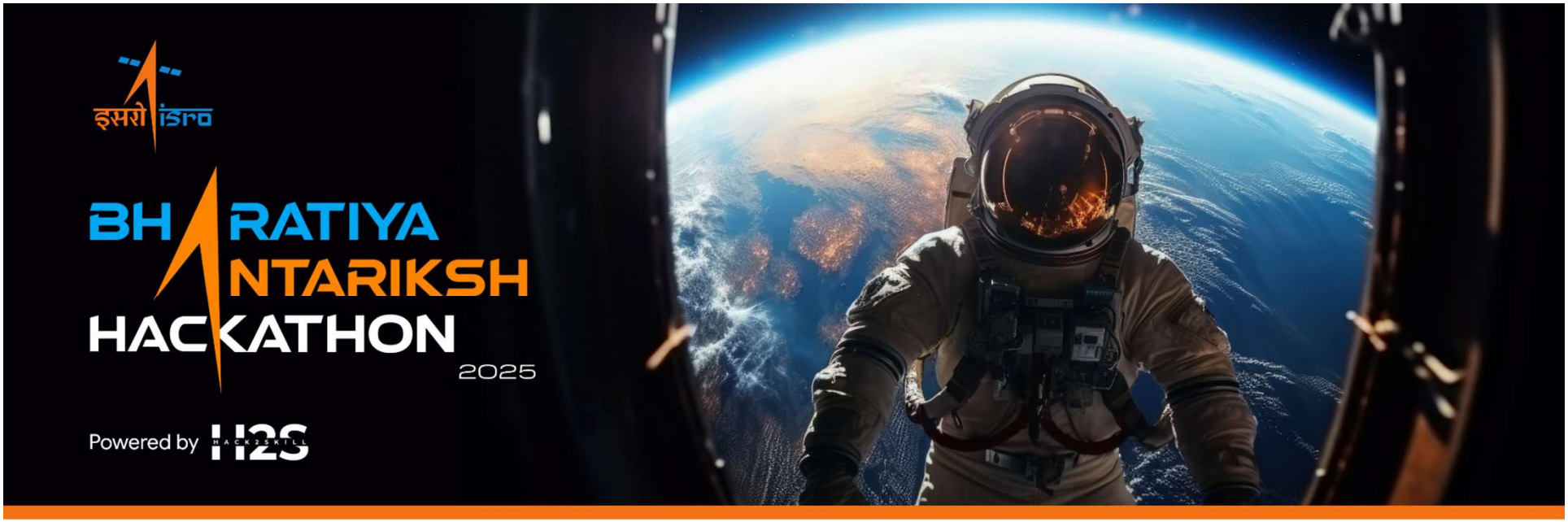

Team Name : LunarCraft

Team Leader Name : Arunaprabha K N

Problem Statement : Dual image super resolution for high-resolution optical satellite imagery and its Blind Evaluation

Team Members

Team Leader:

Name: Arunaprabha K N
College: M. Kumarasamy college of Engineering

Team Member-1:

Name: Priyanka P
College: M. Kumarasamy college of Engineering

Team Member-2:

Name: Maneesha K
College: M. Kumarasamy college of Engineering

Brief about the Idea:

We propose a deep learning model that takes two low-resolution satellite images of the same scene and intelligently fuses them to generate a high-resolution output.

This is achieved using:

- Dual-Branch CNN for extracting complementary features
- Attention-Based Fusion to align and merge fine details
- Super-Resolution Decoder to upscale and enhance clarity
- Streamlit Web App for real-time testing & visualization

No need for ground truth at runtime — works on raw dual inputs!

Trained on patch-level satellite data and deployable offline.

Opportunity should be able to explain the following:

Difference from existing ideas:

Uses dual low-res images with attention-based fusion, unlike typical single-image super-resolution.

How it solves the problem:

Combines complementary info from two LR inputs to generate a clearer, higher-res image without needing HR references.

Unique Selling Point (USP):

- No ground truth needed at runtime.
- Attention-driven fusion for better detail recovery.
- Tailored for real-world satellite image enhancement.

List of features offered by the solution :

- Dual low-res image fusion for detail enhancement
- Attention-based deep learning for smart focusing
- No ground truth needed at runtime
- Auto-adjusts to various input sizes
- Delivers sharp & natural super-resolved output
- Web-based interface with GPU-powered inference

