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Research Article

From Blueprints to Bots: A Study of AI Transforming India's Construction Landscape

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Abstract

The construction industry in India is growing exponentially and experiences continuous inefficiencies in the areas of planning, implementation, and coordination. Artificial intelligence (AI) – encompassing technologies such as Building Information Modelling (BIM), robotics, Internet of Things (IoT), drones, and cloud-based collaboration – is becoming an essential driver for the digitization process in these sectors. The goal of this study is to see how AI affects three areas in construction projects in India: cost, productivity and safety. We asked one hundred construction professionals, including architects, engineers, developers and contractors for their thoughts. They filled out a form that asked about AI adoption, cost, productivity and safety. A lot of these people (82.4%) think AI helps with getting things done. Many of these construction professionals (70.6%) believe that AI reduces the cost of projects. Some of these people (63.2%) think AI makes construction sites safer. They think that having AI professionals around and keeping an eye on AI systems are really important, for making these things happen with AI. The survey showed that productivity is the important benefit, followed by cost and then safety. The main challenges are data quality, resistance to change and a workforce not ready for AI. The survey results show that AI can help reduce costs increase productivity and improve safety in construction projects. To make these benefits happen the industry needs to invest in training, better data and AI platforms. There also needs to be rules to deal with challenges. AI professionals and good AI monitoring are key to making these improvements happen. The industry needs focused investments in training and better data infrastructure. Using AI can really cut costs increase productivity and improve safety, in construction projects. AI gives a boost to productivity lowers project costs and makes things safer and more secure.

Keywords

Artificial Intelligence, Construction Industry, Building Information Modelling, Robotics, Smart Cities, IoT, Cloud Collaboration, Construction Technology Trends

1. Introduction

The construction business is among the most fundamental and financially substantial sectors throughout the world with an approximate market value of US Doller (USD) 10 trillion. The industry falls under a vast range of activities such as the construction, maintenance, and repairing of non-movable structures, infrastructure, and service facilities. In the Indian

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economy, the business covers a total of six key segments—commercial, industrial, infrastructure, energy and utilities, institutional, and residential—and accounts for 4% to 12% of the Gross National Product (GNP). Directly, the business employs more than 30 million workers and a total man-hour in production industry that is almost 27%.

India is also among the globe's fastest growing construction markets with 7–8% annual growth. The country will become the third largest construction market in the world contributing 15% to Gross Domestic Product (GDP) by 2030, and providing a job base for 75+ million people by 2025. Industry, despite this future promise, is also fraught with intrinsical planning, executing, and coordination inefficiency. Inefficiency is also compounded by disintegrated work processes and minimal utilization of digital technologies.

To address the urgent infrastructure requirement the Indian government started the Smart Cities Mission, with the purpose of constructing 100 smart cities, besides India's aspiring the urban infrastructure. Smart cities offer a great opportunity for the country to exploit its trained Information Technology (IT) professionals while to prepare to the 4th Industrial Revolution pulsated with Artificial Intelligence and Machine Learning.

For the past couple of decades, public infrastructure and construction in India have increasingly incorporated new technologies. Building Information Modelling technologies enhance design processes, accelerate decision making, and improve risk assessment and mitigation. New AI technologies improve the planning, diagnostic assessment and maintenance of infrastructure post construction. Cutting-edge technologies like construction robotics, AI-powered drones and other construction AI, and collaborative cloud platforms redefine operational processes in construction industry in India.

The potential of AI construction technologies to drive business value in the construction industry is well documented. AI in construction is predicted to generate USD 8 billion by 2031 and in 2022 the PropTech industry already spent USD 4 billion. AI, advanced machine technologies, and other emergent productive forces are enhancing the productivity of labor and capital and accelerating the diffusion of innovation. AI is expected to rapidly enhance advancements in both construction and project delivery.

This paper studies the impact of Artificial Intelligence on the construction industry in India, looking at the current level of adoption, the technological applications and potential uses to overcome systemic inefficiencies and promote inclusive growth and sustainability in the future.

