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| Title | Real-Time Obstacle Detection with YOLOv8 in a WSN Using UAV Aerial Photography | | |
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| Published Journal Name | Journal of Imaging | | |
| Type of Publication | Article | | |
| Volume | 10 | Issue | 9 |
| Publisher | MDPI Journal of Imaging | | |
| Publication Date | 10 October 2023 | | |
| ISSN | (ISSN 2313-433X) | | |
| DOI | 10.3390/jimaging9100216 | | |
| URL | https://www.mdpi.com/2313-433X/9/10/216 | | |
| Other Related Info. |  | | |
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| Abstract |  |
| Nowadays, wireless sensor networks (WSNs) have a significant and long-lasting impact on numerous fields that affect all facets of our lives, including governmental, civil, and military applications. WSNs contain sensor nodes linked together via wireless communication links that need to relay data instantly or subsequently. In this paper, we focus on unmanned aerial vehicle (UAV)-aided data collection in wireless sensor networks (WSNs), where multiple UAVs collect data from a group of sensors. The UAVs may face some static or moving obstacles (e.g., buildings, trees, static or moving vehicles) in their traveling path while collecting the data. In the proposed system, the UAV starts and ends the data collection tour at the base station, and, while collecting data, it captures images and videos using the UAV aerial camera. After processing the captured aerial images and videos, UAVs are trained using a YOLOv8-based model to detect obstacles in their traveling path. The detection results show that the proposed YOLOv8 model performs better than other baseline algorithms in different scenarios—the F1 score of YOLOv8 is 96% in 200 epochs. | |