Backend Web Developer Intern

Role Description:
Build and maintain the server-side logic and APIs that power the web application and connect with satellite data sources.

Key Responsibilities:

- Develop and maintain RESTful APIs (e.g., for map layers, user access, updates)
- Handle data storage (PostGIS/Cloud), security, and scheduling
- Collaborate with cloud engineer and frontend developers
- Optimize performance for spatial data requests

Requirements:

- Bachelor's in Computer Science or related field
- Strong skills in Python/Node.js, Django/FastAPI, PostgreSQL/PostGIS
- Experience with authentication, database optimization, cron jobs
- Familiarity with satellite data workflow is a plus

Scope of Service:

- Enable scalable map service APIs
- Ensure secure and efficient data flow from backend to frontend
- Support API for automation (e.g., Sentinel Hub integration)

Detailed Tasks:

- B.1 System architecture (backend)
    - Design backend architecture (API layer, database schema, middleware, auth system).
    - Compose modular and scalable API structure (e.g. FastAPI, Express).
- C.3 Database storage integration
    - Prepare preprocessing result upload pipeline to database/spatial server.
    - Design spatial data storage model (PostGIS, GeoPackage, COG tile, etc.).
- D.1 Land Boundary Features (Polygon Drawing)
    - Develop API endpoints to retrieve, save, and update user-drawn boundary polygons.
    - Store boundary data in spatial database (e.g. PostGIS) with user and plantation metadata.
    - Enable geometry validation (e.g. no self-intersecting polygons, within AOI limits).
    - Return GeoJSON format to frontend map viewer.
- D.2 Age Estimation (NDVI Time Series)
    - Create a service that processes NDVI time series data per plantation block.
    - Implement logic to classify tree age (e.g. 0–5, 6–10 years) based on vegetation growth patterns.
    - Serve the resulting tree age map via API (e.g. GeoTIFF or vector).

- Store classification results for reuse and export.
- D.3 Nutrient Analysis (NDRE, NDVI)
  - Process NDRE or NDVI layers and classify them into nutrient zones (low/medium/high).
  - Develop API to retrieve nutrient zone maps per user or block.
  - Save classification logic and thresholds in configurable format.
  - Return analysis layer and summary statistics for dashboard.
- D.4 Contour / DEM Features
  - Generate elevation and slope layers from DEM data using preprocessing pipeline.
  - Store and serve contour vector lines and slope raster via API.
  - Support filter or query by elevation range or slope class.
  - Return results in vector (contour lines) or raster (slope/DEM) format.
- D.5 Yield & Harvest Estimation (Predictive Model)
  - Integrate trained yield prediction model into backend pipeline (e.g. .pt or .pkl file).
  - Create API that accepts input (e.g. tree age, NDVI, soil) and returns predicted yield per hectare.
  - Serve prediction output as raster layer or per-block summary.
  - Log model version and confidence score with each prediction.
- E.1–E.2 System/API integration
  - Connect backend systems to Sentinel Hub or GEE API for automated pipelines (if applicable).
  - Schedule cron jobs for automated data update pipelines.

Application Deadline by: 18 June 2025
Link for Submission of Information: https://forms.gle/4VAG5Wj3deeqzwg98

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