MINERAL FORECASTING HACKATHON-DATAVERZE

Project Overview:

This project implements a dual-stage forecasting pipeline to predict import trends for critical minerals (specifically Copper, Graphite and lithium). It benchmarks a statistical baseline (ARIMA) against an advanced Deep Learning model (LSTM) to aid policymakers in anticipating supply chain fluctuations.

Key Features:

Dual Modeling Approach: Compares ARIMA (Statistical) vs. LSTM (Deep Learning).

Synthetic Data Engine: Uses a simulation module (`generate_mock_data.py`)

Automated Reporting Generates a unified benchmark graph for easy comparison.

PROJECT FOLDER STRUCTURE:

Mineral_Forecasting_Solution/

├── src/

| ├── generate_mock_data.py

| ├── model_arima.py

| ├── model_lstm.py

| ├── plot_graph.py

| └── clean_data.py

├── data/

|--final.csv

├── forecasts/

|--arima_final_forecast.csv

|--lstm_final_forecast.csv

|--arima_metrics.csv

|--lstm_metrics.csv

├── requirements.txt

└── README.pdf

|____Report.pdf

EXECUTION PROCEDURE:

To run the entire project from start to finish, copy and paste the following commands into your terminal:

1. Install Dependencies

pip install -r requirements.txt

2. Generate Synthetic Data

python src/generate_mock_data.py

3. Run Statistical Baseline (ARIMA)

python src/model_arima.py

4. Run Deep Learning Model (LSTM)

python src/model_lstm.py

5. Generate Benchmark Graph

python src/plot_graph.py