scientists and other technical experts did not have the interest or skills needed to manage large projects. Project management was known as Separate system, which requires special skills and even more importantly, the desire to lead the project teams

Artificial intelligence definition

The precise definition that is accepted by all scholars of this science has not yet been presented for artificial intelligence, and this is not surprising at all , because the essential and more basic, that is, the intelligence itself is still doesn't have comprehensive and pervasive definition ,It has not defined. In fact, you can find generations of scientists who have spent all their lives for studying and trying to find an answer to the main question of what intelligence is? But most of the definitions presented in this field are the base of one of this 4 concepts

1: Systems that think logically .2 systems that do logically. 3 systems that think like humans. 4 : Systems that act like humans.

Perhaps it is possible to describe artificial intelligence as follows: 1) Artificial Intelligence is the knowledge of producing machines or smart programsv (John McCarthy).
2) Artificial intelligence is a branch of computer science that examines the computational requirements such as perception, reasoning and learning and provides a system to perform such actions.
3) Artificial intelligence is knowledge to study ways to convert a computer to a machine that can perform human actions.(Ramadan mahmoodi chelche1395)
4) Artificial Intelligence is the study of how computers can be forced to do things that humans are doing better now.
Artificial intelligence in the 15th century has become an important base of human life. If we look at our lives, artificial intelligence used in various means. All the components of our lives have become a place to use artificial intelligence. One of the great ambiguous riddles in the 20th century was the human brain. The sciences have not been able to describe structure of brain completely. Of course, the progress of science in this field has undoubtedly been great. Currently, the science of neurology, which studies the nervous system of living organisms, especially humans, is able to explain many structures and functions of the brain, but we have not yet reached a level of knowledge about our brain to claim that the mystery of the brain has been solved. (alimi motlagfar 1400).

Philosophy of artificial intelligence

Artificial intelligence is the science of making machines with intelligence or using computer and modeling of human intelligence or animal intelligence and ultimately achieving artificial intelligence mechanisms at the level of human intelligence. Compared to human intelligence, it can be said that human intelligence is able to observe and analyze to judgment and making decision, while artificial intelligence is based on programmed laws and procedures. As a result, nowadays despite the very strong computers, we have not yet been able to implement a similar intelligence to human intelligence in creating artificial intelligence.

In general, artificial intelligence can be studied in different parts. We have to differentiate between artificial intelligence as a goal, artificial intelligence as an academic degree or as the set of techniques and ways that have been developed by various scientific centers and industries.

Features of artificial intelligence

Artificial intelligence follow a particular planning to solve the problems. Considering the characteristics of artificial intelligence using the following types of plans will be effective. These 5 factors are more important .1: symbolic representation that uses numerical symbols to solve problems .2) Exploration Method: These problems usually do not have an algorithmic solution.

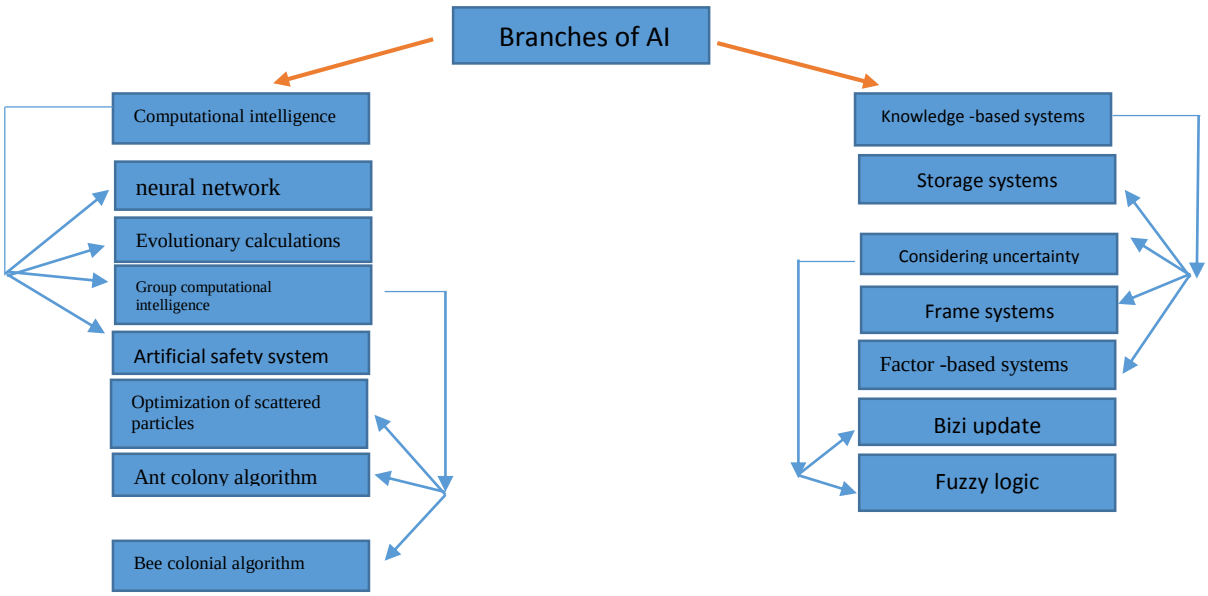
3) Cognition Representation: The compliance of the computer's iconic discipline and symbolic reasoning operations with the outside world. 4: Incomplete Information: Artificial intelligence can solve the problem even when all the required information is not available.

