AI Disaster Response Platform User Guide

1. Overview

Our platform enhances satellite imagery using GANs, detects building damage via SKAI, and generates human-readable multilingual damage summaries with GPT. The interface allows responders to quickly assess disaster-affected areas, prioritize critical zones, and access operational insights in their native language.

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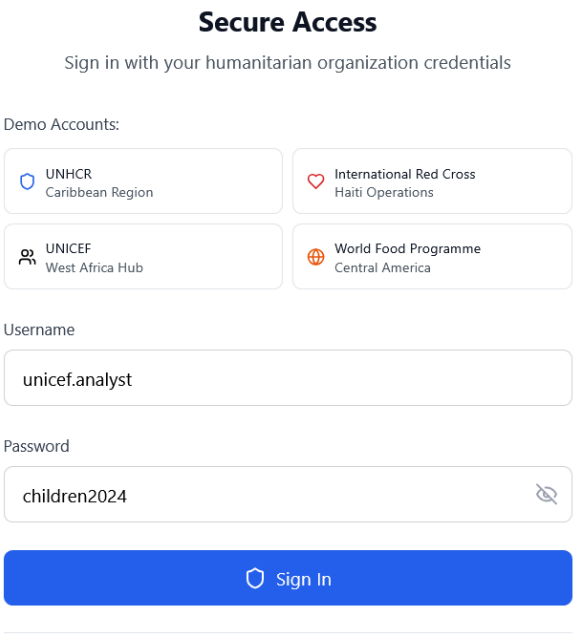
2. Accessing the Platform

- Open the website in a browser (desktop or mobile). https://geoguardiansai.vercel.app/
- No installation is required; the platform runs entirely online.
- To authenticate, login using your humanitarian organization credentials.



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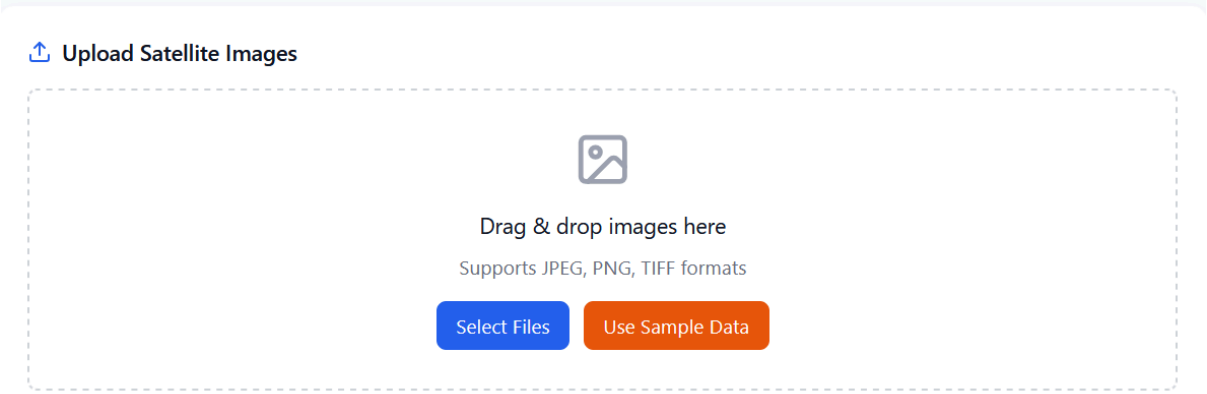
3. Uploading Satellite Images

1. Navigate to the “Upload Satellite Images” section and click on “Select Files”.
2. Select pre- and post-disaster satellite imagery from your device.
3. The system accepts standard image formats (JPEG, PNG, TIFF).

