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Peer Review

Review of: "Fall Detection in Passenger Elevators using Intelligent Surveillance Camera Systems: An Application with YoloV8 Nano Model"

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Peer Review of the Manuscript: "Fall Detection in Passenger Elevators using Intelligent Surveillance Camera Systems: An Application with YoloV8 Nano Model"

1. Strengths of the Paper

Practical and Novel Application: The focus on fall detection in elevators addresses a critical safety concern in high-rise buildings, offering significant real-world value.

Lightweight Model Selection: The choice of YoloV8 Nano is well-justified for resource-constrained environments like elevators, balancing efficiency and performance.

Competitive Results: The reported metrics (85% precision, 82% recall) demonstrate the model’s effectiveness in detecting falls, aligning with industry needs.

Data Augmentation Strategy: The use of Roboflow for dataset expansion (from 300 to 10,000 images) mitigates initial data scarcity and enhances model robustness.

Real-World Deployment: Implementation on an NVIDIA Jetson device validates practical feasibility and readiness for industrial integration.

2. Weaknesses and Limitations

Limited Dataset Diversity:

Only 300 original images were collected, raising concerns about dataset representativeness (e.g., variations in lighting, elevator types, passenger density).

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Heavy reliance on simulated/augmented data may not capture real-world complexities (e.g., reflections, occlusions).

Incomplete Model Comparisons:

The lack of benchmarking against state-of-the-art models (e.g., Vision Transformers, other YOLO variants like YOLOv8s) weakens claims of superiority.

There is no justification for selecting YoloV8 Nano over alternatives (e.g., YOLOv9, EfficientDet).

Omission of Real-Time Metrics:

Critical performance indicators (e.g., FPS, latency) for real-time systems are missing, despite deployment on Jetson hardware.

Unaddressed Practical Challenges:

The impact of dynamic lighting, glass reflections, or crowded elevators on detection accuracy is not evaluated.

3. Recommendations for Improvement

Enhance Dataset Quality:

Collect more diverse real-world data from elevators with varying lighting, angles, and passenger scenarios.

Incorporate depth sensors or thermal cameras to improve detection in low-visibility conditions.

Expand Comparative Analysis:

Benchmark against newer models (e.g., YOLOv9, DETR) and hybrid approaches (e.g., CNN + Transformer architectures).

Include additional metrics (e.g., F1-score, ROC-AUC) for a holistic performance evaluation.

Address Environmental Variability:

Test the model under challenging conditions (e.g., glare, rapid movements, multi-person scenarios).

4. Summary and Final Recommendation

This paper presents a promising approach to fall detection in elevators using YoloV8 Nano, with clear practical relevance. However, gaps in dataset diversity, comparative benchmarking, and real-time

performance reporting hinder its impact. Addressing these issues would strengthen its contribution to both academia and industry.

Decision: Major Revisions Required

Please expand dataset diversity, benchmark against newer models, and report real-time metrics.

Scoring:

Innovation: 4/5

Methodology: 3.5/5

Results: 4/5

Applicability: 4/5

Clarity: 4/5

Overall Score: 3.9/5

Declarations

Potential competing interests: No potential competing interests to declare.