Research Intent - Arushi Kumari

Field: Artificial Intelligence Engineering

Proposed Research Focus: Intelligent Robotics and AI-Driven Design Optimization

Introduction

I am deeply motivated to explore how artificial intelligence can revolutionize mechanical and industrial design. My background in Mechanical Engineering, combined with projects in AI-such as a chatbot assistant, image classifier, and robotic arm simulation-has built my foundation for interdisciplinary innovation. I aim to bridge the gap between mechanical precision and intelligent automation.

Research Motivation

While working with CAD/CAM tools and Fusion 360 simulations, I was fascinated by how machine learning can enhance design efficiency, predict system failures, and automate repetitive tasks. This realization drives my ambition to research AI-driven optimization models that can learn from mechanical systems and improve their performance autonomously.

Research Objectives

1. Develop AI models that can learn from mechanical system data to predict maintenance and optimize energy use.
2. Integrate neural networks into robotic design for adaptive, intelligent movement control.
3. Explore sustainable AI-assisted manufacturing workflows for precision and reduced waste.

Methodology

My proposed approach combines mechanical modeling with AI frameworks like TensorFlow and OpenCV. Using CAD-based simulation data, I plan to train machine learning models that analyze efficiency and propose design improvements automatically. This approach merges mechanical modeling accuracy with AI learning adaptability.

Expected Outcomes

- Creation of an intelligent robotic arm capable of adaptive decision-making.
- AI-integrated design systems that automate simulation and optimization loops.
- Research papers and prototypes demonstrating AI-enhanced mechanical systems.

Future Vision

I envision contributing to the field of AI-powered Mechatronics, where intelligent systems transform industries from manufacturing to healthcare. My long-term goal is to lead innovation in AI-driven robotics and sustainable automation, ensuring technology serves both progress and humanity.

Conclusion

This research direction represents the convergence of my mechanical expertise and AI aspirations. I believe that pursuing it at your esteemed institution will enable me to create impactful, real-world innovations that advance intelligent engineering globally.

- Arushi Kumari
Diploma in Mechanical Engineering, 2023-2026
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