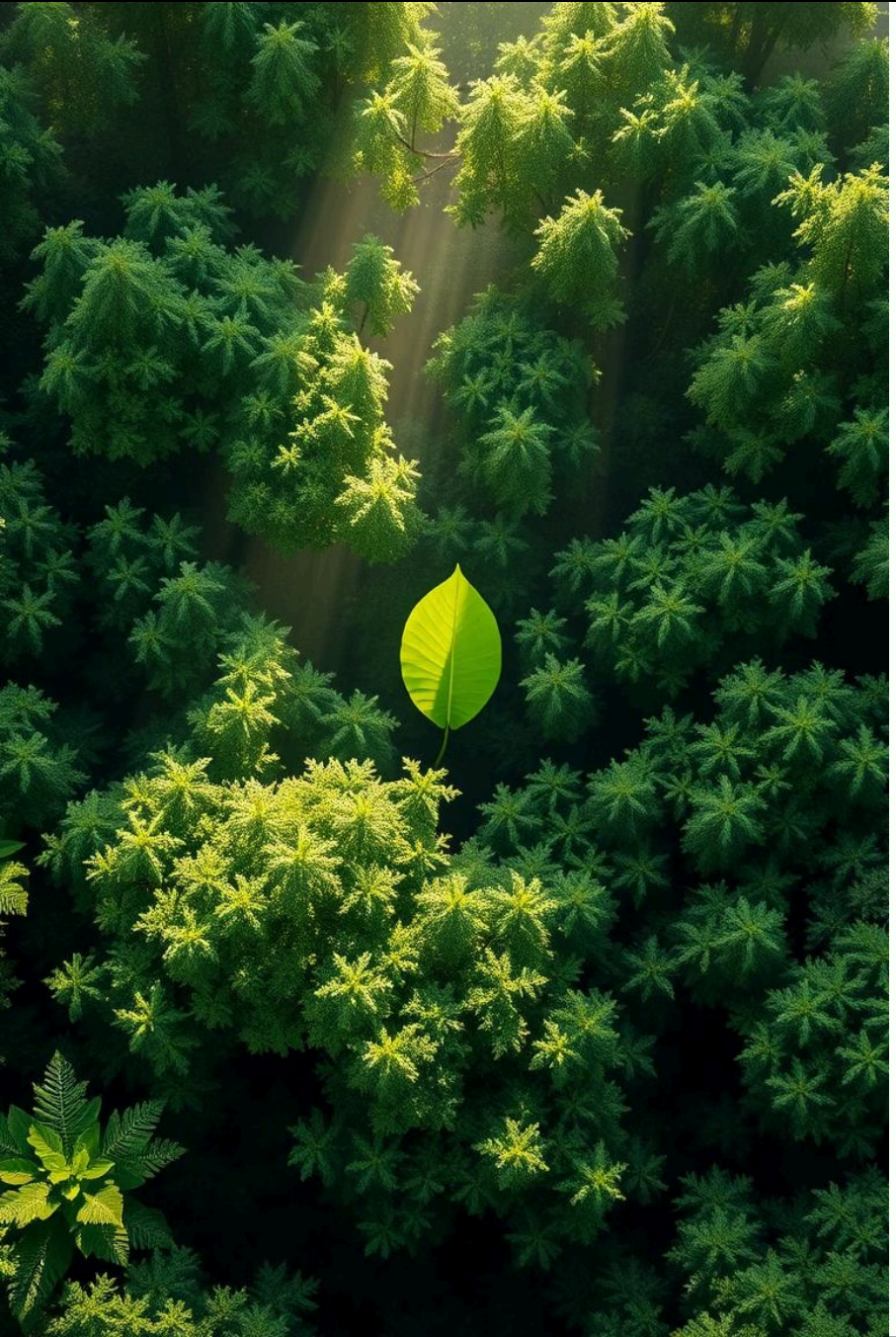


Aeroleaf by VisionX: Blockchain-Based Reforestation Verification System

Presented by **Kushagra Agrawal** and **Moulik Zinzala.** We are pioneering a new era of trust in carbon offsetting. Our system ensures every credit represents real, verifiable environmental impact.

