

Project LunarLife: Exploring NASA's Space Biology through AI

A NASA Space Apps Challenge project

Developed to explore 600+ NASA space bioscience papers

Uses AI to summarize, visualize, and discover research insights

Built with Streamlit, OpenAI/Ollama, and PyVis

AI meets space science — unlocking the future of biology beyond Earth.





Why LunarLife?

The Problem

- NASA's Space Biology archives contain **hundreds of papers**, often difficult to search or analyze.
- Scientists need a **centralized tool** to explore results, trends, and knowledge gaps.
- Traditional search engines fail to connect related studies or summarize insights effectively.

Information is abundant — insight is scarce.



AI-Powered Research Assistant

The Solution

- LunarLife integrates AI models to summarize and analyze NASA bioscience research.
- Interactive dashboard for fast exploration.
- Generates knowledge graphs to visualize research connections.
- AI chat assistant for contextual questions on any publication.

LunarLife turns complex literature into accessible, actionable knowledge.

What LunarLife Can Do



Core Features

Smart Summarization

Extracts key findings and conclusions from papers.

Knowledge Graph Visualization

Connects related studies, authors, and topics.

Interactive Chat

Ask natural language questions about any study.

Dynamic Filtering

Search by year, topic, or keyword.

Real-Time AI Selection

Switch between OpenAI and Ollama models.

All the power of AI and data visualization — unified in one dashboard.

How It Works



System Architecture

01

Frontend

Streamlit UI (modern, responsive)

02

Backend

Python engine calling summarizer models

03

Data

NASA Space Biology publication CSVs
Links in the Github Repo

04

Visualization

PyVis network graph and AI summaries

05

Cache Layer

Speeds up data retrieval with Streamlit caching

A seamless blend of data science, web tech, and AI for space research.

