Smart Grid Loss & Theft Detector

1. The Problem (Why we are doing this?)
India loses 20–25% of electricity during distribution.
Two main reasons:
- Technical losses → wires heating, old equipment (normal, can't avoid fully).
- Non-technical losses → power theft (illegal connections, tampering meters, bypassing lines).
This theft costs billions every year and causes blackouts.

2. Our Idea (What we are building)
We are making a web-based system that:
- Monitors electricity usage from meters in different areas.
- Detects abnormal usage patterns that could mean theft.
- Shows the exact suspicious location on a map (GIS dashboard).
Example: "Red Alert – Possible Theft in Area 12, House 45".

3. How It Works (Flow)
1. **Data Collection** → Smart meters send readings (we will simulate data for 100+ houses).
2. **Backend Processing** → Store data in database, run anomaly detection rules.
3. **Frontend Dashboard** → Show graphs, alerts, and map view (red = suspicious).
4. **Demo Example** → Judges see live theft detection (green = normal, red = suspicious).

4. Tech Stack (What we'll use?)
- Frontend → React.js (charts, tables, maps)
- Backend → Node.js or Django (API + logic)
- Database → MySQL/PostgreSQL
- Data → Simulated consumption values
- Maps → Leaflet.js / Mapbox

5. Why It's Good (Impact)
- Helps Ministry of Power reduce electricity losses.
- Saves money + energy.
- Works in both urban and rural areas.
- Judges will like it because it's visual (map, alerts and realistic).