

## **Orientation towards Using Approved Devices as A Part Of Artificial Intelligence Technology in Architecture and Construction Field**

**Mona Mohamed Saleh Hassen**

assistant prof in the department of architecture, the higher institute of engineering-el shorouk, egyptemail: dr\_mona.saleh@yahoo.com.

### ***Abstract:***

This paper presented a modified framework for Artificial Intelligence (AI) technology through construction industry for sustainable city harvesting. The results were able to classify major challenges facing engineers which revolving project life cycle in the new building technologies; in order to set applicable solutions via using the Internet of Things (IoT), automated devices, Smart Building (SB) and Artificial Intelligence (AI) technology in architecture and construction industry. This paper aims to develop the feasibility of artificial intelligence (AI) devices in order to drive changes that impacts directly both architecture and construction field goals and objectives. The relevance is to face and develop project life-cycle construction processes and challenges to improve its precision. Determining drones and robots devices towards dealing with repetitive and physically demanding tasks and give guidance to the automated devices to make their municipalities smarter and digital, and to propose Machine Learning (ML) as a part of Smart Digital Sustainable City (SDSC) while preserving the sustainable building and construction experiences.

### ***Keywords:***

Artificial Intelligence (AI), Machine Learning (ML), Smart Digital Sustainable City (SDSC), Internet of Things (IoT), Smart Building (SB).

### ***References:***

- 1- Artificial Intelligence In Construction Sector. Chamaki, Franki. 2, Spain : Politecnica, 3 September 2019, Building & Management., Vol. 3. 2530-8157.
- 2- Privacy concerns in smart cities. Zoonen, Liesbet van. 3, Netherlands : El-Sevier Inc., July 2016, Vol. 33, pp. Pages 472-480.
- 3- Robotics and Automation in the Construction Industry. Earnest, G. Scott. s.l. : National Institute for Occupational Safety and Health (NIOSH), 2016.
- 4- Rao, Sumana. The Benefits of AI In Construction. 6 April 2022.
- 5- Clark, Alisson. Global Impact. Florida, USA : University of Florida New, 2017.
- 6- Fon, Pengubah. Advisory, Digital, Capital and Projects. Drones in Construction: What Does It Mean for the Industry. 13 October 2023.
- 7- Economics and logistics in the digitalization of the transport industry. Tugashev, A.A. Russia : Scientific Publications, 2018, Vol. 2.
- 8- Koh, Serge A. Wich and Lian Pin. Conservation Drones: Mapping and Monitoring Biodiversity. England : Oxford University Press , June, 2018. pp. 1–12.
- 9- Machine learning for architectural design: Practices and infrastructure. Martin Tamke, Paul Nicholas, and Mateusz Zwierzycki. 2, s.l. : Sage Journals, 2018, International Journal of Architectural Computing (IJAC) , Vol. 16. 10.1177/1478077118778580.
- 10- A Formal Definition of Big Data Based on its Essential Features. Andrea De Mauro, Marco Greco, Michele Grimaldi. 3, s.l. : ResearchGate, 2016, Vol. 65, pp. 122-135.
- 11- Jayavardhana Gubbi, Rajkumar Buyya, Slaven Marusic ,Marimuthu Palaniswami. Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions. Australia : Australian Research Council's LIEF, 2012.
- 12- The Internet-of-Things: Reflections on the past, present and future from a user-centered and smart environment perspective. Chin Jeannettea, Callaghan Vicb, Allouch Somaya Ben. 1, s.l. : IOS Press Content Library, 2019, Journal of Ambient Intelligence and Smart Environments, Vol. 11, pp. 45-69.
- 13- Machine learning in architecture. Beyza Topuz, Neşe Çakici Alp. s.l. : El-Sevier, October 2023, Automation in Construction, Vol. 154, p. 105012.
- 14- Philip Tanor, Yujian Tang. Machin Llearning (ML) Architecture. s.l. : DEEPCHECKS GLOSSARY, 2023.
- 15- A Scalable Machine Learning Online Service for Big Data Real-Time Analysis. Alejandro Baldominos, Esperanza Albacete, Yago Sáez, Pedro Isasi. Orlando (FL), United States of America : IEEE, December 2014, Symposium on Computational Intelligence in Big Data (CIBD).
- 16- Architecture and Framework for Machine Learning as a Service. Rammohan Vadavalasa, Gali Nageswara Rao. 3, s.l. : ResearchGate, April 2021, International Journal of Scientific Research & Engineering Trends, Vol. 6.
- 17- (NCSC), National Cyber Security Centre. Principles for the security of. s.l. : Crown, 2022.
- 18- Robotics in Construction. Balzan, Alberto. 1, Venice : International Journal of High-Rise Building, 2020, Vol. 9.
- 19- Robots Working with Humans or Humans Working with Robots? Searching for Social Dimensions in New Human-Robot Interaction in Industry. António Brandão Moniz, Bettina Krings. 3, s.l. : ResearchGate, 2016, Societies, Vol. 6.
- 20- Moore, Brian. Construction Robots Market Size, Share & Trends Analysis Report By Function, By Type (Traditional Robot, Robotic Arm, Exoskeleton), By End-use (Industrial, Residential, Commercial), By Region, And Segment Forecasts, 2023 - 2030. State of California, USA : Grand View Research, 2022. GVR-4-68040-032-8.

- 21- Kirstin H. Petersen, Nils Napp, Robert Stuart-Smith, Daniela Rus, Mirko Kovac. A review of collective robotic construction. Science Robotics. Washington, New-York : The American Association for the Advancement of Science, 2020. (ISSN 2470-9476).
- 22- 10 Biggest Challenges in Robotics. Crowe, Steve. Boston, USA : Science Robotics Journal, February, 2018.
- 23- Ram Kumar Mishra, Ch Lakshmi Kumari, P. S. Janaki Krishna, Anupama Dubey. Smart Cities for Sustainable Development: An Overview. Smart Cities for Sustainable Development. s.l. : ResearchGate, 2022, pp. 1-12.
- 24- Mattias Höjer, Josefin Wangel. Smart Sustainable Cities: Definition and Challenges. [book auth.] M. Höjer and J. Wangel. [ed.] Bernhard Aebischer Lorenz Hilty. ICT Innovations for Sustainability. s.l. : Springer, 2014, pp. 333-349.
- 25- Smart Sustainable Cities: The Essentials for Managers' and Leaders' Initiatives within the Complex Context of Differing Definitions and Assessments. Fabienne T. Schiavo, Cláudio F. de Magalhães. Basel, Switzerland : MDPI, August 2022, Smart Cities, Vol. 5, pp. 994–1024.
- 26- Digital skin of the construction site: Smart sensor technologies towards the future smart construction site. Edirisinghe, Ruwini. 13, s.l. : ResearchGate, September 2018, Engineering Construction & Architectural Management , Vol. 26.
- 27- (CLC), Construction Leadership Council. Smart Construction - a guide for housing clients. United Kingdom : CLC, 2018.
- 28- Boman, Magnus. Artificial Intelligence in Cities of the Future. Swedish : Viable Cities, 2019. 978-91-7899-002-3.

### ***Paper History:***

**Paper received November 5, 2023, Accepted December 25, 2023, Published on line March 1, 2024**