Executive Summary — GeoNova Smart Land Platform

Project Overview
GeoNova is an intelligent land measurement platform designed to simplify the calculation of area and perimeter for irregular plots of land. Built using Python (FastAPI) for the backend and a lightweight HTML, CSS, and JavaScript interface, GeoNova enables users to input local coordinates and instantly visualize the shape, dimensions, and total surface area of a property.

Mission
To make technical land measurement accessible to everyone — from farmers and surveyors to property owners — through a fast, simple, and visually intuitive digital tool.

Core Features
- Real-time area and perimeter calculation using the Shoelace formula.
- Coordinate-based drawing via an interactive canvas.
- Auto-scaling visualization of irregular terrains.
- Immediate geometric rendering of user-entered coordinates.
- One-click reset and recalculation for new plots.
- Operates entirely offline for field use.

Technical Foundation
- **Backend:** FastAPI (Python)
- **Frontend:** HTML, CSS, JavaScript
- **Canvas Engine:** Dynamic coordinate plotting and auto-closure polygons
- **Deployment:** Local server with single-click .bat launcher

Use Case Example
A field operator records four corner points of an irregular lot:
(0,0), (10,53), (10,48), and (0,48). GeoNova connects the vertices, forms a closed shape, and instantly provides the total area (~98 m^2) and perimeter (~42 m). The visual output is displayed as a green polygon on a technical-style grid.

Strategic Value
GeoNova empowers small landowners and technicians to perform accurate surface measurements without specialized GIS hardware. The system bridges the gap between digital precision and local practicality, promoting efficient land documentation, project planning, and education in basic geometry and land analysis.

Next Development Steps
- Integrate a technical grid background (topographic style) into the canvas.
- Enable CSV data export for field reports.
- Add multi-language interface (English/Spanish).
- Prepare cloud-ready API endpoints for future expansion.

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