
A **1-day workshop plan on “AI Applications in Geotechnical Investigation”** — tailored for engineers, data professionals, and researchers interested in integrating artificial intelligence with geotechnical engineering.

Objectives:

By the end of this workshop, participants will:

- Understand the fundamentals of AI and its relevance to geotechnical engineering.
- Learn how to apply ML algorithms for soil classification, slope stability, and foundation analysis.
- Explore case studies using AI-based prediction and modelling.
- Gain hands-on experience with data preparation, model training, and validation using geotechnical datasets.

Workshop Agenda

Session 1: Introduction to AI in Geotechnical Engineering (9:00 AM – 10:30 AM)

- Overview of geotechnical investigation (boreholes, CPT, SPT, lab tests).
- Introduction to AI, ML, and deep learning concepts.
- Why AI is transforming site characterization and ground modeling.
- Case examples:
 - Soil type prediction using AI.
 - Slope failure prediction using ML.
- **Activity:** Identify possible AI opportunities in participants’ projects.

Coffee Break (10:30 AM – 10:45 AM)

Session 2: Data and Modelling in Geotechnical AI (10:45 AM – 12:30 PM)

- Sources of geotechnical data (SPT, CPT, seismic, laboratory data).
- Data quality, cleaning, and feature engineering.
- Key algorithms:
 - Regression (for strength parameters)
 - Classification (for soil types)
 - Clustering (for subsurface zoning)
- Tools overview: Python (scikit-learn), TensorFlow, WEKA.
- **Hands-on Exercise:** Build a soil classification model using sample CPT/SPT data.

Lunch Break (12:30 PM – 1:30 PM)

Session 3: Advanced AI Applications (1:30 PM – 3:00 PM)

- Deep learning in ground property prediction.
- AI-assisted slope stability and settlement prediction.
- Integration with GIS and remote sensing data.
- Real-world case studies from infrastructure and mining projects.
- **Mini-project demo:** Predicting bearing capacity using ML models.

Tea Break (3:00 PM – 3:15 PM)

Session 4: AI Implementation & Future Trends (3:15 PM – 5:00 PM)

- Model validation, cross-validation, and uncertainty quantification.
- Automation of site investigation workflows.
- Cloud and IoT integration in geotechnical monitoring.

- Ethical and practical challenges in AI adoption.
- **Group Activity:** Design an AI workflow for a sample geotechnical project.
- Q&A, certificate distribution, and closing remarks.

Tools & Software Used

- Python (Jupyter Notebook)
- Scikit-learn / TensorFlow
- MS Excel / Power BI for visualization
- Open-source geotechnical datasets (CPT/SPT logs)

Target Audience

- Geotechnical engineers and consultants
- Civil engineers and data scientists
- Researchers and postgraduate students
- Infrastructure and mining professionals

Learning Outcomes

Participants will be able to:

- Apply AI techniques for soil and rock property prediction.
- Integrate AI models with geotechnical investigation data.
- Understand best practices in data preprocessing and model validation.
- Use open-source tools for rapid model development.

Instructor: Mr Suresh Tripathi is a founder of Geosun Pty Ltd an Australian company registered in year 2000 to provide AI corporate training, data center solutions and data pipeline end-to-end cloud platform. He has nearly 25+ years of work experience in digital data analytics integrated with AI and tech platforms. His education qualifications include master degree in Statistics from India, master degree in Geostatistics from Australia and master degree in Geoscience from Australia. He completed his AI certificate courses from Stanford Business School from California and High Impact Leadership from Cambridge University, UK. He has worked in Australia and US focusing his career on data strategy, tech platforms, and developing in-house training. He has worked with range of industries in Australia and US that include Deloitte, Flybuys, Ambulance Victoria, CFA (Emergencies Services), Avexa, Covance, Avance Clinical (Pharmaceuticals), Intelligen, Commonwealth Bank, Hackett Group (US), Health and Safety Sphera Solutions(US), Vic Government (Environment, water and energy), Waste Management (US), Outfront Media (US), Adani Mining (Australia) and Fura Gems Industries (Dubai).

Fee: Rs 25,000 per participant plus GST payable to GeosunAI Tech Cloud Pvt Ltd. RTGS/Cheque/ PhonePe via below link form.

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