Literature Survey (Tabular)

Author(s)	Title	Methodology/ Approach	Dataset/ Input Source	Imaging Technology	Study Area	Evaluation Metrics (paper)	Key Findings	Limitations	Our Contribution	Our Project Evaluation Metrics
Raza et al., 2021	Real-Time Trash Detection for Modern Societies Using CCTV	CNN-based object detection	2,100 annotated CCTV images	Fixed-position CCTV cameras	Urban streets, public bins	mAP ~0.82, Accuracy ~90%	High accuracy for 8 trash categories; effective real-time CCTV detection	Only CCTV-based; no citizen input; no predictive analytics	Added dual data streams (CCTV + citizen uploads), predictive risk heatmaps, real-time auto-tasking	mAP, precision-recall for YOLOv8; cleanup task resolution time; citizen satisfaction score
Malik et al., 2023	Machine Learning-Based Automatic Litter Detection & Classification in Smart Cities	Transfer learning with CNN (VGG16, ResNet)	Urban litter images (small dataset)	Mobile & handheld cameras	Smart city streets, parks	Accuracy ~93%	Effective multi-category classification	Small dataset; no workflow automation or gamification	Integrated crowdsourced reporting with auto-assignment, gamified citizen engagement	Classification accuracy for uploads; report-to-task latency
van Lieshout et al., 2023	Advancing Deep Learning Detection of Floating Litter	Fine-tuned Squeeze Net, DenseNet	Open water litter dataset	Fixed riverbank cameras	Riverways & coastal areas	Accuracy ~90%, F1 ~0.88	Robust detection in aquatic environments	Narrow domain; no municipal integration	Applied robust YOLOv8 adaptable to varied urban environments with municipal API integration	Model performance under varied lighting/weather; false positive rate

Pathak et al., 2024	Smart City Community Watch – Camera-Based Illegal Dumping Detection	DL-based object/ event detection	CCTV smart city feeds	High-res public CCTV	Municipal dumping hotspots	mAP ~0.85	Detects illegal dumping in urban zones	No predictive risk maps or public engagement	Added predictive analytics + gamified leaderboard for proactive cleanliness	Heatmap prediction accuracy; engagement index
Manivannan et al., 2024	Garbage Monitoring & Management Using DL	UAV imagery, clustering + YOLOv4 detection	UAV municipal zone images	Drone-mounted cameras	Municipal & peri-urban	mAP ~0.845	Detection + route optimization	Not continuous monitoring; no citizen reporting	Replaced UAV with cost-effective CCTV & mobile app uploads for real-time detection and reporting	Cost per detection; deployment scalability; cleanup proof verification accuracy
Sun et al., 2023	YOLOv5-OCDS: An Improved Garbage Detection Model	YOLOv5 + ODConv + Soft-NMS + C3DCN	Annotated street garbage images	RGB surveillance cameras	Urban street scenes	mAP@0.5 (95.43%), Recall (91.1%)	High real-time detection performance	Increased model complexity	We apply YOLOv8 with cleaner integration for real-time dashboards and citizen feedback loops	mAP, Precision, Recall, Dashboard response latency, Cleanup verification rate
Gilani et al., 2023	Skip-YOLO in Multi-Scenes	YOLOv4-tiny + Skip connections	Multi-scene garbage images	Multi-angle camera setup	Urban smart spaces	mAP (88.3%), Precision (85.7%)	Robust in complex object environments	Struggles with novel trash types	We support live citizen image uploads and multi-source input (CCTV + app)	Detection accuracy, Cleanliness score error rate, Heatmap risk prediction accuracy

Cai et al., 2022	YOLOG: Lightweight Network	Dilated-Deformable CNN + YOLOv4	Domestic garbage dataset	Edge camera modules (low-power)	IoT/ embedded systems	AP@0.5 (94.58%), GFLOPs (6.05)	Lightweight & efficient	Supports only 4 classes	Our system balances lightweight backend with diverse waste classification & location mapping	FPS, Model size vs accuracy trade-off, Post-cleanup verification success rate
Lin et al., 2022	Soft-YOLOX for Quantity Detection	Soft-NMS + YOLOX	Manhole CCTV feeds	Fixed-angle surveillance cameras	Flood-prone zones	mAP (91.89%), FPS (15.46)	Estimates trash quantity effectively	Static fixed-angle only	We implement zone-wise tracking with cleanup assignment and citizen validation	Cleanup time, Citizen rating match %, Task assignment success rate
Zhou et al., 2024	EcoDetect-YOLO in Complex Scenes	YOLOv5n + GhostNet + CBAM	Varied lighting, background sets	Outdoor CCTV + adaptive lighting	Mixed public areas	mAP@0.5 (92.14%), F1-score (0.90), FPS (32.9)	Works under difficult lighting conditions	Drop in nighttime accuracy	We include predictive risk analytics using events/footfall + dashboard heatmaps	Predictive risk score accuracy, Daily/Weekly resolution rate, Alert response time