IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 13, May 2023

# Helmet Detection for Workers Safety

**Prof. Vanita Buradkar[1], Shejal Potuwar[2], Priya Kaveri[3], Shreya Kotpalliwar[4], Sonali Bode[5]**
Guide, Computer Science Engineering Department[1]
Students, Computer Science Engineering Department[2,3,4,5]
Rajiv Gandhi College of Engineering, Research and Technology, Chandrapur, Maharashtra, India.

***Abstract:*** *Ensuring safety in industrial and construction environments is paramount for the well-being of employees. Real-time object detection plays a crucial role in detecting safety compliance violations, such as workers not wearing safety helmets. To address this issue, we propose a digital safety helmet monitoring system based on convolutional neural networks (CNNs). Our approach combines machine learning and image processing techniques to accurately identify whether workers are wearing helmets or not. By leveraging a diverse dataset and considering various factors like colour, we train the CNN algorithm to detect helmets effectively. Additionally, we integrate an alarm system to provide immediate alerts for non-compliance. Our system utilizes OpenCV for camera access, allowing real-time monitoring and efficient processing. Compared to previous methods, our approach demonstrates improved speed and effectiveness in ensuring worker safety. The automatic monitoring method presented in this project contributes to enhancing construction site safety by accurately detecting safety helmet usage. Through the utilization of live images and robust algorithms, our system achieves high accuracy rates, making it a valuable tool for safety enforcement in industrial and construction environments.*

**Keywords:** Safety, Industrial, Construction, Real time object detection, OpenCV, Automatic Monitoring, Image Processing

## REFERENCES

[1] Swapnil Kurkute , Nikita Ahirao , R. G. Ankad , V. B. Khatal "IOT Based Smart System for the Helmet Detection Proceedings of International" in 2019.
[2] Munkh-ErdeneOtgonbold, "An Extended Dataset and Benchmarking for Safety Helmet Detection" in 2022.
[3] "Safety Helmet Detection in Industrial Environment using Deep Learning" in 2020 by Ankit Kamboj and Nilesh Powar, Cummins Technologies India Pvt.
[4] Han LiangORCIDandSuyoungSeo *ORCID, "Automatic Detection of Construction Workers' Helmet Wear Based on Lightweight Deep Learning".
[5] Doshi, A., &Gurav, A. (2020). Safety helmet detection and alert system for workers in construction sites. 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC), Coimbatore, India.
[6] Ramya, R., & Mahalakshmi, V. (2020). Automatic detection of safety helmet for industrial workers. International Journal of Advanced Science and Technology, 29(9), 3087-3094.
[7] Z. Y. Wang, Design and Implementation of Detection System of Warning Helmets Based on Intelligent Video Surveillance, Beijing University of Posts and Telecommunications, Beijing, China, 2018.
[8] J. Huang, V. Rathod, C. Sun et al., "Speed/accuracy trade-offs for modern convolutional object detectors," in Proceedings of the 2017 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 3296-3297, Honolulu, HI, USA, July 2017.
[9] H. Wu and J. Zhao, "Automated visual helmet identification based on deep convolutional neural networks," in Proceedings of the 13th International Symposium on Process Systems Engineering (PSE 2018), vol. 44, pp. 2299–2304, San Diego, CA, USA, July 2018.
[10] W. Liu, D. Anguelov, D. Erhan et al., "Single shot multibox detector," in Proceedings of the ECCV 2016: Computer Vision-ECCV 2016, vol. 9905, pp. 21–37, Springer, Amsterdam, The Netherlands, October 2016.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 13, May 2023