



شركة ابتكارات حادة
Sharp Innovations
Innovating The Tech Experience

POTHOLE DETECTION SYSTEM



OVERVIEW

The AI Smart City Pothole Detection System by Sharp Innvotech is an automated urban infrastructure solution designed to identify, map, and prioritize road surface damage. By utilizing high-resolution camera feeds and vehicle-mounted sensors, the system performs real-time computer vision analysis to detect potholes, cracks, and road depressions as municipal vehicles travel their regular routes.



CHALLENGES

- 1. Reactive Maintenance:** Traditional surveys rely on manual, time-consuming visual inspections, meaning road hazards are often ignored until they cause vehicle damage or accidents.
- 2. Operational Blind Spots:** Large-scale city infrastructure is difficult to monitor comprehensively, leading to gaps in road health data and missed maintenance opportunities.
- 3. Inefficient Resource Allocation:** Without objective severity metrics, maintenance crews often prioritize repairs based on subjective observations rather than data-backed urgency.
- 4. Environmental Degradation:** Harsh environmental factors, such as extreme heat and dust, cause asphalt to deteriorate rapidly, making manual tracking cycles insufficient.



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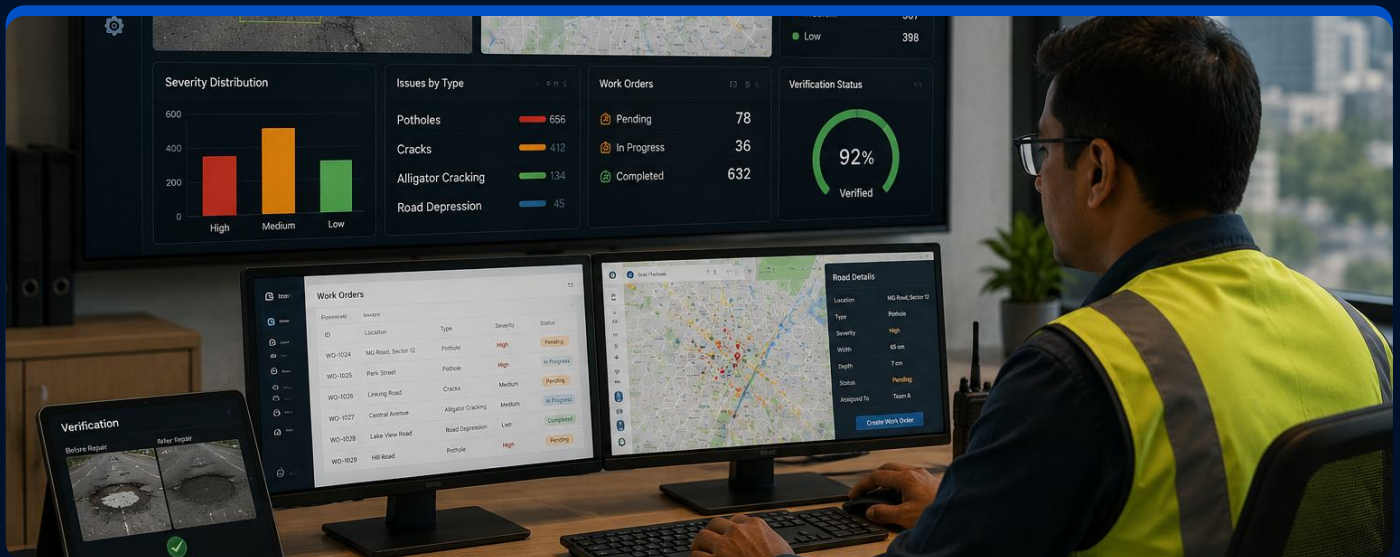


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ANALYSIS

1. **Centralized Road Intelligence:** Transitions pavement management from fragmented, human-dependent surveys to a unified digital ecosystem, acting as a single source of truth for road surface health.
2. **Proactive Defect Mitigation:** Leverages advanced deep learning models to identify degradation in real time, shifting operations from reactive patching to predictive infrastructure management.
3. **Scalable Urban Coverage:** Designed to integrate with existing municipal fleets (such as sanitation vehicles and public transit), enabling comprehensive city-wide monitoring without capital-intensive hardware investments.
4. **Objective Data Accountability:** Replaces human estimation with automated dimension and GPS measurements, providing a verifiable foundation for budget planning and contractor audits.

SOLUTIONS



1. **Automated Surface Sensing:** Employs computer vision to continuously scan for road cracks, alligator cracking, and potholes as vehicles traverse the city.
2. **Precise GPS Geotagging:** Maps every defect to its exact location, allowing maintenance teams to navigate directly to the hazard.
3. **Automated Severity Scoring:** Classifies road defects by width and depth to ensure high-risk hazards are addressed before they expand.
4. **Command Dashboard Integration:** Synced directly with municipal GIS platforms to visualize road health in a centralized map, generating automated work orders for paving crews.
5. **Verification Loops:** Post-repair scans confirm that maintenance was completed effectively, closing the loop on the infrastructure lifecycle.

KEY FEATURES



Enhanced Transport Safety

Proactive detection reduces vehicle accident risks and prevents structural damage to cars and public transport.



Accelerated Repair Cycles

Automated digital work orders ensure paving crews are dispatched immediately to critical areas.



Lowered Maintenance Costs

Extending the functional lifespan of streets through early intervention prevents the need for massive, expensive emergency resurfacing.



Data-Driven Pavement Planning

Historical road health logs empower municipal administrators to plan long-term asphalt investments with higher precision.



Public Trust & Satisfaction

Well-maintained, smooth city roads significantly improve the daily commute and support confidence in municipal infrastructure projects.

END RESULT

- **Optimized Infrastructure Longevity:** A resilient road network that remains safe and usable for years longer through proactive, AI-supported care.
- **Sovereign Smart City Alignment:** A secure, NCA-compliant digital framework that supports the efficiency and innovation goals of Saudi Vision 2030.
- **Operational Excellence:** A seamless transition from manual, error-prone road monitoring to a precise, automated, and cost-effective maintenance lifecycle.



TECHNOLOGY



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