

The Part of Appliance Culture and the Internet of Things in Smart Buildings for Energy Proficiency- A Review Paper

Kunal Dilipkumar Rathod and Jagravi Manohar Wasekar

U.G. Students, Department of Computer Science and Engineering

Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, Maharashtra, India

Abstract: *Machine learning can be used to automate a wide range of tasks. Smart buildings, which use the Internet of Things (IoT) to connect building operations, enable activities, such as monitoring temperature, safety, and maintenance, for easier controlling via mobile devices and computers. Smart buildings are becoming core aspects in larger system integrations as the IoT is becoming increasingly widespread. The IoT plays an important role in smart buildings and provides facilities that improve human security by using effective technology-based life-saving strategies. This review highlights the role of IoT devices in smart buildings. The IoT devices platform and its components are highlighted in this review. Furthermore, this review provides security challenges regarding IoT and smart buildings. The main factors pertaining to smart buildings are described and the different methods of machine learning in combination with IoT technologies are also described to improve the effectiveness of smart buildings to make them energy efficient.*

Keywords: machine learning; Internet of Things; smart buildings; challenges in smart buildings; IoT applications

REFERENCES

- [1]. Zúquete, A.; Gomes, H.; Amaral, J.; Oliveira, C. Security-Oriented Architecture for Managing IoT Deployments. *Symmetry* 2019, 11, 1315. [CrossRef]
- [2]. Nappi, I.; de Campos Ribeiro, G. Internet of Things technology applications in the workplace environment: A critical review. *J. Corp. Real Estate* 2020. [CrossRef]
- [3]. Dos Santos, D.R.; Dagrada, M.; Costante, E. Leveraging operational technology and the Internet of things to attack smart buildings. *J. Comput. Virol. Hacking Tech.* 2021, 17, 1–20. [CrossRef]
- [4]. Khajenasiri, I.; Estebsari, A.; Verhelst, M.; Gielen, G. A review on Internet of Things solutions for intelligent energy control in buildings for smart city applications. *Energy Procedia* 2017, 111, 770–779. [CrossRef]
- [5]. Machorro-Cano, I.; Alor-Hernández, G.; Paredes-Valverde, M.A.; Rodríguez-Mazahua, L.; Sánchez-Cervantes, J.L.; OlmedoAguirre, J.O. HEMS-IoT: A big data and machine learning-based smart home system for energy saving. *Energies* 2020, 13, 1097. [CrossRef]
- [6]. Mohanta, B.K.; Jena, D.; Satapathy, U.; Patnaik, S. Survey on IoT security: Challenges and solution using machine learning, artificial intelligence and blockchain technology. *Internet Things* 2020, 11, 100227. [CrossRef]
- [7]. Mavropoulos, O.; Mouratidis, H.; Fish, A.; Panaousis, E.; Kalloniatas, C. A conceptual model to support security analysis in the internet of things. *Comput. Sci. Inf. Syst.* 2017, 14, 557–578. [CrossRef]
- [8]. Lawal, K.; Rafsanjani, H.N. Trends, benefits, risks, and challenges of IoT implementation in residential and commercial buildings. *Energy Built Environ.* 2021, 3, 251–266. [CrossRef]
- [9]. Cui, L.; Yang, S.; Chen, F.; Ming, Z.; Lu, N.; Qin, J. A survey on application of machine learning for Internet of Things. *Int. J. Mach. Learn. Cybern.* 2018, 9, 1399–1417. [CrossRef]
- [10]. Javed, A.; Larijani, H.; Wixted, A. Improving energy consumption of a commercial building with IoT and machine learning. *IT Prof.* 2018, 20, 30–38. [CrossRef]

- [11]. Hussain, F.; Hassan, S.A.; Hussain, R.; Hossain, E. Machine learning for resource management in cellular and IoT networks: Potentials, current solutions, and open challenges. *IEEE Commun. Surv. Tutor.* 2020, 22, 1251–1275. [CrossRef]
- [12]. Blasch, E.; Pham, T.; Chong, C.-Y.; Koch, W.; Leung, H.; Braines, D.; Abdelzaher, T. Machine learning/artificial intelligence for sensor data fusion—opportunities and challenges. *IEEE Aerosp. Electron. Syst. Mag.* 2021, 36, 80–93. [CrossRef]