4. Uploaded images appear in the “GAN Image Enhancement” section, ready to be enhanced in the next step of the pipeline.



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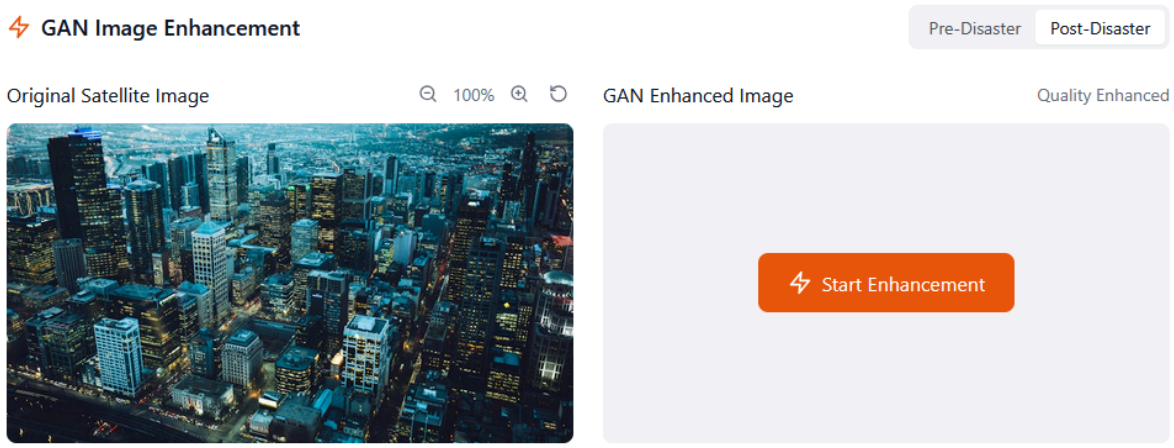
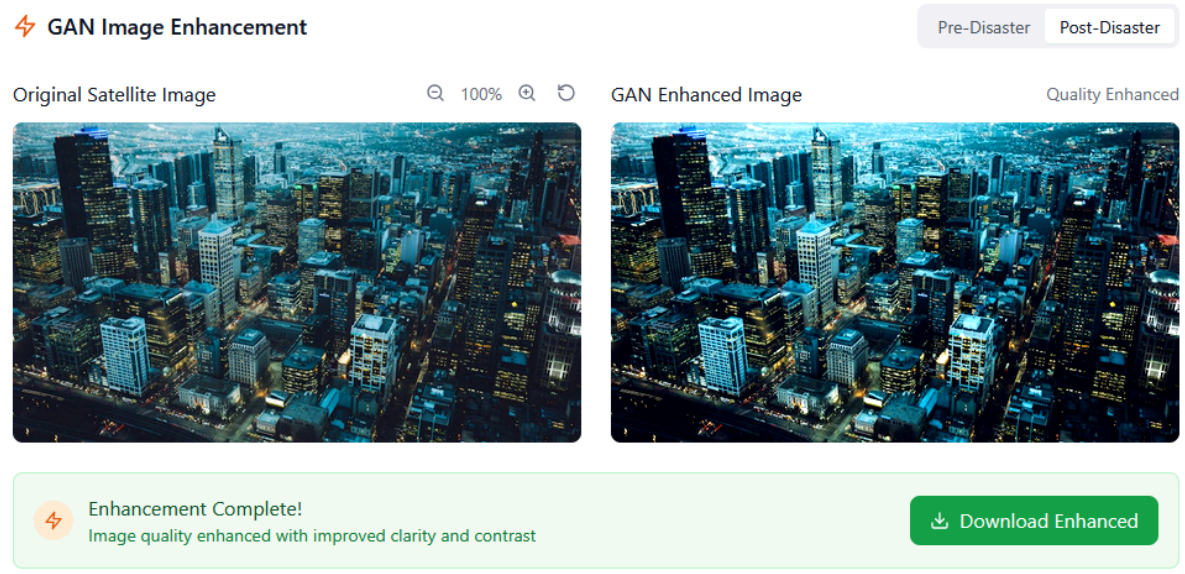
4. GAN-based Image Enhancement

- Click “Start Enhancement” to run GAN super-resolution.
- The platform will process the images to improve clarity, remove cloud cover, and highlight damage areas.
- Enhanced images appear alongside the original images for comparison.

Model Type	Description	Images Needed	Technical Insight	Efficiency / Speed on Colab
DCGAN (PyTorch)	Basic GAN using deep convolutional layers. Good for learning and generating simple synthetic images.	1,000–10,000+	Generator and discriminator use Conv/ConvTranspose layers. No conditioning or paired data. Trains fast, but may lack fine detail for enhancement tasks.	High speed, low resource usage

Pix2Pix (TensorFlow)	Image-to-image translation using paired data (e.g., RGB ↔ segmentation, LR ↔ HR).	1,000+ paired image pairs	Based on conditional GANs. U-Net generator + PatchGAN discriminator. Great for detail-preserving translation. Needs structured datasets.	Moderate (GPU needed, fast convergence)
CycleGAN (TensorFlow)	Unpaired image translation (e.g., cloudy ↔ clear, summer ↔ winter).	~2,000–3,000 per domain	Uses two generators and two discriminators. Cycle consistency loss prevents mode collapse. Flexible with unpaired datasets.	Slower than Pix2Pix due to dual networks
SRGAN (Super Resolution)	Generates high-resolution images from low-res input (ideal for enhancing satellite imagery).	~5,000–50,000 high-res images (patches)	Uses a ResNet-based generator and VGG-based perceptual loss for realism. Targets PSNR and SSIM improvements. ESRGAN is a stronger version.	Slower to train, but excellent results; best run on Colab Pro for faster performance





