AI in Construction:
What Does it Mean for You?

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Getting educated on the beginning basics of artificial intelligence is the best way to ensure it works right for your company.

Artificial intelligence is revolutionizing the construction industry by enhancing efficiency, safety, and decision-making throughout the project lifecycle. AI in construction involves the application of advanced technologies like machine learning, computer vision, and data analytics to various construction processes. Through AI, machines can learn and imitate human cognitive functions.

The possibilities may sound endless, but as an industry traditionally looking from the outside in at technology, we must first step back to educate ourselves on the basics. This paper is meant to function as a starting point in your journey to understand AI and its potential impact on the construction industry. By reading through definitions, construction use cases, and considerations, the reader should walk away with a base level of knowledge to ensure they can actively participate in future conversations on AI in construction.

DEFINITIONS

Artificial Intelligence: Per the National Artificial Intelligence Initiative Act of 2020: "A machine-based system that can, for a given set of human defined objectives, make predictions,
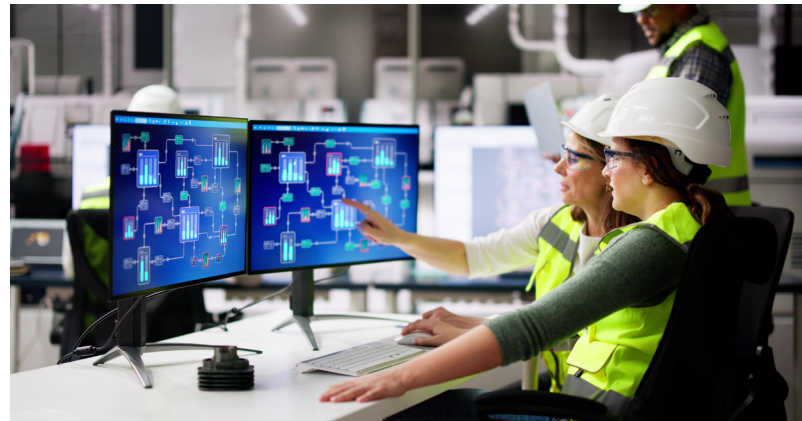
recommendations, or decisions influencing real or virtual environments."

Machine Learning: Application of AI that allows a system to automatically learn and improve from experience. In other words, machine learning helps computers do tasks like recognizing colors, finding pictures of cats on the internet, or even suggesting what to watch on TV. It's like teaching the computer to be smart and make decisions by looking at several examples and learning from them. One common example of this is large language models.

Deep Learning: Per IBM: "Deep learning is a subset of machine learning, which is essentially a neural network with three or more layers. These neural networks attempt to simulate the behavior of the human brain - albeit far from matching its ability - allowing it to 'learn' from substantial amounts of data. While a neural network with a single layer can still make

approximate predictions, additional hidden layers can help to optimize and refine for accuracy." Deep learning has achieved remarkable success in various applications, including self-driving cars, medical diagnosis, recommendation systems, and more. Its power lies in its ability to automatically learn and adapt to new data, making it an innovative technology in the field of AI and data analysis.

Generative AI: A type of AI that can create new data or content, such as images, text, music, or even videos, by learning patterns and structures from existing examples. It works by understanding and mimicking the patterns and styles it has seen in the data on which it was trained. The most publicly recognized tool in the last years is ChatGPT, built by the company OpenAI. ChatGPT is an artificial intelligence chatbot that can process natural human language and generate a response. It has revolutionized how we interact with computer systems and has influenced the evolution of AI. Other generative AI tools include Meta's Llama 3.1, Microsoft's Copilot, Google's PaLM 2, Amazon's Bedrock, and Dall-E 3, also from OpenAI.

Predictive AI: A type of AI that uses data and machine learning algorithms to forecast future events or trends. It helps businesses and organizations make informed decisions by analyzing historical data, identifying patterns, and making predictions based on those patterns.

PROJECT LIFECYCLE IMPACTS

PRECONSTRUCTION

Predictive Analytics: Analyze historical project data and current conditions to optimize construction schedules, resource allocation, and task sequencing.

Optimized Design Development: Allow project stakeholders to identify the best design for a building based on real-world data; rapidly create and explore a variety of unique design options.

Supply Chain: Throughout the procurement process for self-performing contractors, artificial intelligence will empower the purchasing team to quickly identify availability and best pricing within a certain region.

Contract Review: Empower legal teams to quickly identify critical risk factors in construction contracts.

CONSTRUCTION

Autonomous Equipment: Enables existing equipment to run at full utilization every day of the year, in any weather, without an operator, and with 360-degree safety technology preventing any accidents.

Project Management: Ability to optimize resource allocation. AI can analyze various factors like workforce availability, equipment usage, and materials supply, to ensure that resources are utilized efficiently.

Computer Vision/Intelligent Site Monitoring: Through machine learning, video footage is trained to detect the number of workers entering or exiting the jobsite, workers in proximity of heavy construction machinery , and even safety violations, such as the lack of face protection while saw-cutting concrete. "The possibilities may sound endless, but as an industry traditionally looking from the outside in at technology, we must first step back to educate ourselves on the basics."

Jobsite Mapping: Mapping applications use artificial intelligence to process images. Drones use machine learning to decode images and find patterns that are invisible to the human eye.

BUILDING MAINTENANCE

Energy Management: Analyze energy usage patterns and optimize HVAC systems to reduce energy consumption and overall costs.

Predictive Maintenance: Through the expanded use of building automation and control networks, AI can predict when building equipment is likely to fail, allowing for a proactive response.

HR OFFICE CONSIDERATIONS

Per insights from Littler Mendelson, ABC's general counsel,

consider the following when drafting interoffice AI policies. Please also note that "insights" do not constitute legal advice.

Clearly define the purpose of the AI usage policy, which AI technologies are covered and how it applies to employees and/or outside stakeholders.

The policy should include a purpose or mission statement, and an explanation on if AI is able to be used, how it can be used, and who can use it.

Designate point persons to oversee AI usage, troubleshoot problems, and approve of AI use.

Clarify a policy that instructs employees that programs like ChatGPT still make several mistakes and that these programs should be used to assist employees and not serve as a substitute.

Consider an overall approach that monitors AI use and encourages innovation but ensures that AI is only used to augment internal work and with proper data.

AI has been in the background of some of our everyday technologies, but in the last few years has come closer to the surface thanks to strategic marketing and perhaps a more consumer-friendly approach. There are still a lot of unknowns on what the impact will be and what the technology could look like in the future.

The future of AI in construction is promising, with advancements that could revolutionize the industry. By staying informed about AI developments and adopting these technologies, construction workers can ensure they are well prepared for the future and continue to thrive in a rapidly evolving industry.

About the Author

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