AstroCleanAI: AI-Powered Space Agent

Monitor, predict and prevent space debris collisions in real time

Introduction

AstroCleanAI is an advanced space monitoring solution that integrates AI, ML, and real-time simulations to analyze space debris behavior and prevent catastrophic collisions.

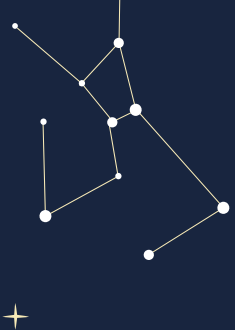
Problem

- Space debris poses a severe risk to satellites and space missions, leading to potential collisions and damage.
- With increasing satellite launches, effective debris monitoring and risk mitigation are critical.

Solution

- AstroCleanAI is an AI-powered space debris tracking and collision prediction system.
- It detects, classifies, and predicts collision risks using state-of-the-art AI models, ensuring satellite safety

Key Features:

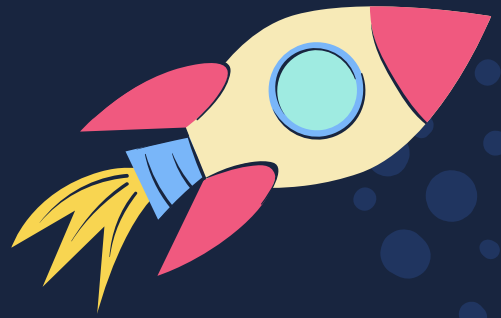


Automated Collision Prediction	AI-driven analysis of orbital data
3D Space Debris Simulation	Real-time visualization of debris trajectories
AI-Powered Image Classification	Detects and categorizes space debris from satellite images
Interactive UI	User-friendly dashboard with intuitive controls

Tech Stack Used:

- **Front-End:** Streamlit, React.js.
- **Back-End:** Python, Flask.
- **AI & ML:** PyTorch, XGBoost, ResNet-50, YOLOv5.
- **Data Handling:** Pandas, NumPy, Joblib
- **Orbital Tracking:** Skyfield, CrewAI

Benefits:



Prevents satellite damage through early collision warnings.

Improves space sustainability by enabling proactive debris management.

Integrates with existing space agencies for real-time debris monitoring.

AstroCleanAI's Unique Edge:

- AI-Powered Real-Time Prediction (Better accuracy than traditional models).
- Interactive 3D Simulations (More intuitive than existing tools.
- Affordable & Scalable SaaS Model (Ideal for startups & governments).

Future Prospects:

01	**Expand AI Models for enhanced prediction accuracy.**
02	**Integrate with Global Satellite Networks for real-time tracking.**
03	**Collaborate with Space Agencies & Commercial Players.**
04	**Develop an Open-Source API for Researchers & Developers.**


Thank
You