The Problem: The Trust Deficit

Phantom Forests Undermine Trust

The global carbon market, estimated at **$2.4 trillion**, faces a severe trust deficit. In the **voluntary segment**, over **90% of some carbon credits are deemed 'worthless'**, representing **phantom forests** that never existed.

Widespread Fraud and Opacity

Verification of reforestation projects is opaque, centralized, and vulnerable to fraud. Some offsets claim credit for non-existent forests.

Greenwashing and Wasted Billions

This cripples climate action, enables rampant greenwashing, and wastes billions in vital climate funding. Buyers are left with unreliable investments.

Numbers that Show the Problem

$1.4B

Current Market Value (2024)

The voluntary carbon market is projected to grow to $7B-$35B by 2030.

90%

Worthless Offset Credits

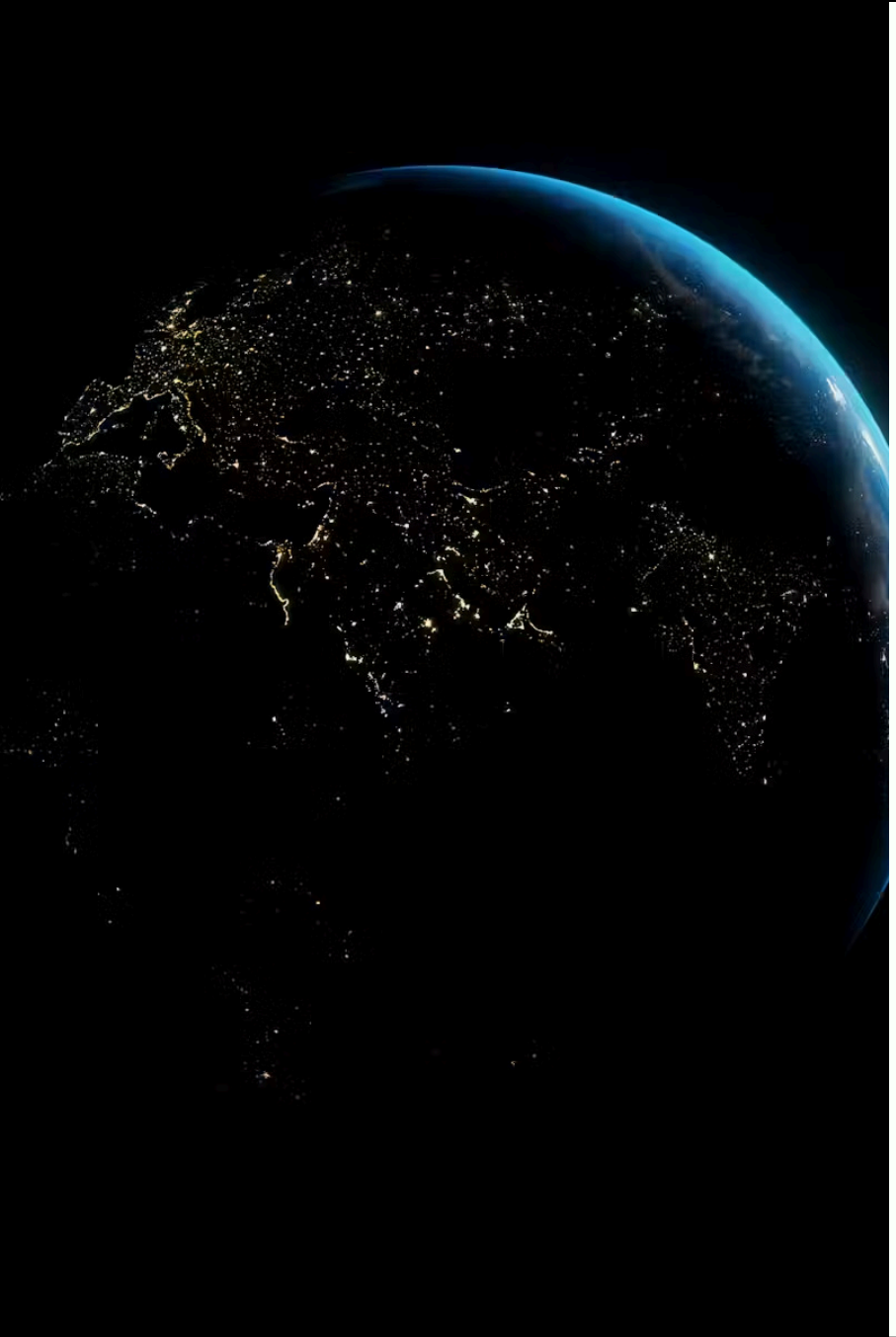
A 2023 investigation found over 90% of Verra-certified rainforest offsets were "worthless".

