

Artificial Intelligence in Occupational Health and Safety: A New Era of Workplace Protection

Claire Petit*

Department of Biotechnology, University of Grenoble Alpes, France

Introduction

Occupational Health and Safety (OHS) is a fundamental aspect of workplace management, ensuring that employees are protected from hazards and able to work in safe environments. Traditionally, OHS practices have relied on manual inspections, incident reporting, and regulatory compliance. However, the rise of artificial intelligence (AI) is transforming this field by introducing smarter, data-driven solutions. AI's ability to analyze large datasets, detect patterns, and predict risks makes it an invaluable tool for preventing accidents, improving compliance, and fostering safer workplaces [1,2].

Discussion

AI applications in OHS are diverse, ranging from hazard detection to predictive safety management. Machine learning algorithms can analyze historical data from workplace accidents, near misses, and environmental conditions to identify trends and predict where risks are most likely to occur. This allows organizations to implement preventive measures before incidents happen. For instance, AI-powered predictive models can highlight high-risk zones in a construction site or anticipate equipment failures in manufacturing plants [3-6].

Another significant use of AI is in real-time monitoring and surveillance. With the help of computer vision, cameras integrated with AI systems can detect unsafe behaviors such as workers not wearing helmets, improper lifting techniques, or unauthorized access to restricted areas. These systems can instantly alert supervisors or the workers themselves, reducing the likelihood of accidents. Similarly, AI-enabled wearable devices can track workers' vital signs, monitor fatigue, and detect exposure to hazardous substances, ensuring timely interventions [7,8].

AI also supports ergonomics and injury prevention. Tools powered by AI can analyze workers' postures and movements, providing feedback to minimize repetitive strain injuries or musculoskeletal disorders. For example, smart sensors can monitor warehouse workers' lifting techniques, suggesting safer alternatives to prevent long-term health issues [9,10].

In addition to preventing accidents, AI enhances regulatory compliance and reporting. Natural language processing tools can review safety documents, inspection reports, and regulations, ensuring organizations stay updated with evolving laws. Automated systems also reduce human error in compliance audits and streamline documentation, saving time and resources.

Despite its advantages, integrating AI into OHS is not without challenges. High implementation costs, data privacy concerns, and resistance to technological change are significant barriers. Moreover, AI systems must be transparent and reliable, as incorrect predictions or false alarms can undermine trust. Therefore, AI should complement—not replace—human expertise, with safety officers and workers playing a crucial role in interpreting and applying AI insights.

Conclusion

AI has the potential to transform Occupational Health and Safety by shifting the focus from reactive responses to proactive prevention. Through predictive analytics, real-time monitoring, ergonomics support, and compliance management, AI enhances workplace safety and efficiency. While challenges such as costs and privacy must be addressed, the benefits far outweigh the drawbacks. By embracing AI, organizations can create safer, healthier, and more productive workplaces, marking a significant step toward the future of occupational health and safety.

References

1. Wei J, Goldberg MB, Burland V, Venkatesan MM, Deng W, et al. (2003) Complete genome sequence and comparative genomics of *Shigella flexneri* serotype 2a strain 2457T. *Infect Immun* 71: 2775-2786.
2. Kuo CY, Su LH, Perera J, Carlos C, Tan BH, et al. (2008) Antimicrobial susceptibility of *Shigella* isolates in eight Asian countries, 2001-2004. *J Microbiol Immunol Infect*; 41: 107-11.
3. Gupta A, Polyak CS, Bishop RD, Sobel J, Mintz ED (2004) Laboratory-confirmed shigellosis in the United States, 1989- 2002: Epidemiologic trends and patterns. *Clin Infect Dis* 38: 1372-1377.
4. Murugesan P, Revathi K, Elayaraja S, Vijayalakshmi S, Balasubramanian T (2012) Distribution of enteric bacteria in the sediments of Parangipettai and Cuddalore coast of India. *J Environ Biol* 33: 705-11.
5. Torres AG (2004) Current aspects of *Shigella* pathogenesis. *Rev Latinoam Microbiol* 46: 89-97.
6. Bhattacharya D, Bhattacharya H, Thamizhmani R, Sayi DS, Reesu R, et al. (2014) Shigellosis in Bay of Bengal Islands, India: Clinical and seasonal patterns, surveillance of antibiotic susceptibility patterns, and molecular characterization of multidrug-resistant *Shigella* strains isolated during a 6-year period from 2006 to 2011. *Eur J Clin Microbiol Infect Dis*; 33: 157-170.
7. Bachand N, Ravel A, Onanga R, Arsenault J, Gonzalez JP (2012) Public health significance of zoonotic bacterial pathogens from bushmeat sold in urban markets of Gabon, Central Africa. *J Wildl Dis* 48: 785-789.
8. Saeed A, Abd H, Edvinsson B, Sandström G (2009) *Acanthamoeba castellanii* an environmental host for *Shigella dysenteriae* and *Shigella sonnei*. *Arch Microbiol* 191: 83-88.
9. Iwamoto M, Ayers T, Mahon BE, Swerdlow DL (2010) Epidemiology of seafood-associated infections in the United States. *Clin Microbiol Rev* 23: 399-411.
10. Von-Seidlein L, Kim DR, Ali M, Lee HH, Wang X, Thiem VD, et al. (2006) A multicentre study of *Shigella* diarrhoea in six Asian countries: Disease burden, clinical manifestations, and microbiology. *PLoS Med* 3: e353.

*Corresponding author: Claire Petit, Department of Biotechnology, University of Grenoble Alpes, France, Email: petit039@yahoo.com

Received: 01-May-2025, Manuscript No: omha-25-171466, **Editor Assigned:** 03-May-2025, Pre QC No: omha-25-171466 (PQ), **Reviewed:** 17-May-2025, QC No: omha-25-171466, **Revised:** 22-May-2025, Manuscript No: omha-25-171466 (R), **Published:** 29-May-2025, DOI: 10.4172/2329-6879.1000586

Citation: Claire P (2025) Artificial Intelligence in Occupational Health and Safety: A New Era of Workplace Protection. *Occup Med Health* 13: 586.

Copyright: © 2025 Claire P. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.