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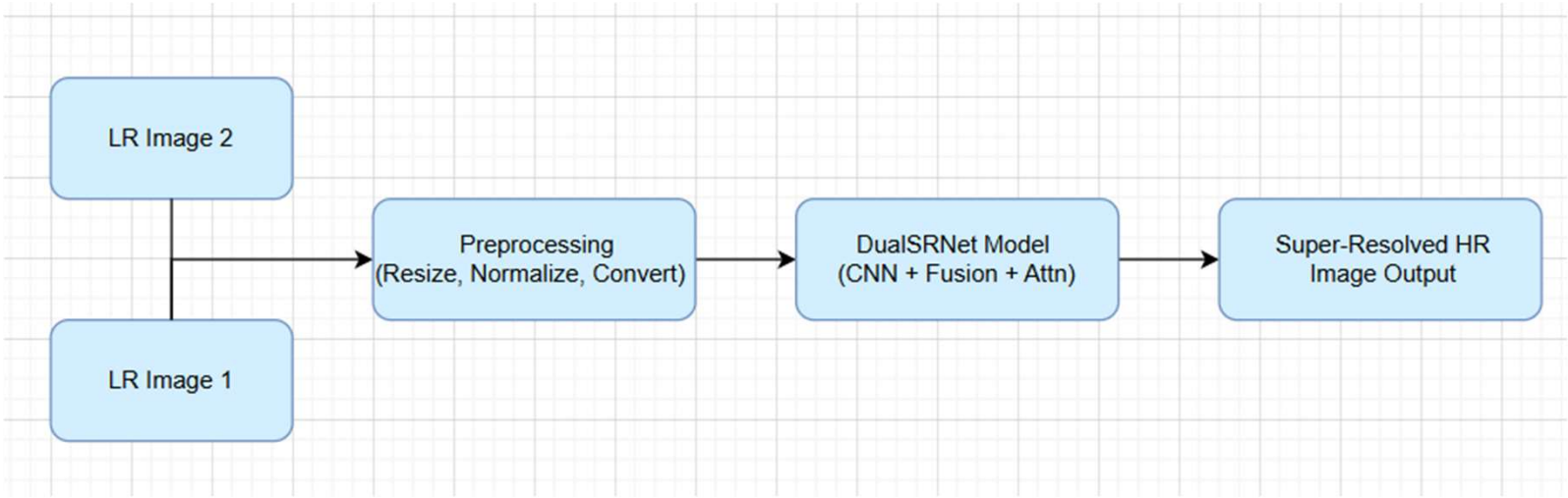
LR1 + LR2

Model:
DualSRNet
CNN + Feature
Fusion + Attention

Super-Resolved Output

Enhancing satellite images through a dual-input super-resolution model built with CNN and attention.

