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Hexapod Robot for Khalifa University

Use Case: StrugNova Hexapod Robot for Khalifa University

Company: StrugNova FZC
Client: Khalifa University
Robot: Khalifa University Hexapod (KUH)

Purpose: This use case describes the deployment, modifications, and operational benefits of the Khalifa University Hexapod (KUH) by StrugNova FZC, showcasing its enhanced capabilities for academic and research purposes within Khalifa University.

1. Overview

Khalifa University, a renowned institution for higher education and research, sought significant modifications and upgrades to their existing hexapod robot for advanced research and experimental purposes. StrugNova FZC was contracted to redesign and enhance the control system and mechanical structure of the hexapod. The result was an operational hexapod robot tailored for rigorous academic research in robotics and automation.

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3. Objectives

- Functionality: Achieve harmonious and operational movement through mechanical design adjustments.
- Control: Deploy microcontroller and software coding, including a user-friendly interface.
- Appearance: Recoat and polish the robot, and redesign control boxes for better aesthetics and functionality.

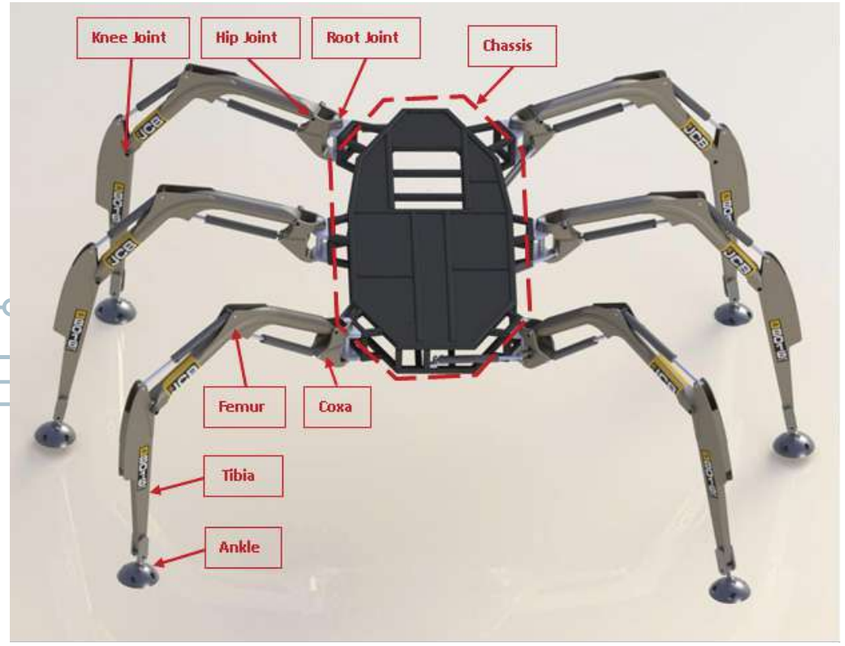
4. Challenges Addressed

•Model Mismatch: The provided 3D model did not match the actual hexapod, leading to inaccuracies in the physical structure.

•Legs: Adaptations were needed due to the change from hydraulic to servo actuation, requiring modifications to ensure stability and power efficiency.

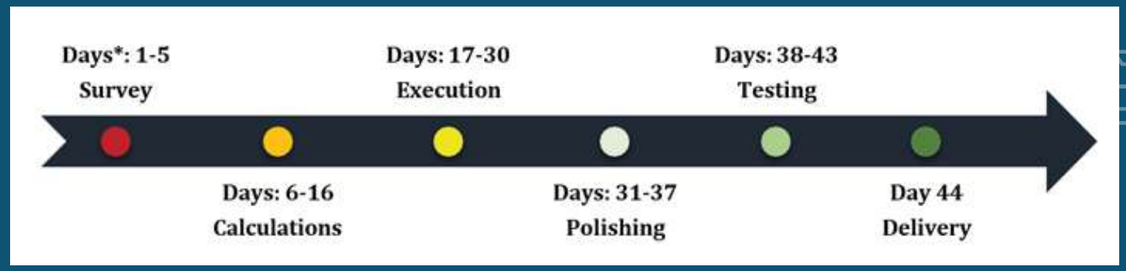
•Control System: The existing PLC-based control system was inadequate for the dynamic, nonlinear tasks required, necessitating a complete re-evaluation and upgrade.

5. Proposed Solutions



- Root Actuator Adjustments: Symmetrical positioning to ensure stable movement.
- Hip Actuator Modifications: Optimized actuator angles to reduce required force.
- Knee Actuator Reinstallation: Ensured correct kinematics for effective movement.
- New Control System: Replacement of PLC with a micro controller capable of handling complex kinematics and control algorithms.

6. Execution Plan



- Survey: 3D modelling, mechanical and electrical inspection.
- Calculations: Movement simulations, force calculations, and kinematics.
- Execution: Purchase and installation of mechanical and electrical components, cable management, and programing
- Appearance Improvements: Shell installation, coating, control box redesign, and joystick control integration.
- Testing and Delivery: Comprehensive testing, code optimition, and final delivery to Khalifa University.

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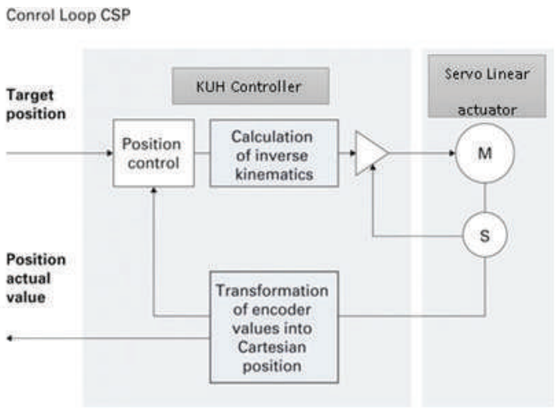
7. Technical Specifications



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8. Conclusion

The successful modification and deployment of the KUH by StrugNova FZC for Khalifa University demonstrate the robot's enhanced capabilities for research and educational purposes. This project highlights StrugNova's expertise in advanced robotics, providing a robust platform for future academic and experimental endeavors.