400%

Overstated Deforestation Threat

These projects often overstated deforestation threats significantly, by as much as 400%.

(Sources: McKinsey, CarbonCredits.com, 2024)



Introducing Aeroleaf: The Future of Verifiable Reforestation

Satellite Imagery

We leverage powerful satellite imagery to actually see trees growing on the ground.

AI Engine Analysis

Our AI engine analyzes data to scientifically quantify carbon sequestration.

Blockchain Ledger

Blockchain records every verified credit on an unbreakable, immutable ledger.

This revolutionary, decentralized platform provides unprecedented transparency. Every carbon credit is tied to a real, provable, growing forest, ensuring absolute confidence in your climate investment.

How It Works: Satellite Verification Engine

Data Acquisition

Continuously pull time-series data from Sentinel-2 and Landsat APIs.

Baseline Establishment

Capture initial images to establish a precise land condition baseline.

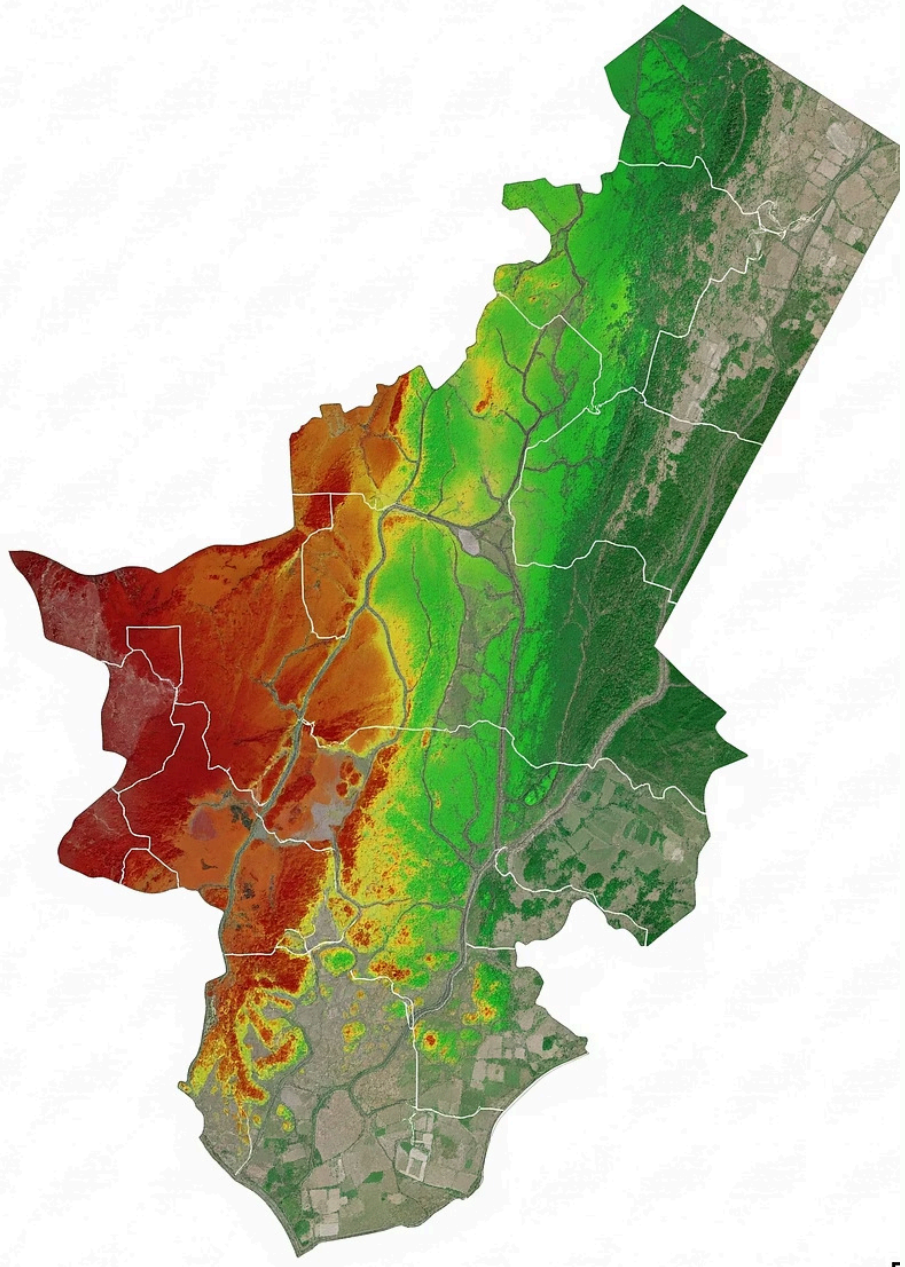
Growth Tracking

Meticulously monitor coordinates for changes in vegetation density.

Objective Proof

Provide undeniable, continuously updated evidence of genuine tree growth.

Our system ensures continuous, independent verification of reforestation projects. This moves beyond self-reported data to objective, visual proof.



How It Works: Machine Learning Analysis

1 Spectral Analysis (NDVI)

Utilize Normalized Difference Vegetation Index for health and density. Higher NDVI indicates more biomass.

2 Biomass Estimation (Future)

Architecture allows future integration of complex ML for precise biomass estimation.

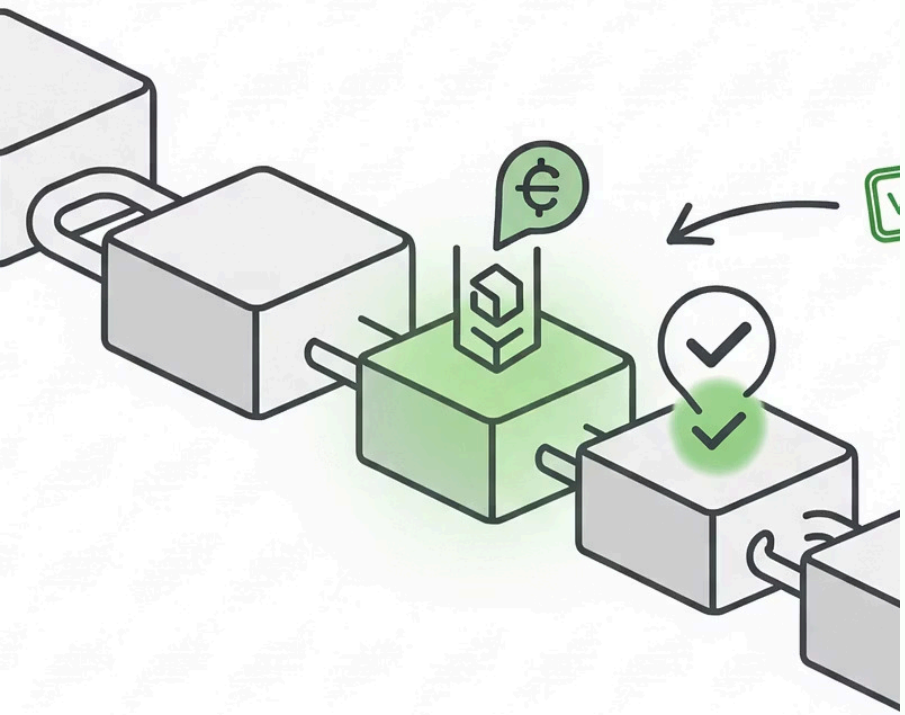
3 Objective Measurement

Data-driven approach provides consistent vegetation growth measurement.

4 Growth Trend Analysis

Analyze NDVI trends over time to track reforestation success, near locations like Surat.

