Volatility-Forecasting-in-Kenya

Got it 👍 You want **everything** (intro, setup, usage, future work, etc.) under **one single Markdown file**. Here's the full **README.md** you can directly use:

```
# 📊 Volatility Forecasting in South Africa

This project explores **stock market volatility forecasting** using data from the South African financial market.
It leverages Python, machine learning, and time series models to analyze trends, forecast volatility, and gain insights into financial risks.

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## 🚀 Project Overview
Stock markets are dynamic, with prices moving constantly due to supply and demand, investor behavior, and economic factors.
This project focuses on:
- Collecting financial time series data (**open, high, low, close, volume**).
- Storing and managing data in **SQLite**.
- Implementing forecasting models (e.g., **ARIMA, GARCH, ML-based approaches**).
- Analyzing volatility patterns in the South African stock market.

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## 🛠️ Tech Stack
- **Python 3.13+**
- **SQLite** (for database management)
- **Pandas, NumPy** (data manipulation)
- **Matplotlib, Seaborn** (visualization)
- **Scikit-learn, Statsmodels** (modeling & forecasting)
- **pydantic-settings** (configuration management)

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## 📂 Project Structure
```

```
Volatility-Forecasting-in-South-Africa/
├── config.py # Configuration (API keys, DB paths, etc.)
├── database.py # SQLite connection & queries
├── data_fetch.py # Fetch stock data from AlphaVantage
├── analysis.ipynb # Exploratory Data Analysis & visualizations
├── models.py # Forecasting models (ARIMA, GARCH, ML)
├── requirements.txt # Python dependencies
├── README.md # Project documentation
```

```
├── .env # API keys & sensitive credentials
├── stocks.sqlite # SQLite database (generated after fetch)
```

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## 🔑 Setup Instructions

### 1. Clone the repository
```bash
git clone https://github.com/your-username/Volatility-Forecasting-in-South-Africa.git
cd Volatility-Forecasting-in-South-Africa
```

2. Create a virtual environment

```
python -m venv venv
source venv/bin/activate   # Mac/Linux
venv\Scripts\activate      # Windows
```

3. Install dependencies

```
pip install -r requirements.txt
```

4. Configure environment variables

Create a `.env` file in the project root:

```
ALPHA_API_KEY=your_api_key_here
DB_NAME=stocks.sqlite
MODEL_DIRECTORY=models
```

5. Run the project

```
python data_fetch.py
```

📊 Example Usage

```

```
from database import Database

db = Database("stocks.sqlite")
data = db.get_stock_data("JSE") # Example for Johannesburg Stock Exchange
print(data.head())
```

☑ Features

- Fetch stock data using **AlphaVantage API**
- Store and query data in **SQLite**
- Time series forecasting using **ARIMA & GARCH**
- Visualize market trends & volatility
- Extendable to other African stock markets

🌍 Future Work

- Incorporate real-time streaming data
- Test deep learning models (**LSTM, Transformer**)
- Compare South African market with global indices
- Deploy interactive dashboards (**Plotly/Dash/Streamlit**)

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📜 License

This project is licensed under the **MIT License** - see the LICENSE file for details.

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👉 Do you also want me to **embed the dependencies (requirements.txt
content)** directly inside this README so you don’t need a separate file?
```