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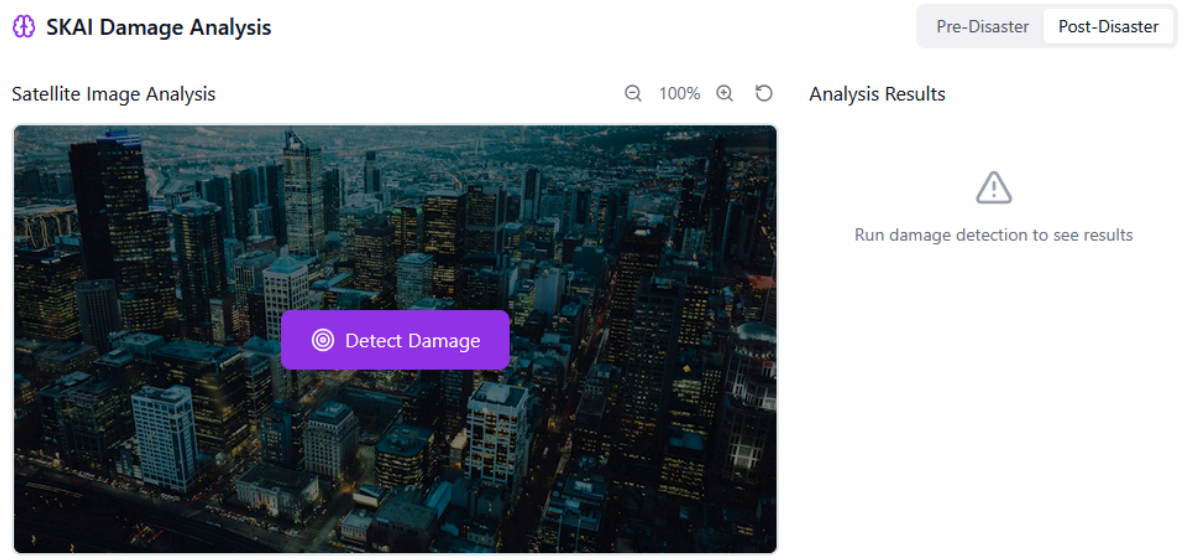
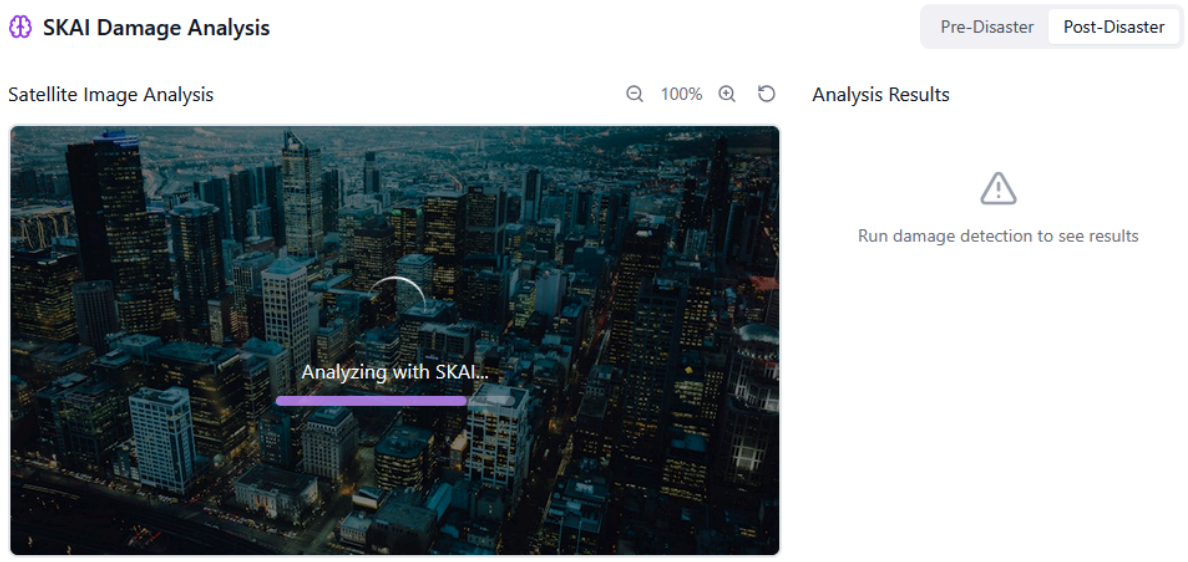
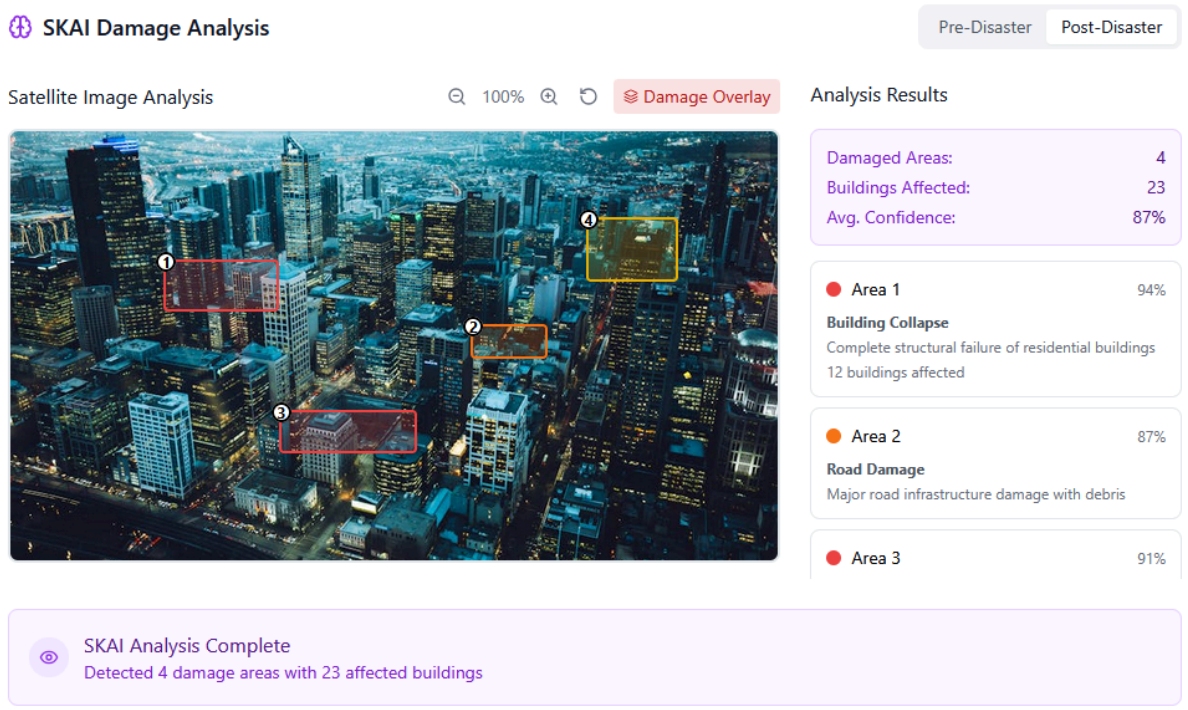
5. Damage Detection (SKAI)