5: Artificial Intelligence can find a good solution to the problem if it is confronted with contradictory information

Main goal of artificial intelligence

In fact, our goal is to make an artificial creature of what we do not know it properly, and it is obviously so difficult to do. That is why the founders of artificial intelligence and their followers have been looked at, with different attitudes to the field of artificial intelligence. Mostly under the influence of their main field

(Mathematics, psychology, computers, etc.) Have injected different views into artificial intelligence.



Artificial intelligence fields

In most sources of smart systems, neural networks, search techniques, genetic algorithms have been regarded as branches of artificial intelligence, but according to one of the most comprehensive reviews in the references, artificial intelligence can be divided in the form of figure 1.

Usage of artificial intelligence

Even now, artificial science is being used in many places but none of its users are obvious at first sight. Therefore to make a comprehensive list of the situations in which this technology is used cannot be done. The mechanism of artificial science for recognizing, identifying and classifying people and objects in pictures and videos are very efficient. In order to achieve this goal, the simple but tough pattern recognition mechanism is being used. If the picture data is not encrypted and the machine can used it, picture and videos can be classified in different categories that they can be searched and found. Such recognitions can be also used for audio data. The usage of chat bots in the customer service section is increasing day by day. This text-based assistance performance is done based on the recognizing the key words in customers request and showing an appropriate reaction to that request according to the different usage that this assistance have. They can be similar or more complex analysis of ideas besides the predicting election results in the world of politics .it is also used in marketing and many other sections. Extracting of the ideas that is also called sentiment analysis is used for searching the net about emotional ideas and phrases. Via this message anonymous polls can be executed. Search algorithm as the ones that Google uses are strongly confidential. The methods of computing, ranking and displaying the search results are working greatly based on the mechanism in which machine learning is used. on the world processing or checking a text grammatically of the classical uses of symbolic artificial science that has been used for a long time in this method language is defined as a complex network of rules and instructions that analysis parts of the text in a sentences and in certain situation it is able to detect and correct the errors. This capabilities are also used for text to speech conversation in all the other systems as Siri, Alexa and Google assistant.

Architecture and artificial intelligence are a process that uses the ability of artificial intelligence algorithms such as machine learning and deep learning to analyze, simulate, model and optimize architectural data. In fact, artificial intelligence in Functional architecture uses to increase speed and it brings accuracy and efficiency. Artificial intelligence is the basis of the emergence of a new ideology, an ideology that transforms the beliefs and ideas of the architect's position in the architectural process, but from the other point of view, this technology is a new technology and tool for upgrading architectural knowledge that is both ideologically changing in the fundamental concepts and ontology of human and technologically making modern human technologies and tools.

Augmented design as a method based on artificial intelligence and using cloud computing can perform the difficult and complex steps of the design category well and with certainty and is a powerful tool in the hands of modern architectures . Artificial intelligence is a computer system that can perform tasks that usually require human intelligence; such as visual perception, speech recognition, decision making and translating between different languages.

Artificial intelligence can also shine in architecture using high data. Architects are now using previous data from buildings, plans and constructions for new projects. The ability to use massive amounts of previous data in milliseconds to improve the architectural design process is amazing and effective.

