PATENT APPLICATION

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TEMPERATURE-ADAPTIVE CONTROL ALGORITHM

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ABSTRACT

A system and method for dynamically adjusting robotic control parame
on ambient temperature conditions in extreme cold environments. The
comprises temperature-sensitive algorithmic controls that modify auto
mobile robot (AMR) navigation, power management, and mechanical
operation in sub-zero conditions. The system utilizes a network of the
sensors and proprietary software to maintain optimal performance in t
ranging from 0 C to -40 C.

BACKGROUND OF THE INVENTION

[0001] Autonomous mobile robots operating in cold storage and indus
environments face significant challenges related to battery performan
mechanical component reliability, and navigation accuracy. Existing s
fail to adequately address the complex interplay between temperature
fluctuations and robot performance parameters.

[0002] Traditional AMR control systems are designed for ambient tem
environments and exhibit degraded performance in extreme cold cond
invention addresses these limitations through adaptive algorithms tha
dynamically optimize robot operation based on real-time temperature

DETAILED DESCRIPTION

1. System Overview

[0003] The temperature-adaptive control system comprises:

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A distributed network of temperature sensors

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A central processing unit running proprietary BlueCore(TM) software

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Machine learning algorithms for parameter optimization

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Real-time performance monitoring systems

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Thermal management subsystems

2. Temperature Sensing and Response

[0004] The system employs multiple temperature sensors strategically throughout the robot chassis to:

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Monitor ambient environmental temperature

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Track internal component temperatures

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Detect temperature gradients and transitions

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Trigger automated response protocols

3. Adaptive Control Algorithms

[0005] The core innovation involves dynamic adjustment of:

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Motor torque and speed parameters

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Battery charging and discharge rates

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Navigation sensor calibration

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Path planning optimization

- Component thermal management

4. Performance Optimization

[0006] The system maintains optimal performance through:

- Predictive thermal modeling
- Real-time parameter adjustment
- Performance envelope monitoring
- Automated safety protocols
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Energy efficiency optimization

CLAIMS

A method for controlling an autonomous mobile robot in sub-zero env

a) Continuously monitoring ambient and internal temperatures

b) Dynamically adjusting control parameters based on temperature da

c) Optimizing performance through machine learning algorithms

d) Implementing automated thermal management protocols

The method of claim 1, wherein the control parameters include:

a) Navigation system calibration

b) Power management settings

c) Motor control parameters

d) Sensor operation adjustments

A system for implementing temperature-adaptive control, comprising:

a) A network of thermal sensors

b) A central processing unit

c) Proprietary control software

d) Mechanical adaptation mechanisms

DRAWINGS

[0007] Figure 1: System Architecture Diagram

[0008] Figure 2: Temperature Sensor Network Layout

[0009] Figure 3: Control Algorithm Flowchart

[0010] Figure 4: Performance Optimization Curves

TECHNICAL SPECIFICATIONS

Operating Temperature Range: 0 C to -40 C

Response Time: <100ms

Sensor Accuracy: 0.1 C

Algorithm Update Frequency: 10Hz

Power Consumption: 5W (nominal)

INVENTOR DECLARATIONS

We, the undersigned inventors, hereby declare that:

We believe we are the original inventors of the claimed invention

We have reviewed and understand the contents of this application

We acknowledge the duty to disclose all relevant prior art

Executed on this 15th day of March, 2022

/s/ Marcus Chen

Marcus Chen, CTO

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LEGAL REPRESENTATION

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