- After enhancement, click “Detect Damage”.
- The system analyzes images and highlights damaged buildings with color-coded overlays.
- Zoom and pan tools allow detailed inspection of affected areas.







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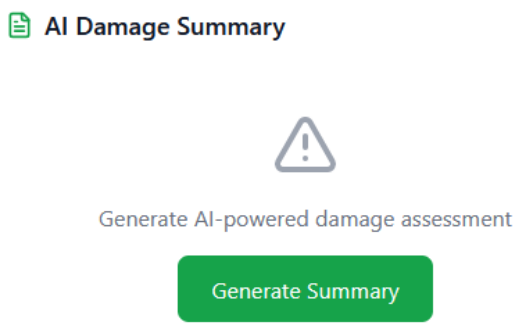
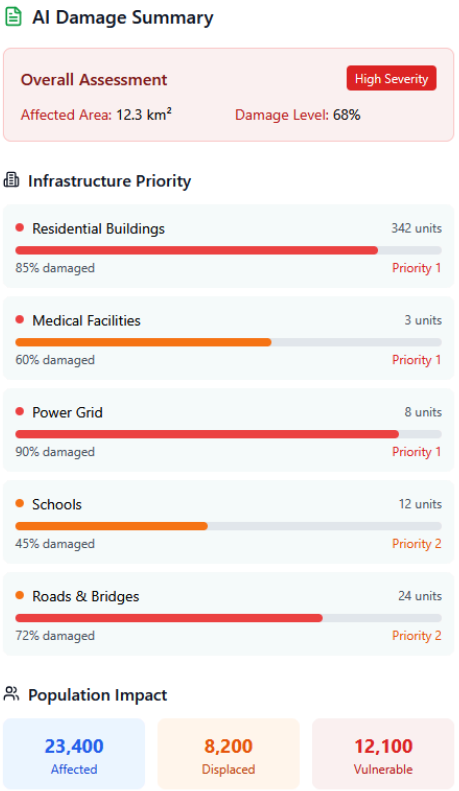
6. Visualise Summarised Statistics (Dashboard View)