Our Machine Learning transforms raw satellite data into quantifiable carbon sequestration metrics. This provides objective, scientifically validated results.



How It Works: Blockchain Ledger & Smart Contracts

1

Immutable Records

Every growth milestone and carbon credit is permanently recorded on blockchain.

2

Smart Contract Automation

Automates credit issuance and payments upon verified growth conditions.

3

Trustless System

Leverages Polygon's speed and low fees for transparency and auditable records.

4

Fraud Prevention

Removes intermediaries, ensuring every credit is backed by real-world data.

Once our AI confirms genuine growth, data is instantly recorded on a decentralized blockchain ledger. This system guarantees verifiable, fraud-proof carbon credits.

Technical Deep Dive: Tech Stack

Category	Technologies Used
Frontend	**React.js** (Vite), Context API, React Hooks, Tailwind CSS, Leaflet maps, Nivo charts, Three.js, Framer Motion, GSAP
Backend	**Node.js, Express**, Firebase/Firestore, Firebase Auth, Swagger UI
Blockchain	**Solidity (ERC-721)**, Hardhat, **Polygon**, ethers.js
Data & ML	**Sentinel-2 imagery**, NDVI processing, carbon estimation, **Python** (numpy, matplotlib, scikit-learn), Google Earth Engine API

Aeroleaf's Competitive Advantage

Traditional Carbon Offsets

Often lack transparency, rely on self-reporting, and are vulnerable to fraud. Verification is centralized and inconsistent.

- Opaque verification
- Prone to fraud
- Centralized authority
- Phantom forests

Aeroleaf Blockchain-Verified

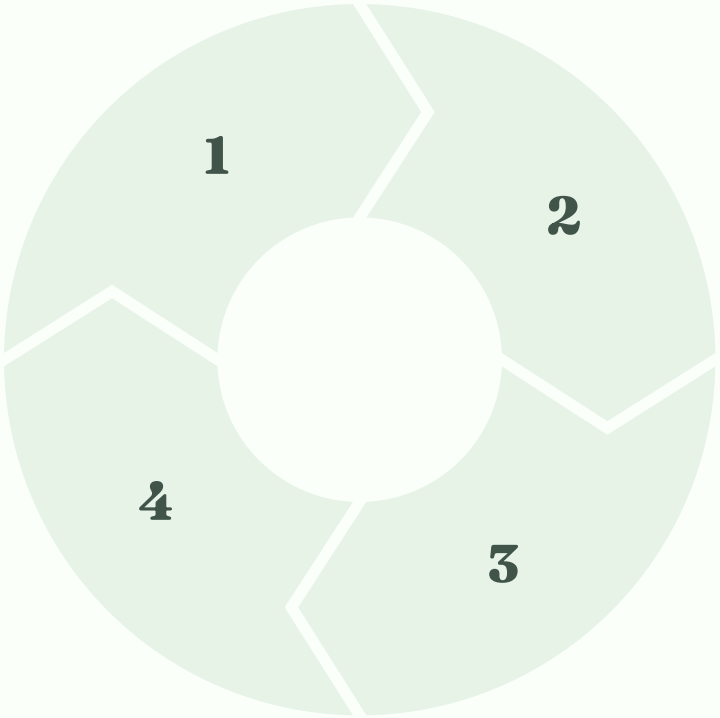
Utilizes satellite imagery and AI for objective, continuous verification. All data is immutably recorded on blockchain.

- Transparent and verifiable
- Fraud-proof
- Decentralized trust
- Real-world impact

Conclusion, Future & Impact: A Verifiable Green Horizon

AI-Driven Carbon Forecasting

Predict future impact, optimize planting, and offer proactive insights.



Real-time Satellite Data

Integrate Sentinel Hub APIs for frequent, granular forest growth updates.

Mobile Application

Develop an app for on-the-go project monitoring and climate tracking.

NFT-Based Marketplace

Develop a marketplace with unique NFTs for immutable credit ownership.

Aeroleaf restores trust to the carbon market, empowering companies to make impactful climate investments. We are building the infrastructure for a genuinely accountable environmental economy.