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المؤتمر الدولي الثاني والعشرون لإدارة الأصول والمرافق والصيانة The 22nd International Asset, Facility & Maintenance Management Conference

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Impact of Tailored Robots on the Construction Engineering Industry

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26-28 January 2025 The Ritz-Carlton Jeddah, Kingdom of Saudi Arabia

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Introduction

Tailored robots are transforming **operational efficiency** in building and facilities management.





Benefits: Enhance precision, consistency, and reduce human error and costs.

Key Functions: Automate routine tasks (cleaning, maintenance, inspections, Else).





Historical Context

Early Robotics: Originated in the 20th century; evolved from mechanical devices to modern automation.

Construction Integration: Increased interest in robotics due to labor shortages and project complexities since the 1990s.







Tailored Robots in Action



Robotic Cleaning Systems Widely used in airports and hospitals for autonomous cleaning



phase analysis methodology. (Ri, S., Ye, J., Toyama, N. et al.) **Inspection Robots** Drones for building inspections and highprecision maintenance tasks



HVAC Robots Monitor air quality and system performance for energy efficiency







Robotics in Construction



Robots' Impact on Productivity Is Already Significant Compared to Other Major Technologies







Market Growth Value projected to reach \$166 million by 2026 (19% CAGR)

Productivity Gains Up to 30% increase in projects using robotic technologies

Safety Enhancements

20-40% reduction in workplace accidents with robotic assistance





AI Integration in Construction Robotics



AI Capabilities Drones for building inspections and highprecision maintenance tasks



Safety Monitoring Real-time hazard identification and risk management







Future Directions





Collaborative Robots Focus on human-robot teamwork for improved workflows

Autonomous Systems Research on fully autonomous robots for construction tasks



Prefabrication Automation

Explore robotics in modular construction practices

Safety Protocols: Research on AI-driven safety measures for construction sites.





Robots in the Middle East



Dubai Municipality launches construction activities using 3D printing technology

UAE Innovations Dubai's 3D Printing Strategy for sustainable building practices



Vision 2030 Saudi Arabia's initiative promoting robotics in construction







Custom Robot Development

Robotic Platform Development

Phases Concept, Design, Build, Integrate & Test



Systems architecture, Technical requirements capture, Payload integration, Test plans & Mechanical, electrical, firmware and software integration

Autonomous Navigation Software

Spec sensors, network equipment and computing hardware Deploy and tune our indoor or outdoor navigation solutions onto your system.



Customize features and behaviors to meet mission objectives. Implement core navigation building blocks of localization, planning and control to build an entirely bespoke system.

Full Stack Implementation



Mechanical, electrical, firmware, software, autonomous navigation, integration: your application.







From PaveVision to PathVision



pave Vision

Saudi Made

First AI-Based Complete Pavement Distress Detection & Rating Solution



Autonomous Detection

Sidewalk Damages Detection & Curing Robot

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