Techfest 2025-26

National Geo-AI Hackathon

In collaboration with Ministry of Panchayati Raj

Hackathon Challenge Background

1. The Hon'ble Prime Minister launched the SVAMITVA Scheme on the National Panchayati Raj Day, 24th April 2020 with a resolve to enable the economic progress of Rural India by providing "Record of Rights" to every rural household owner. The scheme aims to demarcate inhabited (Abadi) land in rural areas through the latest surveying drone technology, Continuous Operating Reference System (CORS), and Geographic Information System (GIS) technology. The scheme covers various aspects viz. facilitating monetization of properties and enabling bank loan; reducing property-related disputes; comprehensive village-level planning.

2. With the use latest drone technology and CORS technology for the Abadi land survey, the high resolution and accurate image base maps of accuracy 5 cm have facilitated creation of the most durable record of property holdings in these areas with no legacy revenue records. Such accurate image-based maps provide a clear demarcation of land holdings in a very short frame of time compared to on ground physical measurement and mapping of the land parcels.

3. Rural settlements frequently encounter flooding and waterlogging during monsoon seasons due to poorly planned or outdated drainage infrastructure, encroachment on natural water channels, and the lack of detailed topographic intelligence. Advancements in Drone-based remote sensing and high-resolution Digital Terrain Models (DTM), coupled with the power of Artificial Intelligence (AI) and Machine Learning (ML), provide an opportunity to automate hydrological analysis and drainage network design with a high degree of accuracy and scalability.

Hackathon Challenge:

1. Theme 1: Feature Extraction from Drone Images:

1. Develop an AI model capable of identifying key features in orthophotos with high precision. Use of AI/ML techniques for extraction of the following features from SVAMITVA Drone Imagery: -
    a. Building footprint extraction (built-up area from the drone image and classified roof-top based on observation on the imagery as RCC, Tiled, Tin, and Others.
    b. Road feature extraction
    c. Waterbodies extraction

   d. Distribution Transformer location/Over-head Tank, well location identification etc.
2. Achieve a target accuracy of 95% in feature identification.
3. Optimize the model for efficient processing and deployment.

Expected Deliverables

SVAMITVA Scheme drone-images for 10 villages along with feature extracted datasets for 10 villages to train and validate the AI model, and 10 more villages drone data for output testing.

- A fully trained and optimized AI model for feature identification in orthophotos.
- Documentation detailing the model architecture, training process, and deployment guidelines.
- A final report summarizing the project outcomes, including accuracy metrics and recommendations for future improvements.

2. Theme 2: DTM Creation using AI/ML from point cloud data and development of drainage network

To conceptualize and develop a data-driven, DTM using Drone point cloud datasets leveraging AI/ML:

1. Delineate natural surface-water flow paths and low-lying zones,
2. Predict waterlogging hotspots, and
3. Design an optimized, resilient drainage network for densely inhabited village (abadi) areas.

Input data:

1. Point Cloud data for 10 villages

Expected Deliverables

- Automated AI/ML Processing: From point-cloud classification to generate DTM.
- Optimized Drainage Network Design: GIS-ready layers and design parameters.
- Documentation detailing the model architecture, training process, and deployment guidelines.
- A final report summarizing the project outcomes, including accuracy metrics and recommendations for future improvements.

Problem Statement Data:

https://drive.google.com/drive/folders/1ZHGEfmr7WVTbCO4WWGztCKnylCLE1sYM

Structure of Hackathon

Team Composition: 1–4 members

Stages:

1. Data familiarization and pre-processing
2. AI/ML model development and network design modelling
3. Prototype demonstration
4. Presentation and evaluation

Round 1 — Prototype Submission

Round 1 Objective:
Theme 1: Teams must build and submit a working prototype for theme 1 — Feature Extraction from Drone Images — demonstrating the ability to detect at least two features among buildings, rooftops, roads, waterbodies, or infrastructure (transformers/overhead tanks/wells) using AI/ML and a Report (2-3 pages) containing output images.
Theme 2: Short technical report (3–5 pages) covering approach for theme 2

Round 1 Deliverables:

- Prototype output (masked imagery / polygon layer / sample accuracy metrics)
- Short technical report (3–5 pages) covering approach for theme 2

Round 1 submissions link:

Theme 1: https://forms.gle/Sy2VB7hcnxguZ3hWA

Theme 2: https://forms.gle/tydgSZNMQFcvThEd6

Final Round — Full Solution Development & Presentation

Final Round Objectives:
Shortlisted teams will complete their theme:

1. **Theme 1 — Feature Extraction:**
   Build a full-scale, high-accuracy model (target ≈ 95%) detecting all required features from drone orthophotos.
2. **Theme 2 — DTM & Drainage Network Design:**
   Using point-cloud data, generate a DTM, analyse water flow patterns, identify waterlogging hotspots, and design an optimized drainage network.

Timeline:

- **Round 1 Submissions deadline:** 11 December 2025
- **Announcement of result for round 1:** 14 December 2025
- **Final presentation:** 23 December 2025

Technical Evaluation Criteria

- Technical Excellence:
  - Accuracy (locational and shape) of features extracted and AI/ML model performance for Problem statement #1.
  - Accuracy of drainage delineation and AI/ML model performance for Problem statement #2.
- Innovation: Novel application of AI/ML to geospatial feature extraction / hydrology.
- Scalability: Adaptability across varied terrain and multiple villages.
- Practical Utility: Ease of integration with government planning workflows and usability of outputs going forward.

Prize Money

Prize money will be awarded to the top three teams per theme via NEFT by the latest May 2026. Winners must email the following to **devam@techfest.org** immediately after results:

Subject: "National Geo-AI Hackathon, [Team ID] – [Position]" (e.g., "National Geo-AI Hackathon, TF-250245 – 1st Position")

Body:

1. Account Holder's Name
2. Account Number
3. Bank Name and Branch
4. IFSC Code
5. A photograph of the Bank Passbook as proof