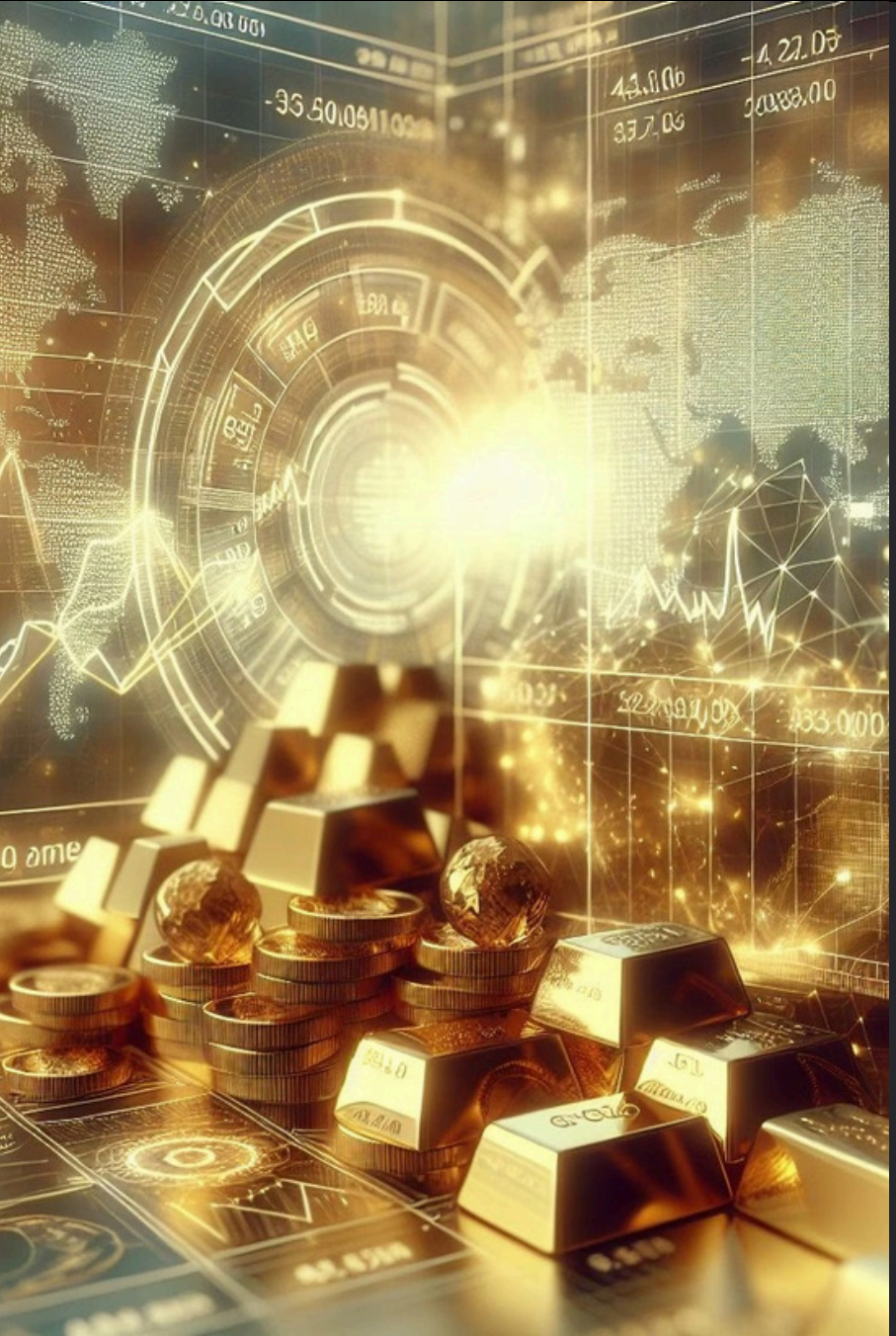


Real-Time Gold AI Predictor

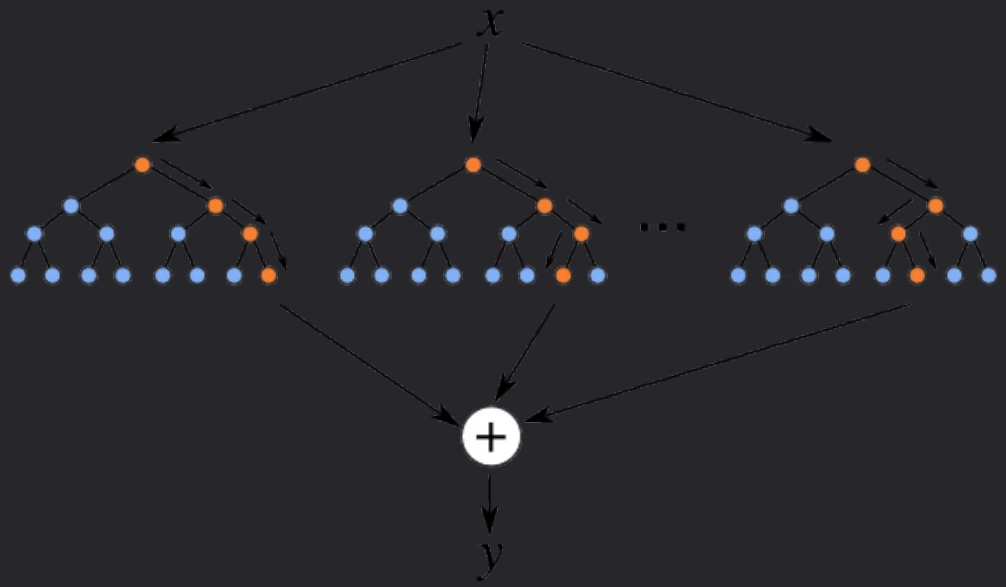
Forecasting Market Trends with Machine Learning