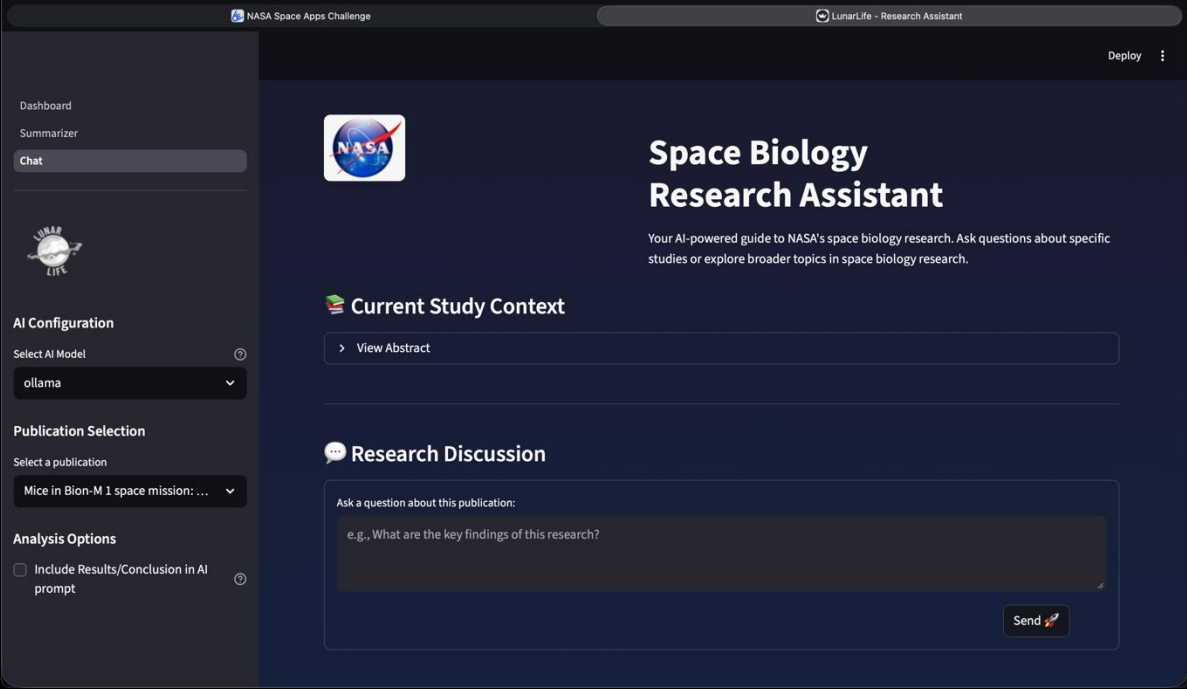
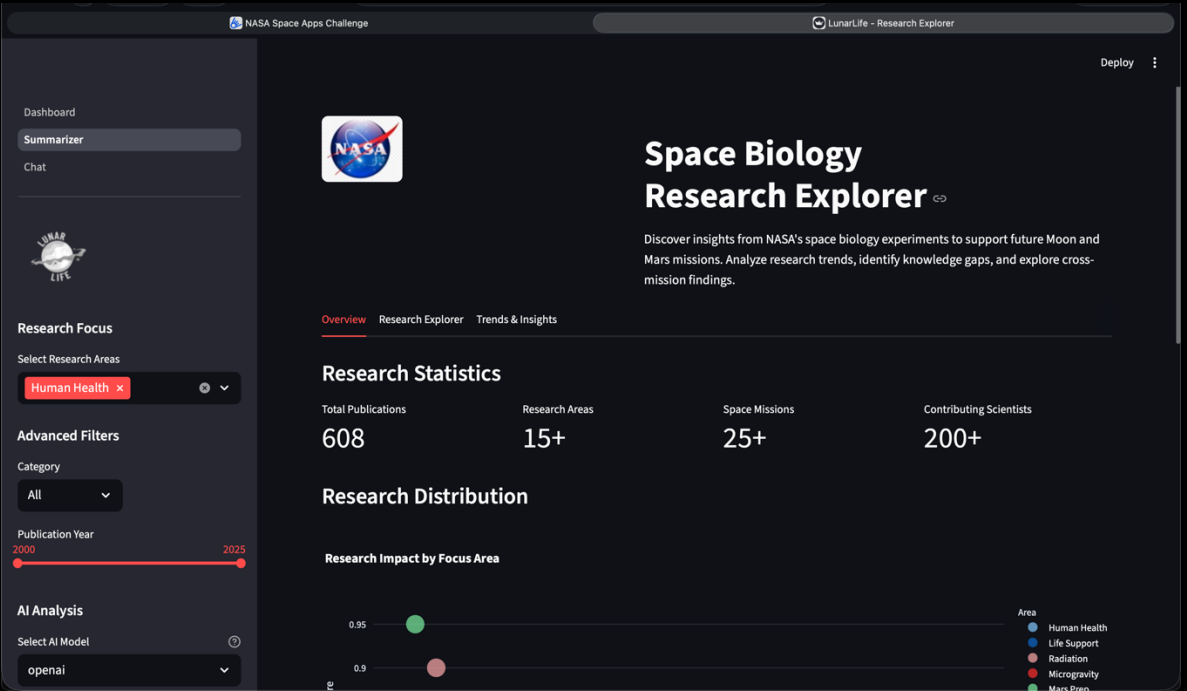
How It Looks

Visual Showcase

Include screenshots (these match your assets):

- Dashboard Interface
- Summarizer Examples
- Chat Assistant

LunarLife is both beautiful and functional — science made interactive.



Future of Space Research Exploration

Impact & Future Vision

- Support scientists in **mission planning for Moon & Mars**.
- Expand dataset to include Earth and planetary bioscience research.
- Add citation network analysis and automated report generation.
- Open-source contribution and community-driven dataset updates.

LunarLife is just the beginning — building the next frontier of AI-powered discovery.

