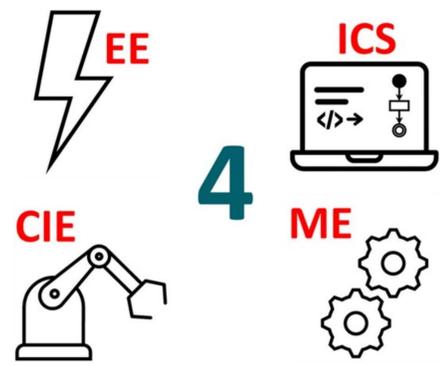


AI- Integrated Wall Painting Robot For Enhanced Painting Quality

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Problem Statement

Manual wall painting is slow, labor-intensive, and inconsistent. An autonomous system is needed to detect surfaces, plan efficient paths, and apply paint accurately for better consistency and reduced effort.

Constrains

- Maximum project budget: $\leq 15,000$ SAR
- Robot total mass: ≤ 70 kg
- System continuous runtime: ≥ 30 minutes
- Electronic system non-interference: No interference with nearby electronics

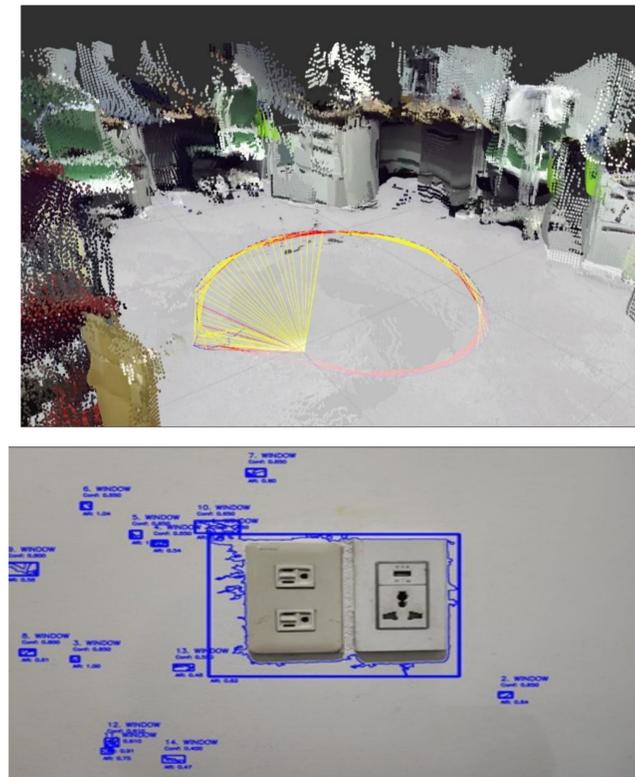
Specifications

- Smart charging cutoff: $85\% \pm 2\%$
- Maximum vertical reach: ≥ 1.5 meters
- Sprayer flow rate: ≤ 0.5 L/min $\pm 10\%$
- Final paint coverage: $\geq 98\%$
- SLAM map update rate: ≥ 5 Hz
- Obstacle detection accuracy: ± 3 cm
- Object recognition confidence: ≥ 0.6 (60%)

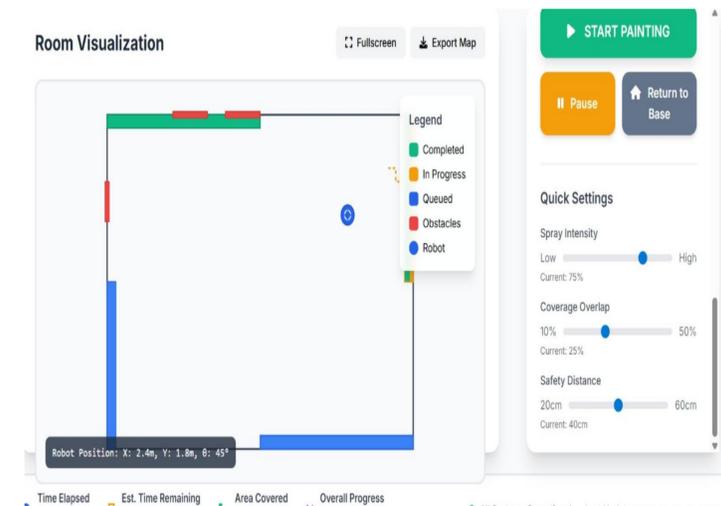
Prototype Design



Testing & Validation



Dashboard



Conclusion

The wall-painting robot demonstrates autonomous surface detection, path planning, and precise painting using advanced sensors and control systems. By integrating robotics, mechatronics, and intelligent algorithms, the system achieves efficient operation, high-quality coverage, and reduced human effort, highlighting the potential of automation in construction and maintenance tasks.

System Structure

