Bridging the Gap from Remote Sensing to Street View Human-Centered Visual Perception for Environmental Sustainability

TEXAS A&M UNIVERSITY

ESI Graduate Fellow Project | Yifan Yang

♦ *Section 1*

THE SUSTAINABILITY CHALLENGE: Missing the Human Scale

Abundant Macro Data
Satellites provide crucial, large-scale monitoring of environmental disasters and long-term environmental change.

Scarce Ground Truth
However, we often lack immediate and safe access to ground-level visual information. This creates a perception gap, limiting our understanding of the lived, human-scale impacts on communities.

Project Goal
To translate abstract satellite imagery into realistic, human-centered street-level visual perception, enabling more informed decision-making for environmental sustainability and resilience.

👉 *Homepage*
https://rayford295.github.io/

Technical background 👉
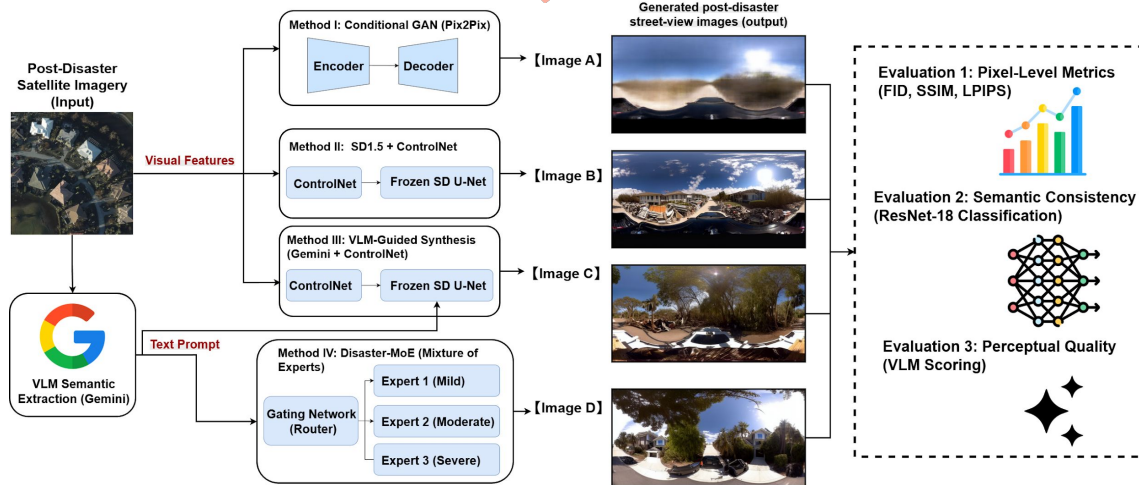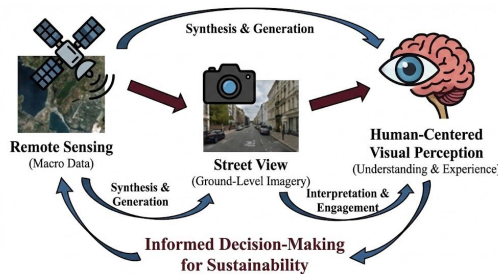*https://github.com/rayford295/Sat2Street-DisasterGen*

Figure. Satellite-to-street-view generation and evaluation framework

♦ *Section 2* **TECHNICAL SOLUTION & ESI IMPACT** We develop a satellite-to-street-view generation framework that integrates generative vision models and vision–language models to synthesize plausible ground-level visual scenarios from post-disaster satellite imagery. This technical engine bridges the gap between overhead observation and human-centered environmental perception.

♦ *Section 3* **ESI Project Impact: Enabling Resilient Futures**

(1) Enhanced Disaster Resilience Rapidly synthesize potential ground-level damage scenarios (e.g., mild, moderate, severe) to support early-stage situational awareness and resource allocation before on-site assessments. **(2) Effective Climate Communication** Translate remote sensing data into intuitive, relatable visual experiences that foster public understanding, empathy, and engagement with climate and environmental risks. **(3) Policy Support** Provide realistic visual evidence to inform urban planning, infrastructure resilience strategies, and sustainability-oriented policy decisions.

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Yifan Yang | Ph.d. Student@Texas A&M University | Email: yyang295@tamu.edu | Lab Website: https://www.geoearlab.com