Advantages of artificial intelligence

Currently, artificial intelligence capabilities are the second most used centralized technology in the world after computers:

- Schedule analysis and control
- Budget and billing
- Performance estimation and analysis
- 3D printing technology
- Construction of infrastructure
- Parametric architecture
- Construction and planning
- Smart cities

Artificial intelligence in construction

The five fields in which artificial intelligence can play a very important role are as follows:

1: Security: By analyzing videos, artificial intelligence can give warnings in case of security disruptions. These disorders include methods of using tools and equipment and violations of valid certificates to use them. These warnings are also sent if the PPE safety hats, vests, safety glasses or other things are not used. The intelligent control removes human errors and prevents the risks caused by the lack of safety when dealing with heavy machines.

2: Real-time schedule analysis and control: If there are hundreds of simultaneous activities in the program, it is almost impossible to do all the tasks on time by using traditional tools. Artificial intelligence provides the possibility of monitoring the schedule, discovering irregularities and the possibility of performing compensatory activities in real time. Artificial intelligence can also recover training resources from databases and help construction industry to solve the problem of skilled labor shortages. Compensatory activities in real time also provide an important factor for quick action or re-planning. By using artificial intelligence, a project manager can be present everywhere at the same time. By using a mobile app, project managers can get familiar with new hired labors, add a profile to the system, and convey what tasks new workers have to do. In addition, artificial intelligence technology can be used to label tools to make them easier to find.

3: Budgets and bills: Artificial Intelligence is able to match the activities carried out in the construction workshop with the bills issued.

4: Estimation and performance analysis: the more data is available to artificial intelligence, the better decision will be made. Local management and risk mitigation will be beneficial for both current and future projects. Collecting data from hundreds of sites provides a more accurate measurement criterion for future planning. When budgeting is done accurately, the number of projects that the construction industry can handle will also increase.

5: Modeling of BIM Construction Information: Conventional construction projects are pre -construction projects and are updated only (and manually) by changing site conditions. While artificial intelligence -based maps consist of materials related to materials, workers, tools and equipment, soil and even weather conditions. These maps provide better outputs.(sardari 1397).

Artificial intelligence in industry

Industrial programs in the recruitment and application of new technologies are based on parameters such as needs, operations of projects, financial savings estimates if exploited and the impact on quantitative and qualitative development of processes. There are industries that are most attracted to technology and innovation. Digitalization of industrial processes along with extensive hardware and software applications of AI and intelligent machines that are capable of interacting with each other and humans, use the word AI Transform meaning Transformation based on artificial intelligence in the energy industry. The main factor of real time data processing, information security, reducing risk and increasing quality of operations as factors in the interest of governments and energy companies to intelligent systems. The importance of using new technologies in the field of energy is such that in 2019, the United States Department of Energy approved a financial package of 20 million dollars for innovative projects in the field of attracting and using AI-based tools in these industries.

The use of smart technologies in the energy industry is not merely for economic interests but the facts such as global warming and environmental damage, including the publication of pollutants in the planetary ecosystem caused by hydrocarbons extraction, social and urban changes such as smart cities, The increasing digitization of businesses and industries and the need for major changes in the subjectivity, the methods of extraction, production and distribution of energy have led to more intelligent systems in these areas.

The development of artificial intelligence and robotics and how smart systems interact with humans, especially in industrial environments, are challenging issues in the operational application of these systems in sensitive industries. The extent to which intelligent machines can have awareness and freedom of action in performing tasks and from which modeling the capabilities of machine learning-based systems can be developed are among the key issues in the interaction between humans and intelligent machines.

Digitalization and developing industrial needs in the field of energy to use interactive smart technologies to respond optimal operational and safety requirements while protecting the environment and natural resources have led to the introduction of smart industrial platforms, based on their use of use Technologies such as AI for the development of hardware and software that, in addition to integrating industrial systems to increase the quantitative and qualitative output, can also interact with humans.

Project management

Definition of project

The project is a temporary effort to produce a product, serve or achieve a unique result. Projects are different from operations. Operations are the work done in an organization for business survival. The project ends when the project goals are achieved as well as the need for human resources, materials and equipment, time and financial resources. The project has a certain start time, duration and end, and it happens once. (Golabchi 1392).