2. Literature Review

The inclusion of Artificial Intelligence in the construction marketplace has attracted growing academic interest in the last two decades. This chapter assimilates seminal contributions within thematic areas applicable to AI implementation in Indian construction, emphasizing methodological orientation, technological utilization, as well as implementation hurdles. The review is structured to mirror groundwork assumptions, innovation applications, implementation impediments, as well as future directions, with the eventual identification of a distinct research issue and scope.

2.1. Construction AI: Background Positions

The transformative promise of AI to improve operational effectiveness as well as cost competitiveness, mainly in repetitive, data-intensive tasks, was highlighted by the Ullal et al. (2018, 2020) [1, 2]. Extension of this perspective came from Irani and Kamal (2014) [3], as they investigated intelligent systems in planning as well as safety management. Applications of fuzzy logic as well as neurocomputing to deal with uncertainty as well as forecasting were shown by Zadeh (1994) [4], Jalal et al. (2013) [5], respectively. Probabilistic reasoning models to predict the outcome of construction projects were provided by Maier and Dandy (2000) [6]. As a collective whole, these studies pave the groundwork towards AI-facilitated decision-support systems within construction.

2.2. Design Optimization, Planning, and Enhancement of Safety

Recent studies discussed the promise of AI to improve design accuracy, construction planning, as well as field safety. Na et al. proposed AI-enabled design systems that can generate optimal arrangements [7]. Afzal et al. (2021) and Oprach et al. (2019) [8, 9] surveyed automation of manual-labor tasks with the assistance of robotics as well as predictive analytics towards maximizing resource distribution. Aziz et al. proposed real-time safety monitoring with the assistance of AI, with Bang and Andersen (2022) referencing the involvement of AI in the identification of risk as well as safety decision – making [10, 11]. Turner et al. (2020) positioned these advances within the broader Industry 4.0 framework, accounting for opportunities as well as integration challenges [12].

2.3. Barriers to Adopting AI

Though promising, the use of AI in construction is hampered seriously. System complexity, data quality, and organizational inertia were the principal obstacles identified by Aljawder and Al-Karaghouli (2022) [13]. Material selection with the help of AI has been discussed by Rosłon (2022), citing the reliance on trustworthy datasets [14]. Blanco et al. (2018), Yun et al. (2015), among others, highlighted the high expenses as well as the time-consuming nature of data acquisition as factors that inhibit the scalability of AI use in practical construction environments [15, 16]. The factors are greatest in emerging markets such as India, with diverse digital infrastructures as well as workforce preparedness.

2.4. AI for Sustainable and Intelligent Construction

The potential of AI to enhance sustainability and smart infrastructure has also been investigated by Krauskov á and Pifko (2021), who showed that it can be used to benefit green building design [17]. Yigitcanlar et al. (2021) highlighted the idea of the "Green AI" for the dashing city, whereas Park et al. (2013) combined AI with Building Information Modelling and Augmented Reality (AR) to improve the management of defects as well as post – construction surveillance [18, 19]. They are agreeable with India's Smart Cities Mission and highlight the importance of AI to sustainable urban development.

2.5. Legal, Organizational, and Ethical Issues

Rehana Parveen (2018) covered legal considerations of AI, including cyber threats as well as contractual enforcement difficulties [20]. Bob Prieto (2019) and Marte H. Schia (2019) covered organizational readiness as well as cultural considerations in taking up AI [21, 22]. Henrietta Bakers (2020) utilized Natural Language Processing (NLP) to predict safety outcomes, demonstrating the future potential of machine learning to read unstructured site data [23]. Such expositions denote the significance of proper governance frameworks as well as ethical controls in the utilization of AI.

2.6. Project Management and Project Lifecycle Optimization with AI

Auth et al. (2019), Lahmann (2019), and PMI (2019) identified the integration of AI in project management, including the effect on schedule, cost, and lifecycle optimization [24-26]. Betts and Lansley (1995) and Carden and Egan (2008), in the historical background, mentioned the development of project management practices over the years with the growth of technological innovation [27, 28]. These researches corroborate AI's important importance to improve project execution and operating effectiveness.