Process flow diagram or Use-case diagram



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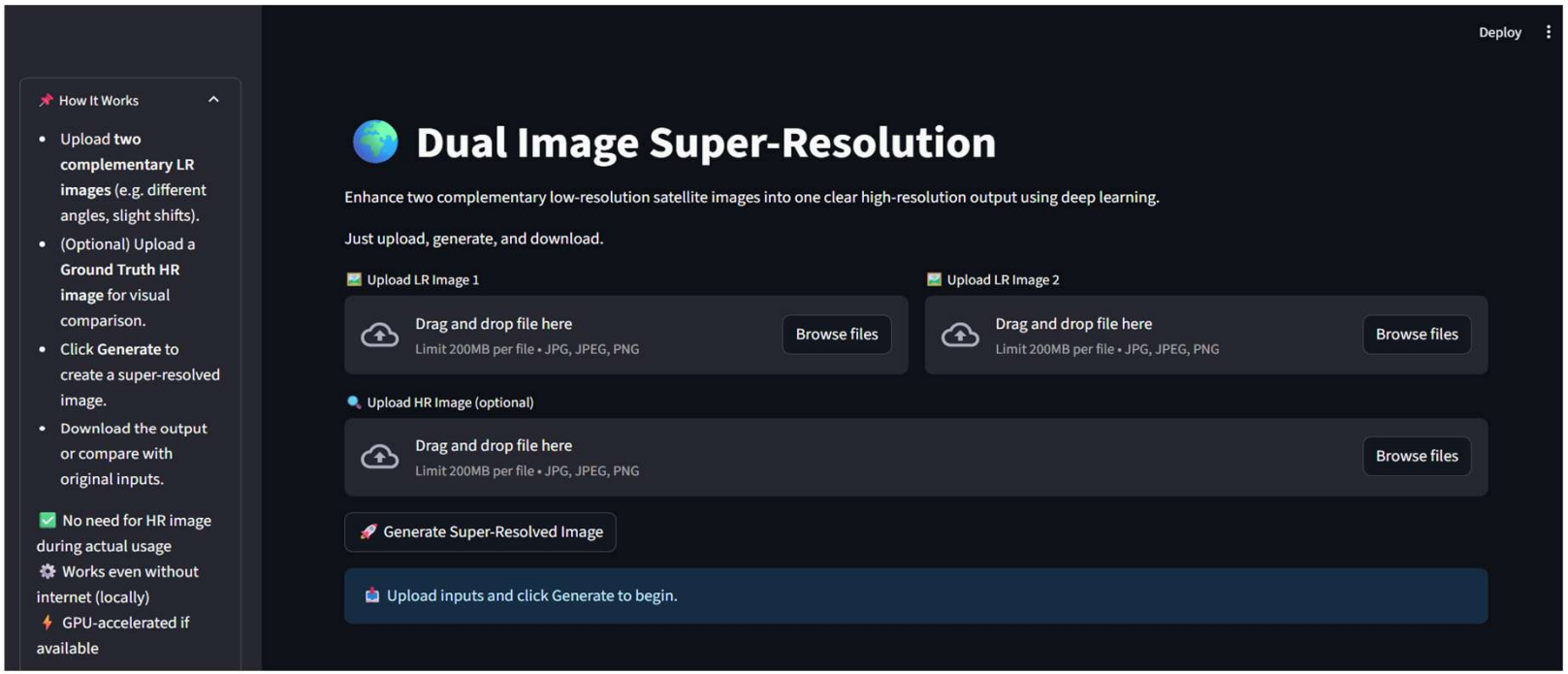
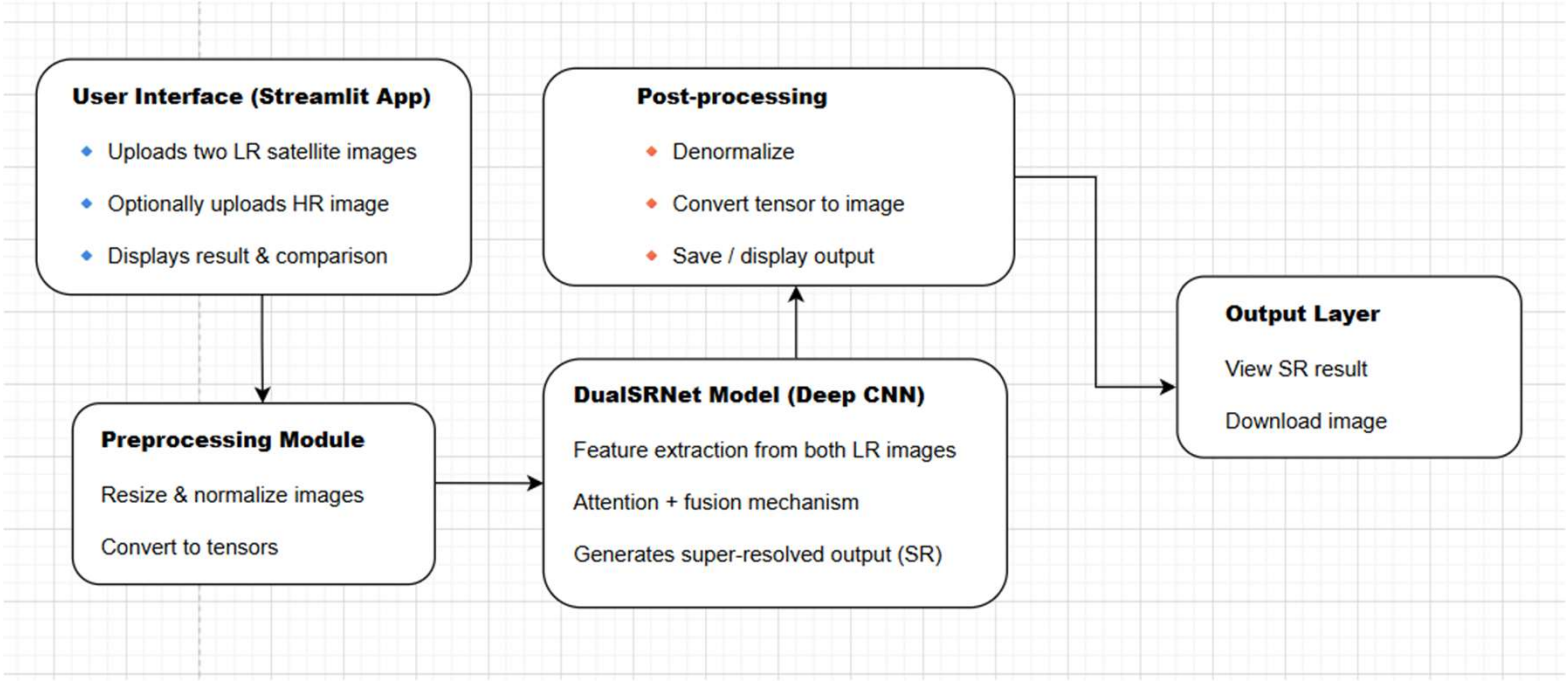
User Interface – Web App Preview (Built with Streamlit)



Architecture diagram of the proposed solution



Technologies to be used in the solution:

PyTorch

Deep learning framework used to train the SR model

torchvision

Transforms, data loading, utility

Image preprocessing

Streamlit

Interactive web app for testing the model

Core programming language

Estimated implementation cost :

Component	Description	Estimated Cost
Model Training	Local machine with CPU/GPU (academic use)	₹0
Dataset	Publicly available open-source datasets	₹0
Development Frameworks	PyTorch, Streamlit (open-source tools)	₹0
Deployment (UI)	Streamlit local app (no cloud needed)	₹0
Hardware Requirements	Standard system with Python environment	₹0
Total		**₹0**

इसरो ISRO

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BHARATIYA ANTARIKSH HACKATHON 2025

THANK YOU