A **1-day workshop plan on "Predictive Maintenance using Artificial Intelligence"** — ideal for engineers, data professionals, and managers interested in applying AI and analytics for asset reliability and performance optimization.

Workshop Objectives

By the end of the workshop, participants will be able to:

- Understand the fundamentals of predictive maintenance (PdM) and its business value.
- Learn key data sources and sensors used in industrial monitoring.
- Explore AI/ML techniques for failure prediction and anomaly detection.
- Gain hands-on exposure to building a simple predictive model.
- Learn how to deploy and monitor PdM solutions in real-world scenarios.

Detailed Schedule

Session 1: Introduction to Predictive Maintenance (9:00 AM – 10:00 AM)

- Evolution from reactive → preventive → predictive maintenance
- Benefits of PdM: Cost savings, uptime, asset longevity
- Industry examples (manufacturing, energy, transportation)
- Key concepts: MTBF, RUL, vibration analysis, condition monitoring

Session 2: Data Sources and Technologies (10:00 AM – 11:30 AM)

- Types of maintenance data:
    - Sensor/IoT data (temperature, vibration, pressure)
    - Equipment logs & SCADA data
    - Historical maintenance records
- Data preprocessing and feature extraction
- Tools overview: Python, MATLAB, Azure ML, AWS IoT, TensorFlow

Tea Break – 11:30 AM – 11:45 AM

Session 3: Machine Learning for Predictive Maintenance (11:45 AM – 1:15 PM)

- Overview of ML algorithms for PdM:
    - Regression for RUL prediction
    - Classification for failure detection
    - Anomaly detection techniques (autoencoders, isolation forest)
- Feature engineering and model selection
- Case study: Predicting bearing failure using vibration data

Lunch Break – 1:15 PM – 2:00 PM

Session 4: Hands-On Lab – Building a Predictive Model (2:00 PM – 4:00 PM)

- Data exploration (sample sensor dataset)
- Feature creation and labeling
- Training a model in Python (Random Forest / XGBoost)
- Model evaluation and visualization of results

Tools: Jupyter Notebook / Google Colab

Session 5: Deploying and Monitoring PdM Solutions (4:00 PM – 5:00 PM)

- Integrating models with IoT platforms
- Real-time monitoring dashboards
- Edge vs. cloud deployment
- KPI tracking: accuracy, false alarms, ROI measurement

Session 6: Case Studies and Discussion (5:00 PM – 6:00 PM)

- Case examples from:
  - Power plants
  - Manufacturing lines
  - Rail and transport
- Discussion: Challenges and best practices
- Q&A and wrap-up

Resources Provided

- Workshop slides and code notebooks
- Dataset for practice
- Reading list and tools for continued learning

Target Audience

- Maintenance & Reliability Engineers
- Data Analysts / Data Scientists
- IoT & Automation Professionals
- Plant Managers and Technical Leads

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.

Bank: Punjab National Bank

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