Ourmodel is a **Gold AI Predictor** designedtoforecast tomorrow's gold price using live OHLCV (Open, High, Low, Close, Volume) data from financial markets.

We have chosen the **Random Forest Regressor** for its ability to handle volatile financial data and provide high-accuracy continuous value predictions in real-time trading environments.

MACHINE LEARNING

What is Random Forest Regression?



EnsembleLearning Method

Random Forest is a powerful **ensemble learning** technique that combines multiple decision trees to create robust predictions.

Bagging Mechanism

Utilises **Bootstrap Aggregating (Bagging)** where the model creates multiple decision trees on random subsets of training data, ensuring diversity.

The Consensus Approach

In regression tasks, the final prediction is the **average of all individual tree outputs**, significantly reducing the risk of error from any single biased tree.

⚖ Why Random Forest for Gold?

Handles Volatility

Gold markets are inherently noisy with rapid fluctuations. Random Forest averages out the noise across multiple trees, providing stable predictions despite market turbulence.

Non-Linear Relationships

Financial trends rarely follow straight lines. RF excels at capturing complex, non-linear patterns between features like volume spikes and price movements.

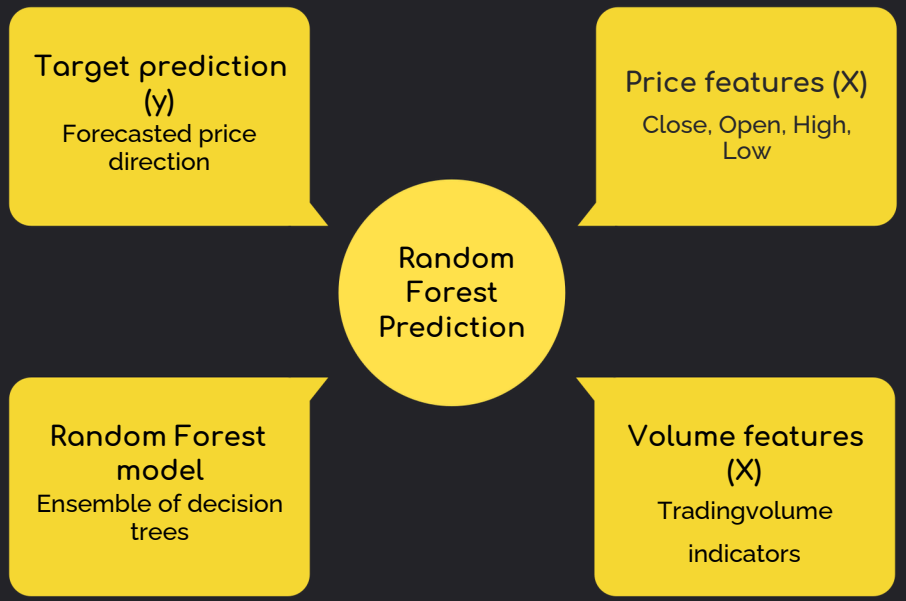
Feature Importance

Identifies which factors—such as trading volume versus previous closing price—have the greatest impact on tomorrow's gold price predictions.

Overfitting Prevention

By using a "forest" of trees instead of a single decision tree, the model generalises better to new, unseen live market data.

Model Inputs & Outputs



The model learns relationships from 10 years of historical data retrieved via yfinance API, enabling accurate real-time predictions.

The Features (X)

- **Price Data:** Current Close, Open, High, Low
- **Volume:** Trading volume indicator
- **Temporal Data:** Year, Month, Day, Day of Week

The Target (y)

Next Day's Closing Price

Calculated using the shift(-1) method in pandas, creating a supervised learning dataset for regression.

TECHNICAL STACK

Tools & Workflow

TechnologyStack

Python ecosystem with **Scikit-Learn** for model training, **Streamlit** for interactive frontend,and **yfinance** for real-time market data retrieval.

Data Collection

10yearsofgoldpricehistory via yfinance API

Feature Engineering

Datacleaningandtemporal feature creation

Model Training

Random Forest with pickle serialisation

Real-Time UI

Streamlit prediction interface