- Click “Generate Summary”.
- The system produces a concise, visual dashboard with:
  - Total damaged buildings
  - Critical infrastructure status (medical facilities, power grid, transport)
  - Population impact (affected, displaced, vulnerable groups)
  - Priority levels with color-coded statistics bars
- This allows you to quickly assess severity and prioritize response efforts.





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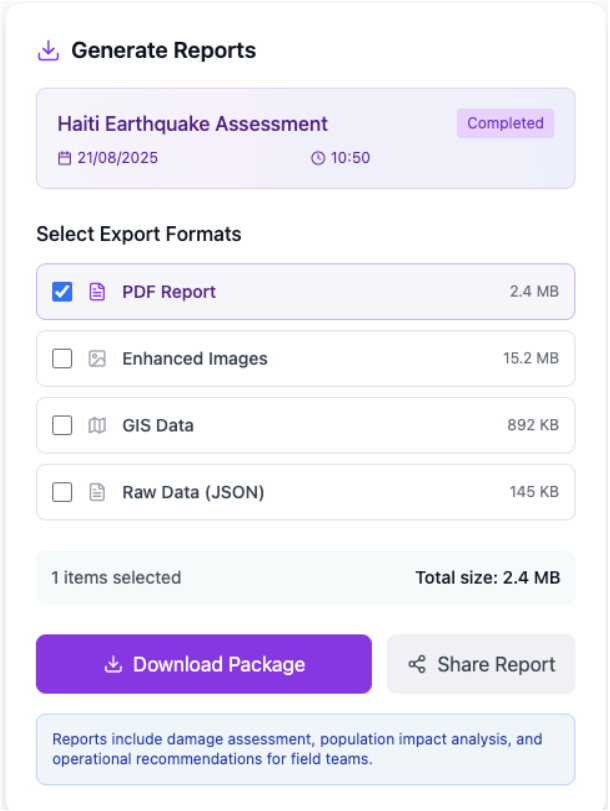
7. AI-Generated Reports (Detailed View)

- After reviewing the dashboard, you can navigate to the “Generate Report” section for a detailed AI-powered assessment.
- The report is written in prose format, with explainable AI insights such as:
    - Risk implications of damaged infrastructure
    - Impact on vulnerable populations
    - Recommended priority actions with reasoning behind them
- Reports can be viewed on-screen or exported as PDF for sharing and documentation.