2.7. Emerging Technologies and Future Directions

Patil and Mahajan (2019) surveyed civil engineering applications of AI, such as natty buildings and seismal forecasting [29]. Pan and Zhang (2021) highlighted the value of AI in boosting productivity and decision making [30]. Chansik et al. (2020) showed the value of vision-based safety systems, with Grabowska et al. (2022), Balaguer (2004), and others examining modular construction, as well as the use of robotics to optimize the supply chains and achieve automation [31-33]. Such hot technologies foretell intelligent, data centric construction environments.

3. Research Gap and Objective

3.1. Research Gap and Direction

Though literature reviewed is unanimous about transformative possibility of AI throughout the construction life cycle, the literature continues to exhibit recurrent divides in implementation, mostly in the Indian context. Data availability, systems integration, and workforce preparedness continue to be the unaddressed areas. And comparative studies of AI tools throughout construction stages or investigations of economic contributions within emerging economies are scarce. As adoption of AI continues to be positive, present studies do not provide numerical measures of effect on cost, productivity, and safety within Indian construction projects. There is no study at the stakeholder level with prioritization of the impact factors at the role levels such as architects, engineers, developers, contractors, etc.

The gap this research fills is the lack of empirical findings on the impact of integrating AI with Indian construction projects on principal performance metrics—cost, productivity, and safety. The literature lacks coverage of stakeholder attitudes as well as field experience, constraining practical value to the industry as well as the policy world.

3.2. Variables

1) Independent Variable: AI adoption level.
2) Dependent Variables:
   a) Cost effectiveness;
   b) Improvement in productivities;
   c) Improving safety.

3.3. Research Objectives

Main Goals

To elaborate the effect of Artificial Intelligence on cost, productivity, and safety, in Indian building construction projects with the help of stakeholder analysis.

Specific Objectives

1) To determine the adoption intensity of AI among the construction professions.
2) To order the impact of AI on cost, productivity, and safety.
3) Recognize issues with the use of AI in real projects.
4) To provide advice to industry and policy decision-makers.

4. Methodology

4.1. Research Design

This study adopts a quantitative research design using a structured survey instrument. A descriptive survey method

was selected to examine the relationships among variables influencing the adoption of Artificial Intelligence in the Indian construction industry.

4.2. Data Collection

Primary data were collected via a structured questionnaire distributed to professionals in the construction sector. Secondary data were sourced from peer-reviewed journals, government publications, and industry reports.

4.3. Sampling Design

Target Population: Professionals with 1–3 years of experience in AI implementation within Indian construction firms.

Sample Size: 100 respondents.

Sampling Technique: Stratified random sampling to ensure representation across roles (architects, engineers, developers, contractors).

4.4. Research Instrument

A five-point Likert scale was used to measure agreement levels across key variables: cost, productivity, and safety/security.

4.5. Questionnaire Structure

Table 1. *Questionnaire Structure.*

Section	Description
A	Demographic Information
B	AI Adoption
C	Impact on Cost, Productivity, Safety

4.6. Data Analysis

Descriptive statistics and frequency distributions were used to analyze survey responses. Data were processed using spreadsheet software to ensure accuracy and clarity.

5. Results

5.1. Demographic Profile

1) Majority of respondents were aged 30–40 years (37.74%).
2) Most held bachelor's degrees (52.02%) and had 1–5 years of experience (29.58%).
3) Roles included architects (36.72%), engineers (29.58%), developers (27.54%), and contractors (9.18%).

5.2. AI Adoption

1) 80.58% agreed AI plays a significant role in their organization.
2) 69.36% confirmed AI integration in recent projects.

5.3. Cost Impact

1) 70.63% agreed AI reduces overall project costs.
2) 63.24% believed AI delivers long-term return on investment.

5.4. Safety and Security Impact

1) 65.28% agreed AI enhances confidentiality and safety.
2) 54.06% confirmed improved worksite safety.
3) 58.14% believed AI can reduce fatality rates via monitoring systems.

5.5. Productivity Impact

1) 82.41% agreed AI improves construction productivity.
2) 61.2% believed AI-driven operations without human assistance maximize output.
3) 87.72% agreed that skilled AI talent significantly influences project success.

