Artificial Intelligence in Construction Management

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ABSTRACT

Artificial intelligence (AI) is a process that combines the power of deep learning and fast processing to solve various construction problems. It can help identify and prevent defects and improve the efficiency of the project by analyzing large amounts of data. It can also provide various solutions for risk assessment and prediction.

Through the combination of deep learning and fast processing, AI can help identify and prevent defects and improve the efficiency of the project by analyzing large amounts of data. It can also provide various solutions for risk assessment and prediction. Some of these include knowledge discovery, root cause analysis, and prediction.

The rapid emergence and evolution of AI has greatly improved the efficiency and productivity of construction projects. This has allowed industrial participants to operate more safely and efficiently, which has increased the competitiveness of the construction industry globally.

Keywords : Artificial Intelligence, Construction Management, Civil Engineering, AI for Construction Safety

I. INTRODUCTION

Artificial Intelligence is an erudition package that specializes in seizing material in numerous diverse ways to scrutinize and replicate. AI software and technology have been improving the lives of human beings in the most creative and innovative ways. AI helps the software in analyzing blueprints and mockups for the studying of design possibilities and helps HR in analyzing and scrutinizing candidates for hiring. AI is subjected to limitless potential. AI is capable of evolving and learning new things (Wei, 2021).

A. Basic AI Principles

There are many rules and principles that aid in the development of artificial intelligence. These rules ensure that the use of AI does not result in any unintended consequences. Following are those four principles for the usage of Artificial intelligence.

B. Accounts for itself

The machine is unable to hide its actions and intentions, and no one can make it learn it.

C. Benefits all of humanity

AI is invented with the purpose of serving its users.

D. Operates autonomously

Human intervention is not required in its operations.

E. Abides by a moral compass

It is abided by moral codes which influences its decision-making capabilities.

II. ARTIFICIAL INTELLIGENCE IN CONSTRUCTION MANAGEMENT

AI is supporting the construction industry by bringing new innovative designs to structures and buildings. Construction through artificial intelligence was a fantasy till some years ago but it is a reality now. Artificial intelligence has started showing its miracle in the construction industry already. The project designers, project managers, and HR management all are taking the support of AI Technology for the improving the pace and efficacy of their tasks for the development, management and recruitment in the construction industry (Leo Kumar, 2017).

Construction robots and drones are the new emerging trends in construction management. AI in the construction industry guides and aids the development and construction of buildings that are safe and smart for its residents. Construction through AI helps in developing efficient and innovative designs (Sacks, Girolami and Brilakis, 2020).

III. BENEFITS OF ARTIFICIAL INTELLIGENCE IN CONSTRUCTION MANAGEMENT

Construction industry is the least digital in the whole world. The reason for this is the resistance to change. The resistance of using digital technology makes the project more complicated and time consuming. Artificial intelligence has helped in improving automated processes which helps the industry in gaining competitive advantages.

Artificial intelligence in construction industry not only helps in improving the efficiency and accuracy of project designs but also supports in organizational culture and leadership. It helps the management in becoming better at their jobs and tasks. Artificial intelligence in construction industry can be helpful in every stage of the construction, from designing till its demolition (Polar and Poluektov, 2021).

IV. PREVENT COST OVERRUNS

Going over budget is quite normal in the construction industry, in spite of having the best project team managers for planning. Artificial intelligence has helped in predicting cost overruns on the basis of the size of the project, type of the contract and the competency of the project managers. All of this is done through Artificial Neural Networks which predicts and plans start and end dates of the projects (Pan and Zhang, 2021).

V. RISK MITIGATION

Risk is associated with every project in construction management, whether the project is big or small. Greater risks are associated with larger projects. Artificial intelligence and machine learning technology is used by the contractors for monitoring and prioritizing risks at the construction site. This helps the contractors and workers in focusing on other big issues. AI is used to robotically allot precedence to matters (Naser, 2018).

VI. MONITORING OF CONSTRUCTION SITES

Artificial intelligence is used by the contractors for monitoring the construction sites. The IoT sensors and digital technologies helps in analyzing the construction sites from the development stage to the

progress stage for storing and gathering of data of construction sites. All this information gathered through AI technology can help in the improvement of the performance in site areas. It also helps in delivering a standard quality of projects.

VII. AI FOR CONSTRUCTION SAFETY

Job in the construction industry is quite a risky job in terms of health and mortality. Workers in the construction field died more than any of the other workers. Workers can also face and suffer long term health issues incapability etc. Artificial intelligence in construction sites scans the photos of the construction sites and analyzes them for safety hazards, which helps the company in taking safety measures for the workers (Micolier, Taillandier, Taillandier and Bos, 2019).

VIII. AI WILL ADDRESS LABOR SHORTAGES

Artificial intelligence and digital technology are also supporting the construction companies in distribution of labor and machineries across their projects. A robot constantly evaluates the project sites and inform the management that which site is having adequate workers and machinery and which sites need more to complete their tasks in adequate time. It also helps in monitoring the progress of the construction sites.

IX. AI MAKES JOBSITES MORE PRODUCTIVE

AI technology is helping the construction industry in increasing their productivity. Many of the tasks that were performed previously by the human workers are now performed by the digital machineries that not only help in reducing human errors but also aid in time management. All the tasks performed by the digital technologies helped in reducing the time for

the overall completion of the project (Liang, Xue and Wang, 2020).

X. CONCLUSION

The reimbursements of artificial intelligence in structure administration cannot be underrated. AI is a ground-breaking approach to increase efficacy. The cyberspace has advanced from permitting entities to interrelate with each other to let numerous effects and persons to connect to shape a keen atmosphere. Current technical progressions and faster and economical strategies with enhanced dispensation competences have permitted this transformation. It has the latent to totally transform the erection segment. It can influence its extraordinary competences to enable the project progression. Artificial intelligence has the latent to intensely upsurge the consistency of corporate in real estate business.

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