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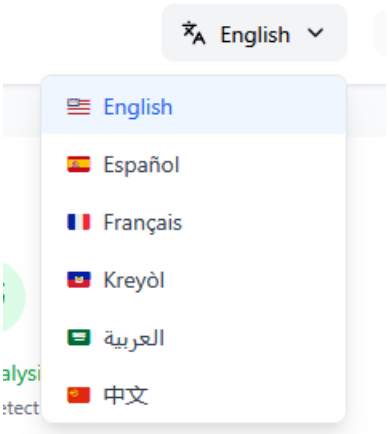
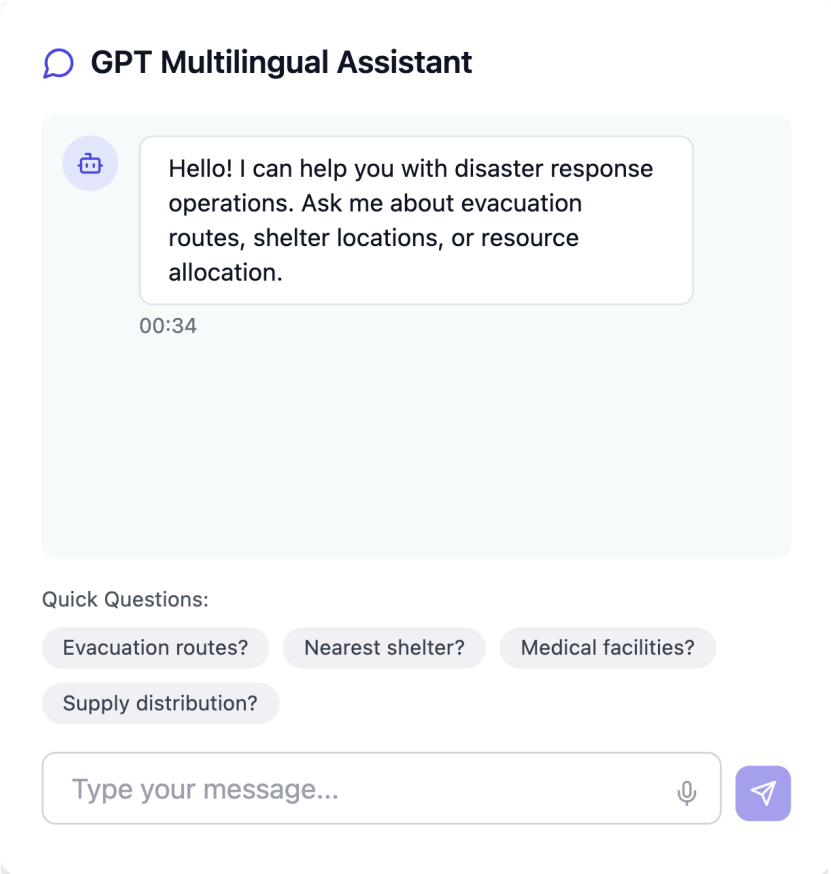
8. Multilingual Support

- Select your preferred language from the dropdown menu.
- All summaries, tooltips, and reports are automatically translated.
- You can interact with the chatbot assistant in the selected language to ask operational questions.





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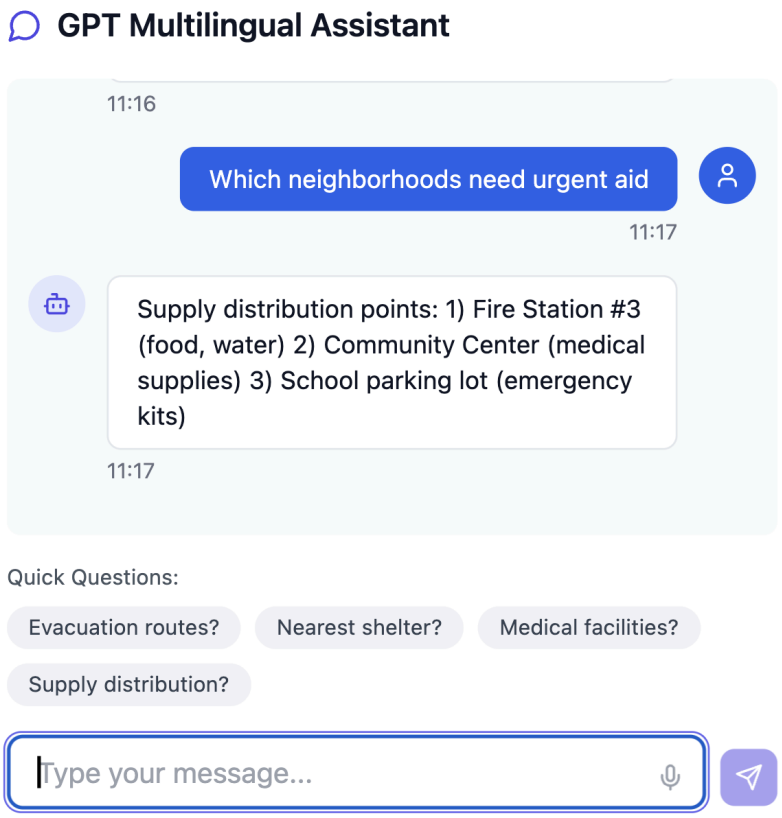
9. Chatbot Assistant

- Use the chat panel to ask localized operational questions (e.g., “Which neighborhoods need urgent aid?”).
- The assistant leverages RAG to provide context-aware answers based on satellite and population data.
- Chat history allows you to track queries and responses.



