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Artificial Intelligence in Construction 4.0 - A Systematic Review of Current Applications and Future Prospects

This critical review examines the advancement of AI technology driving Industry 4.0 transformation within construction. The study thoroughly examines AI applications in 7 essential areas like structural design and analysis; material design and Optimization; offset manufacturing and automation; smart building operation and health; construction management, progress and safety; architectural design and visualization; sustainability, life cycle analysis and circularity. By covering the complete building life cycle beginning with design to construction, maintenance and decommissioning- this article provides efficient insights by the integration of AI/ML Technology. The review concludes by presenting 3 crucial requirements for effective building industry 4.0 implementation: standardized analysis protocols, cross-disciplinary collaboration frameworks, and ethical implementation guidelines. The review paper summarizes by highlighting promising study direction and evolving technological synergies that may shape future industry advancement.

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