Definition of management the art of doing work by others or creating an effective environment for people working in official organizational groups.

Definition of project management

Project management is the application of knowledge, skills, tools and techniques related to project activities to meet project

requirements. Management through proper application and usage and integration of project management processes that exceeds 24 processes, in five process groups including the initial process, The planning process , implementation, monitoring and control process, and the closing process .(Golabchi 1392).

Project managers should not only try to achieve specific goals of time, range, cost and quality, but also facilitate the process that meets the needs and expectations of people involved or influenced by the project.(katy shoalb 1398) .

Implication of standard project management

The application of skills knowledge and techniques to successfully complete the project through the realization of initial processes, planning, executive, control and ending. In each project, there are usually four goals: 1. Time 2. Cost 3. Quality 4. Scope .and these constraints have interactions with each other.

One of the main duties of the project manager is to manage them according to the importance and interactions and be diligent in maintaining the balance between the time, cost and quality constraints according to the amount of each of them in the project.

Management processes include:

1. Planning
2. Organization
3. Implementation

The project management process identified in the PMBOK Guide is grouped into 9 distinct knowledge domains. A knowledge field provides a complete set of concepts, terms, and activities that make up a specialized field, project management discipline, or specialty. (Saiedi 1390).

These three areas of knowledge are used in most projects at most times. Project teams must use these two areas of knowledge and other areas of knowledge, depending on the case, for their specific projects.

These areas of knowledge are:

Project Integrity Management: Processes required to ensure coordination between different project elements include communication between project executive and project stakeholders, such as employer, consultant, contractor, financial supplier, insurer, guarantee, and operator.

Project domain management: A set of processes needed to ensure comprehensive and permanent attention to project activities include identifying the types of project activities and relationship between them, which is fully completed after these activities.

Project Time Management: A set of processes required to ensure the project is completed within the approved period, including activities scheduling, determining the duration of each activity, starting time and finishing time, and the arrangement of activities and coherency between them, using different techniques of scheduling and it is meant to control the matching time of the actual executive time with the planning.

Project Quality Management: Processes required to ensure the project under the qualitative needs of the designated qualitative requirements include identifying multiple indicators, of the various dimensions of the project quality, in terms of delivery, and project resources.

The set of processes required to ensure the completion of the project according to the approved budget includes the identification of different resources for carrying out activities, the amount and type of appropriate resources for each activity, and controlling how resources are used during implementation.

Project communication management: the necessary processes to ensure the timely and

appropriate production of information, collection, distribution, maintenance and updating of information include the field of information circulation, how to document information and access information for different human resources.

Project risk management: necessary processes to ensure the identification of various project risks, quantitative and qualitative assessment of risks, assessment of each risk and compensatory measures to control eventual risks.

Project procurement management: the necessary processes to ensure the supply and procurement of goods and services, outside the mother organization (executive), include the method of supply of goods and planning of suppling goods and resolution with sub-contractors, etc.

Project Human Resources Management: The processes needed to guide and lead human resources include how to provide and apply the project's human resources and to organize work teams. In this article, the focus is on the areas of basic knowledge, such as management area, quality, time and cost.

Artificial Intelligence in Project Management

According to the definition of project range management, project range management processes include collecting requirements, defining range, creating work failure structure, confirmation of range, range control. According to the statistics provided in the reference, the bulk of the research was done about the balances between rage elements and limited research on the failure of the work failure has been done And the use of genetic algorithms, scattered ants and neural networks and fuzzy logic have allocated the highest volume of research in the management of project range. (Iranmanesh 1390_95)

An example of the work done in this field is testing a project with 41 activities in a research work. For this purpose, a separate mathematical model of time, cost and quality created, then this multi -purpose math model from combining these separate models has become a single -goal model. The solving of this weight target function is carried out by a scattered particle optimization algorithm and, in the next step, by testing this method through a 41 -activity project, its efficiency has been proven in comparison with the differential evolution algorithm and the particle optimization algorithm. (Wang and Feng)

Artificial Intelligence in Project Time Management

According to the definition of project time management, include activities definition processes, activities sequence, estimation of activity resources, activity time, and scheduling, timing control. According to the statistics presented in the used reference, the major amount of research is done regarding project scheduling and the least amount of research has been done regarding the identification of relationships between activities, and according to the investigation, the use of genetic algorithm, scattered particles of ants and Neural network and fuzzy logic have the most amount of research. (Iranmanesh)

As a practical example of the application of artificial intelligence, in the field of project management, it has provided a knowledge -based system using expert’s knowledge of project managers in a research and updating CPM network. This method has sufficient potential to use as a decision -making tool for sensitivity analysis and performance in large project management as well as as an efficient training tool for inexperienced planners. (Arinze and Partovi, 1992).