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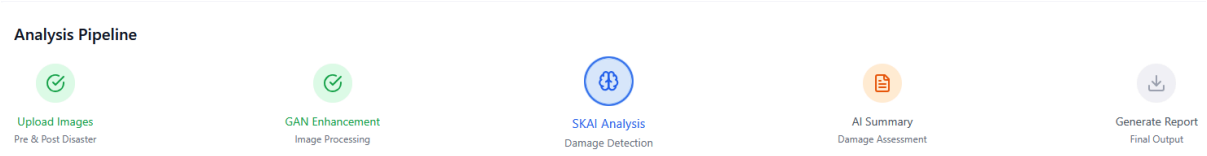
10. Workflow Dashboard

- Monitor processing progress via the dashboard:
    - Upload → Enhancement → Damage Detection → Damage Summary → Report Generation
- Status indicators show whether each step is complete.



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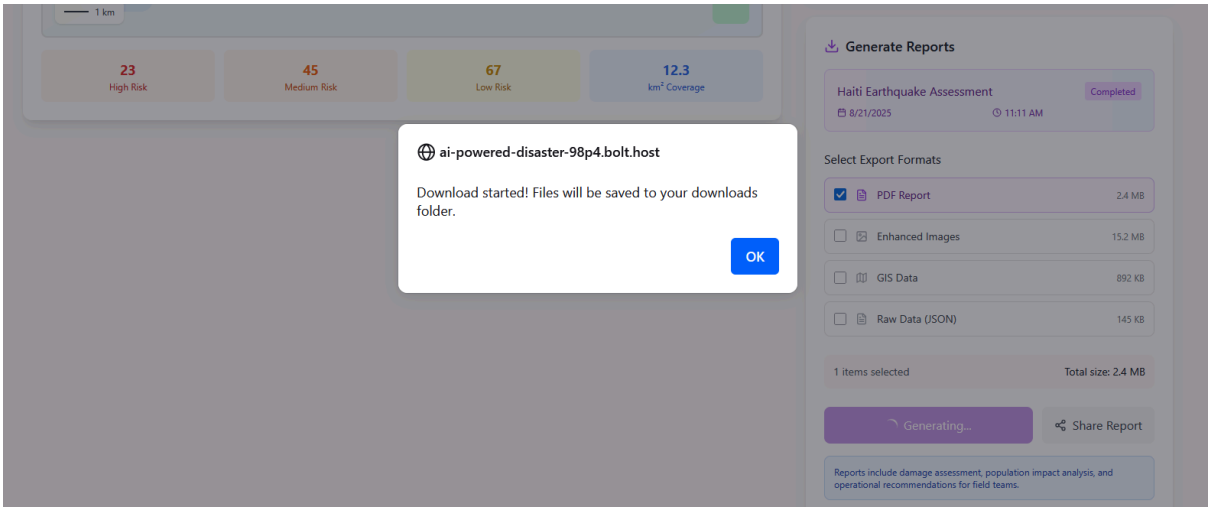
11. Download and Sharing

- Download enhanced images, damage maps, and AI-generated reports.
- Share outputs with other responders via secure links or email export.