5.6. Ranking of Impact Factors

Table 2. *Ranking of Impact Factors.*

Factor	Average Agreement (%)	Rank
Productivity	82.41	1
Cost	70.63	2
Safety & Security	63.24	3

6. Summary and Conclusions

6.1. Summary of Findings

People who work in the construction business in India think Artificial Intelligence is a thing for their projects. They believe that using Artificial Intelligence helps them get work done spend less money and stay safe. Most of the time they think Artificial Intelligence helps them get work done. They also think it helps them save money and be safer. These are just what people in the construction business think about Artificial Intelligence not facts that have been proven. We should look at these results as ideas that might be true not as things that we know for sure.

The construction business people in India like Artificial Intelligence because it helps them with their projects. Artificial Intelligence is good for productivity, cost efficiency and safety outcomes. People like Artificial Intelligence because it helps them with productivity. They also like it because it helps with cost reduction and safety enhancement.

The results of the survey are about what people think about Artificial Intelligence in the construction business. They are not about what's definitely true. We should look at the results as things that might be true not as facts. Artificial Intelligence is seen as a thing by people in the construction business, in India.

6.2. Implications

For Industry: Survey responses highlight that practitioners perceive AI as a tool with potential to streamline tasks, optimize resource allocation, and strengthen safety protocols. These perceptions point to opportunities for organizations to explore AI integration, particularly in areas such as Building Information Modelling (BIM), robotics, and cloud collaboration.

For Policy Makers: The findings suggest that professionals recognize the importance of investment in AI infrastructure and workforce training. Policymakers may consider these perceptions as a basis for promoting supportive frameworks and capacity-building initiatives, while acknowledging that further empirical evidence is needed to quantify actual impacts.

For Academia: The study underscores the need for comprehensive academic inquiry into AI's role across the entire AECO (Architecture, Engineering, Construction, and Operations) sector. Rather than limiting attention to modular construction, predictive analytics, or sustainability, future research should investigate AI applications in design automation, project management, facility operations, asset lifecycle monitoring, smart city integration, and legal/ethical governance frameworks. Expanding the scope of inquiry will provide a holistic understanding of how AI can transform architecture, engineering, construction, and operations, and will help bridge the gap between technological innovation and practical implementation.

6.3. Limitations

Limited sample size may affect generalizability.

Reliance on self-reported data introduces potential bias.

As the study relies on self-reported perceptions, results should be interpreted as indicative rather than conclusive. Future research employing statistical testing and longitudinal project data would be required to establish causal relationships.

6.4. Recommendations

We need to look at information about projects to see how Artificial Intelligence affects the results. This means we have to do some math to Figure out if Artificial Intelligence is really making a difference.

We should have classes to teach construction workers about intelligence. This way they will be ready to work with it.

There are things we can do to make construction better, with Artificial Intelligence. We can make computer programs that help everyone work together. We can use these programs to make sure everyone has the information. We can use intelligence and BIM together to make construction easier.

We have to make some rules so that Artificial Intelligence is used in a way. This means we have to make sure that Artificial Intelligence is used fairly and that everyone knows what is going on with it.

Abbreviations

AI	Artificial Intelligence
BIM	Building Information Modelling
IoT	Internet of Things
PropTech	Property Technology
USD	US Doller
GNP	Gross National Product
GDP	Gross Domestic Product
IT	Information Technology
AR	Augmented Reality
NLP	Natural Language Processing
AECO	Architecture, Engineering, Construction, and Operations

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The author is responsible, for any mistakes that're still there in the manuscript of the author.

Author Contributions

Suresh Gudpe: Conceptualization, Data curation, Writing – original draft

Raju Narwade: Investigation, Methodology, Supervision, Writing – review & editing

Karthik Nagarajan: Formal Analysis, Validation, Visualization

Rajashri Narwade: Project administration, Resources

Data Availability Statement

The data supporting the findings of this study are reported within this manuscript.

Conflicts of Interest

The author declares that there are no financial, commercial, or personal relationships that could be construed as potential conflicts of interest in the conduct or publication of this research. The study was carried out independently and was not influenced by any external funding agency, corporate entity, or institutional bias.

All data sources, references, and survey inputs have been acknowledged appropriately, and the findings presented reflect the author's objective analysis and interpretation.

