

ABSTRACT: CRAWL-O-TRON

Team: RED BULL

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1. Introduction

Red Bull is an inverted robotic walker designed to traverse a rope using a unique grip-and-release mechanism. Instead of relying on wheels or propulsion, it mimics biological crawling by alternating its motorized arms to move forward. The bot's design focuses on stability, efficiency, and precise control.

2. Design Overview

The bot consists of four primary components:

1) Main Frame

- Acts as the structural support of the walker.
- Houses batteries and motors for actuation.

2) Front Gripping Mechanism

- Engages the rope securely to prevent slippage.
- Facilitates forward motion by alternating grip between arms.

3) Arms

- Controlled by 100 RPM motors.
- Provide cyclic movement for forward propulsion.
- Actuated to swing and shift weight effectively.

4) Tail

- Offers lateral support for improved stability.
 - Prevents undesired tilting or oscillations.
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3. Dimensions & Weight

- The bot adheres to the given size constraints, **not exceeding 25 cm** in length along the rope.
 - The **total weight is under 500g**, ensuring compliance with competition regulations.
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4. Working Mechanism

1. The front gripping mechanism locks onto the rope, securing the bot in place.
 2. The motor-driven arms move in an alternating fashion, mimicking a hand-over-hand motion.
 3. This continuous alternating **motion** enables the bot to move along the rope efficiently.
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5. Materials Used

- Frame Material: Lightweight Plastic (ABS)
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4. Circuit and Control System

- The circuit contains 4 Lithium-Polymer Batteries for powering Motors
 - The arms are actuated by 2 - N20 Micro-gear motors operating at 7.4 volts each and proving 100 rpm
 - The circuit involves a slide switch for turning on/off the walker.
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7. Conclusion

Red Bull is a mechanically efficient, lightweight, and stable bot designed to traverse a rope without wheels or traditional propulsion. The gripping-arm mechanism, powered by 100 RPM motors, ensures controlled motion while maintaining balance. The design adheres to the competition constraints, making it a viable entry for Cognizance 2025.