Guru Nanak Dev Engineering College

Training Diary – TR-102 Report

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Day 8

Training Summary

On the eighth day of training, we explored foundational concepts of **Supervised Machine Learning**, created custom datasets for model fine-tuning, and applied **Generative AI** for **code generation, debugging, and optimization** using Python.

Concepts Covered: Supervised Machine Learning

We learned how supervised learning works by training a model on labeled data to predict outcomes. The focus was on:

- Input-output pairings
- Pattern recognition from data
- Model training and evaluation

We also discussed real-world examples like:

- Spam email classification
- Loan approval prediction
- Sentiment analysis

Dataset Preparation and Fine-Tuning

We prepared a **custom dataset** for fine-tuning a language model. This included:

Steps Followed:

1. Created sample prompt-response pairs.
2. Formatted them in a structured way for supervised training.
3. Divided the data into:
    - **train.jsonl** – for training the model
    - **test.jsonl** – for validating the model's performance

This helped us understand how models learn from curated examples and how fine-tuning improves output quality.

Code Generation, Optimization, and Debugging

We used **Generative AI (GenAI)** tools and Python to:

- **Generate new code** from task-specific prompts.
- **Optimize existing code** by making it cleaner, faster, or more efficient.
- **Debug code** by identifying errors, suggesting corrections, and rewriting the corrected version.

Activities Included:

- Writing prompts like:
  "Generate a Python program to find prime numbers."
- Asking the AI to optimize a function for sorting large datasets.
- Feeding buggy code and requesting fixed versions with explanations.

This hands-on practice showed how AI can speed up development workflows and assist in real-time problem solving.

Learning Outcome

We gained practical experience in:

- Preparing structured datasets for supervised learning.
- Fine-tuning AI models using custom examples.
- Utilizing GenAI for code generation, debugging, and optimization in Python.
- Understanding how prompt structure affects output quality in developer tools.