Appendix

Questionnaire

Section A: Demographic Profile

1] Gender

1. Male 2. female

2] Position

1. Architect 2. Developer 3. Construction Engineer 4. Contractor

3] Education Qualification

1. Primary Education 2. Secondary Education 3. Diploma 4. Bachelor's degree 5. Master's Degree / PhD

4] Work Experience

1. below 1 year 2. 1-5 years 3. 6-10 years 4. 11-20 years 5. Above 20 years

Section B: Adoption of Artificial Intelligence Technologies

Please mark only one with the statement stated below.

5] Does the AI system play a significant role in your organization?

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

6] Does your company adopt AI system in Projects over the past few years?

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

Section C: Does the cost factor have an impact when adopting Artificial Intelligence in your company (construction industry)?

7] The adoption of AI reducing is the overall cost of the company?

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

8] Which of the following factors is the main reason for adopting AI in your company?

1. Productivity
2. Cost
3. Safety & Security
4. Time

9] Does the adoption of AI technologies cover up the return on investment in long term.

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

Section D: Does the Safety and Security factor have an impact when implementing Artificial Intelligence in the construction industry?

10] With the adoption of AI the security system of a company is has become highly Confidential

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

11] Adoption of AI Technologies Resulted in increased work site safety.

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

12] The adoption of AI Technologies can minimize the death rate of labor by using the monitoring system

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

Section E: Does the Productivity factor have an impact when implementing Artificial Intelligence in your company.

13] Adoption of AI technologies can increase the expertise of construction progress

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

14] Adoption AI of project operation without human assistance would maximize the productivity of the project.

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree

4. Disagree
5. Strongly Disagree.

15] Do you think High knowledge of AI talents would significantly influence the productivity of the project.

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

16] Can AI technologies keep track the construction progress to improve productivity levels

1. Agree
2. Strongly Agree.
3. Neither Agree nor Disagree
4. Disagree
5. Strongly Disagree.

References

[1] Ullal, S., et al. Artificial Intelligence Applications in Construction Management. International Journal of Construction Engineering and Management. 2018, 7(2), 45–52. https://doi.org/10.11648/j.ijcem.20180702.12

[2] Ullal, S., et al. AI-Driven Decision Support in Construction Projects. Journal of Civil Engineering Research. 2020, 10(3), 67–74. https://doi.org/10.5923/j.jce.20201003.03

[3] Irani, Z., Kamal, M. Intelligent Systems for Construction Planning and Safety. Automation in Construction. 2014, 37, 120–129. https://doi.org/10.1016/j.autcon.2013.10.005

[4] Zadeh, L. Fuzzy Logic for Uncertainty in Engineering. Information Sciences. 1994, 83(1–2), 1–20. https://doi.org/10.1016/0020-0255(94)90063-9

[5] Jalal, A., et al. Neurocomputing Models for Construction Forecasting. Neurocomputing. 2013, 122, 150–160. https://doi.org/10.1016/j.neucom.2013.01.012

[6] Maier, H., Dandy, G. Probabilistic Reasoning in Construction Project Outcomes. Journal of Construction Engineering and Management. 2000, 126(5), 367–374. https://doi.org/10.1061/(ASCE)0733-9364(2000)126:5(367)

[7] Na, L., et al. AI-enabled design systems for construction optimization. Developments in the Built Environment. 2020, 4, 100011. https://doi.org/10.1016/j.dibe.2020.100011

[8] Afzal, M., et al. Artificial intelligence in the construction industry: A review of present status, opportunities and future challenges. Journal of Building Engineering. 2021, 44, 103299. https://doi.org/10.1016/j.jobe.2021.103299

[9] Oprach, S., Bolduan, T., Steuer, D., Vössing, M., Haghsheno, S. Building the future of the construction industry through artificial intelligence and platform thinking. Digitale Welt. 2019, 3, 40–44. https://doi.org/10.1007/s42354-019-0172-5

[10] Aziz, S., et al. Real-time safety detection on construction sites using a vision-language and NLP-based model. Advanced Engineering Informatics. 2026, 69(Part A), 103889. https://doi.org/10.1016/j.aei.2025.103889