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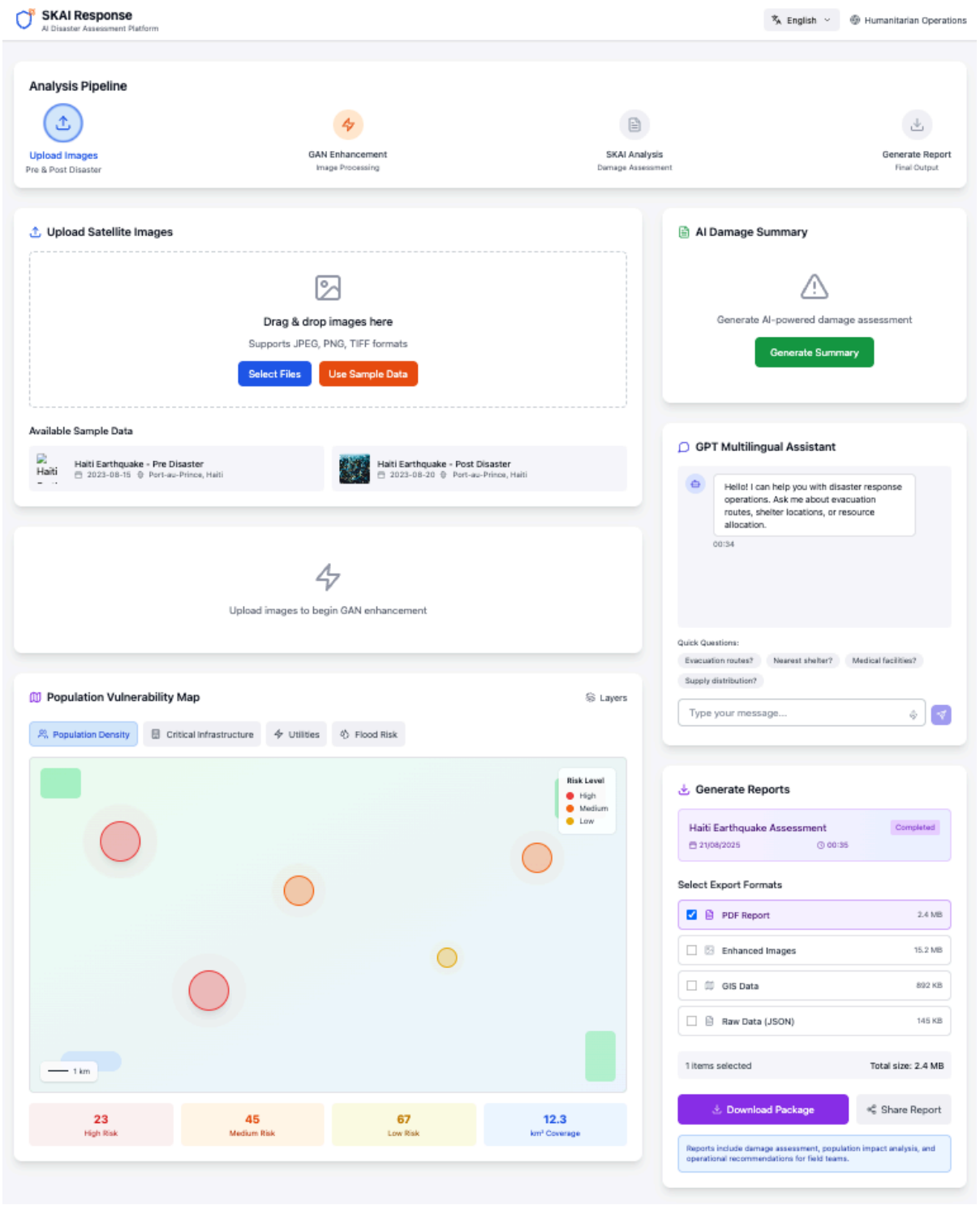
12. Tips for Effective Use

- Upload high-resolution satellite images for best results.
- Verify GAN-enhanced images and damage overlays with on-ground reports when possible.
- Use multilingual support for coordination in diverse regions.
- Regularly refresh data to capture evolving disaster scenarios.

Demo Document
GeoGuardians

Note: This demo is produced through prompt engineering with the assistance of GenAI.

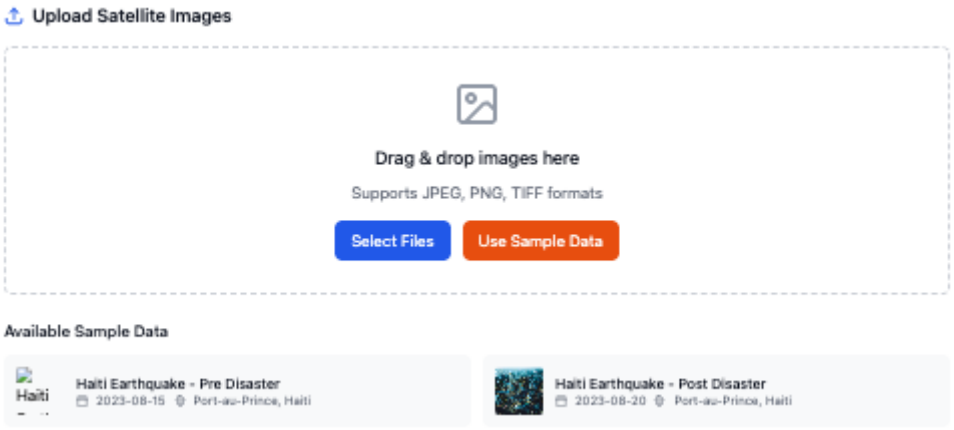
App Overview



1. Analysis Pipeline

- Illustrates to humanitarian responders the part of the pipeline they are in
- In subsequent steps, the button turns green to indicate completion

2. Image Upload



- Upload your satellite imagery for analysis
- Sample data can be used for testing purposes

3. Analysis Pipeline

- Illustrates to humanitarian responders the part of the pipeline they are in
- In subsequent steps, the button turns green to indicate completion

Website link - https://ai-powered-disaster-98p4.bolt.host/
Github Link - https://github.com/algorathem/genai-augmentation-challenge