Artificial Intelligence in Project Quality Management

According to the definition of project quality management, project quality management processes include quality planning, quality assurance and quality control. Search for the use of various artificial intelligence tools in project quality management identified the fact that there are limited researches on Estimation of the quality of the project and the methods of neural network, scattered particles and fuzzy logic. (Iranmanesh).

Among the examples of research conducted in the field of project quality management using an artificial network, there is a research in which, first, 11 characteristics affecting the quality of project implementation were identified and these items were grouped into 5 general categories. Then, by collecting 41 data, 8 data have been used for neural network training and 2 data have been used to estimate the performance quality. (Yang Wang 2010).

Artificial intelligence in project cost management

According to the definition, project cost management processes include cost estimation, budget estimation, cost control. According to the analysis, the main focus of published research is on the function of budget estimation at the time of project completion. the frequency of articles in each of the approaches of artificial intelligence, implementation of artificial neural networks, genetic algorithm and fuzzy logic have provided the highest amount of research in project cost management. (Iranmanesh 227_1390)

In a research that has been done as a practical example in the application of artificial intelligence, neural networks have been used to estimate construction project costs and the theory of constraints has been used to control these costs. With this approach, the pricing model of the list of optimized values and the costs related to the optimized model have been controlled. (Xiaokang&Mei).

Artificial Intelligence in Project Management

According to the definitions, human resource management processes include the preparation of human resource program, project team formation, project team development, project team management. Due to researches for human resources management, the main focus of the research published was to select the project team or the project manager selection. Implementation of fuzzy logic, multi -factor systems and genetic algorithm have the highest amount of research. (Iranmanesh 263_1390)

In a research, a model based on fuzzy and theoretical logic of Dempster Shafr has been used to decide on the selection of project team members from the inventory options that have no exactly the same criteria.

In this model, the decision-making mechanism is accompanied by inherent uncertainty in determining the relative importance of each skill and classifying the potential of team members through the opinion of experts. (Shiply 1999).

Conclusion

Humans want to simulate their intelligence on the computer Robots, unmanned machines are examples of human effort in this area. Artificial intelligence, of course, goes beyond the imitation of human intelligence, and the simulation of animals, plants and everything on the planet is another aspect of this branch of artificial intelligence.

It is also used in some disciplines, including automatice automotive industries, intellectual games, computers, face recognition, internet searchers, economics, cyberspace and law. Estimations, such as estimating the cost of

building construction, decision -making issues such as concrete productivity and fuzzy uncertainty are project management issues that can be solved with artificial intelligence. On the impact and application of artificial intelligence on project management, every construction project is associated with risks and uncertainties. These include risks related to work allocation, project costs and construction management. Machine learning is a branch of artificial intelligence that has many applications in project management. Among the first category issues solving project problems, reducing project time, structural health monitoring, safety and project workforce, structural analysis and prevention Earthquake crises, concrete and soil laboratory estimates are among the applications of artificial intelligence in project management. How to allocate concrete from several concrete workshops to multiple projects, optimize multiple projects to multiple contractors in the tender process, determine the appropriate amount of excavation and embankment in a leveling project, optimized management of a portfolio including several projects with minimum resources Costs, and minimizing time, balancing cost quality and risk in projects are second category issues in artificial intelligence performance in project management. And the third category is the presence of fuzzy uncertainty in the level of efficiency of human resources in optimal management (excellent, average and poor workforce), the presence of fuzzy uncertainty in the amount of factors affecting the risk of project (low, average and high work difficulty and suitable weather conditions and low, average and high risks) . . In this article, an introduction to the impact of artificial intelligence on project management and its application in projects is highlighted, and according to the severe shortage of study resources in this field, it has tried to increase knowledge in this subject.

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