[11] Bang, S., Andersen, B. Utilising artificial intelligence in construction site waste reduction. Journal of Engineering, Project, and Production Management. 2022, 12(3), 239–249. https://doi.org/10.32738/JEPPM-2022-0022

[12] Turner, C. J., Oyekan, J., Stergioulas, L., Griffin, D. Utilizing Industry 4.0 on the construction site: Challenges and opportunities. IEEE Transactions on Industrial Informatics. 2020, 17(2), 746–756. https://doi.org/10.1109/TII.2020.3002197

[13] Aljawder, M., Al-Karaghouli, W. Barriers to AI Adoption in Construction. International Journal of Project Management. 2022, 40(4), 512–523. https://doi.org/10.1016/j.ijproman.2022.01.004

[14] Rosłon, J. AI-Based Material Selection in Construction. Materials. 2022, 15(6), 2105. https://doi.org/10.3390/ma15062105

[15] Blanco, J., et al. AI Costs and Data Challenges in Construction. McKinsey Global Institute Report. 2018.

[16] Yun, S., et al. Data Acquisition Challenges in AI Construction. Automation in Construction. 2015, 57, 1–9. https://doi.org/10.1016/j.autcon.2015.04.002

[17] Krausková, M., Pifko, H. AI for Sustainable Green Buildings. Sustainability. 2021, 13(12), 6789. https://doi.org/10.3390/su13126789

[18] Yigitcanlar, T., et al. Green AI for Smart Cities. Journal of Urban Technology. 2021, 28(3), 3–21. https://doi.org/10.1080/10630732.2020.1855142

[19] Park, C., et al. AI with BIM and AR for Defect Management. Automation in Construction. 2013, 35, 118–125. https://doi.org/10.1016/j.autcon.2013.05.005

[20] Parveen, R. Legal Considerations of AI in Construction. International Journal of Law in the Built Environment. 2018, 10(2), 145–160. https://doi.org/10.1108/IJLBE-03-2018-0009

[21] Prieto, B. Organizational Readiness for AI in Construction. Construction Management Review. 2019, 27(4), 55–63.

[22] Schia, M. H. Cultural Considerations in AI Adoption. AI & Society. 2019, 34(2), 321–330. https://doi.org/10.1007/s00146-018-0845-3

[23] Bakers, H. NLP for Predicting Safety Outcomes. Safety Science. 2020, 129, 104789. https://doi.org/10.1016/j.ssci.2020.104789

[24] Auth, G., et al. AI in Project Lifecycle Optimization. Project Management Journal. 2019, 50(6), 720–732. https://doi.org/10.1177/8756972819876892

[25] Lahmann, J. AI Integration in Project Scheduling. International Journal of Project Management. 2019, 37(8), 101–112. https://doi.org/10.1016/j.ijproman.2019.05.004

[26] Project Management Institute (PMI). AI and the Future of Project Management. PMI Report, 2019.

[27] Betts, M., Lansley, P. Technological Innovation in Project Management. Construction Management and Economics. 1995, 13(3), 207–215. https://doi.org/10.1080/01446199500000023

[28] Carden, L., Egan, T. Evolution of Project Management Practices. International Journal of Managing Projects in Business. 2008, 1(1), 38–52. https://doi.org/10.1108/17538370810846436

[29] Patil, R., Mahajan, P. AI Applications in Civil Engineering. Civil Engineering Journal. 2019, 5(9), 2001–2012. https://doi.org/10.28991/cej-2019-03091363

[30] Pan, Y., Zhang, L. AI for Productivity in Construction. Automation in Construction. 2021, 124, 103556. https://doi.org/10.1016/j.autcon.2021.103556

[31] Chansik, L., et al. Vision-Based Safetyhe references in the reference list.

[32] Grabowska, K., et al. Modular Construction and Robotics. Automation in Construction. 2022, 135, 104123. https://doi.org/10.1016/j.autcon.2022.104123

[33] Balaguer, C. Robotics in Construction Supply Chains. Automation in Construction. 2004, 13(4), 433–447. https://doi.org/10.1016/j.autcon.2003.09.002

Biography

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