AI Stock Analyzer

Concepts that will cover in this project-

Theory-

1)- Essentials.

2)- The "Key Performance Indicators" (KPI)

3)- Modern Investment Theories

4)- Generative AI Tools

5)- Practical Applications

What is Langchain?

1. Langchain is our go to framework for building frameworks using language models.
2. It integrates with models like OpenAI.
3. Langchain-OpenAI wrapper let's you fully utilize OpenAI's models within the Langchain ecosystem.
4. Wrapper streamlines the creation of AI-driven customer service bots and innovative audience engagement tools.

Key Parameters of ChatOpenAI

1. Model (Specifies the OpenAI model)
2. Temperature (Controls Output Randomness)
3. Max_Tokens (Set the maximum token limit for the model's output)
4. Timeout – Defines the response wait time.
5. Max_retries – Set retry attempts for failed requests.
6. Api_key – For authenticating requests

Introduction to Finance –

Finance is the study and management of money, investments, and resources. It involves of obtaining, allocating and managing resources over times.

Finance is divided into 3 main categories-

1)- **Personal Finance** – Managing personal or household finance

2)- **Corporate Finance** – Managing Corporate activities within an organization.

3)- **Public Finance** – Managing Government revenue and expenditure

Assets –

Resources that are owned by an individual or a company. Resources that are expected provide future economic benefits. Divided in two categories.

There are 2 kinds of assets-

1)- **Tangible Assets** – Physical assets like real estate and machinery.

2)- **Intangible Assets** – Non-Physical assets like Patents, Trademarks

Liabilities -

Obligations Owned, representing future sacrifices to settle debts or contracts.

1)- **Short-term Liabilities** – Due within one year.

Example – Accounts Payable, Short-term loans

2)- **Long-term liabilities** – Due after one year.

Example – Long term payable, long-term loans

Example – Company has a $1 million loan for it's new factory and owes $50,000 to suppliers.

Equity -

Residual Interest in assets after deducting liabilities, reflecting shareholders' ownership value.

a)- **Common Equity** – The value of shares owned by shareholders.

b)- **Preferred Equity** – Higher-ranking equity with fixed dividends but no voting rights.

Assets = $5 million, Liabilities = $3 million, Equity = $2 million

Debt – Borrowed money repaid with interest, essential for financing operations for growth.

Secured Debt – Backed by Collateral.

Unsecured Debt – Not Backed by Collateral.

Example – A company issues $2 million in bonds, a secured debt if backed by it's assets.

Let's take an example –

Imagine a startup, Tech Innovators Inc., that manufactures innovative tech gadgets.

Example – Total assets = $3.5 million

Total Liabilities – $1.2 million

Equity = (Assets – Liabilities) ($3.5 million–$1.2 million = $2.3 million) (Representing shareholder's ownership value).

Debt – $1 million long-term loan (Long-term loan used to finance manufacturing facility).

Tangible Example of Interrelationships-

a)- **Asset Increase** – Buys $500,000 worth of equipment, increasing tangible assets but reducing cash.

b)- **Liability Management** – Borrows $300,000 short-term, increasing cash assets and debt liabilities.

c)- **Equity Impact** – Any operational profit, like $200,000, increases retained earnings and equity.

Company's current financial position is as follows-

a)- **Total Assets** – $4 million

b)- **Total Liabilities** – $1.5 million

c)- **Equity** – $4 million – $1.5 million = $2.5 million

It shows how managing assets, liabilities, and equity impacts company's financial health.

Note – 1)- Understanding financial basics is crucial for informed decisions and strategy.

2)- Finance requires strategic decisions for sustainability and growth success.

Top Fundamental KPIs for Stock Analysis-

These KPIs are essential tools that investors and analysts use to evaluate financial health and performance of a company.

In this section you will about-

1)- Earnings Per Share (EPS)

2)- Revenue Growth

3)- Return on Equity (ROE)

4)- Debt-to-Equity Ratio

5)- Free Cash Flow (FCF)

1)- Earnings Per Share (EPS) – EPS is crucial as it shows how profitable a company is per share, indicating earnings per stock.

Formula – **EPS** = Net Income – Preferred Dividends/Average Outstanding Shares

Example – $5 million net income, pays $500,000 in preferred dividends, with 1 million shares outstanding.

EPS = $5,000,000 – $500,000/1,000,000 = $4.50

Interpretation – EPS of $4.50 means the company earned $4.50 per share last year.

2)- Revenue Growth – It measures the increase in a company's sales, indicating business expansion.

Formula - Revenue Growth (%) = Current Period Revenue – Previous Period Revenue / Previous Period Revenue

Example – Last Year Revenue = $20 million

This Year Revenue = $25 million this year

Revenue growth (%) = $25,000,000 – $20,000,000/$20,000,000 * 100 = 25%

Interpretation – Company's sales rose 25% from last year, indicating successful market and operational expansion.

3)-**Return on Equity (ROE)** – Measures profitability relative to shareholders' equity, showing management's efficiency in using funds to generate profits.

Formula - ROE = Net Income / Shareholder's Equity * 100

Example – Net Income = $5 million

Shareholders' Equity = $25 million

ROE – $5,000,000/$25,000,000 * 100 = 20%

Interpretation – 20% ROE means the company generated a 20% return on shareholders' equity.

4)- **Debt-to-Equity Ratio** – It compares a company's total liabilities to it's shareholders' equity. Indicating the proportion of financing from debt versus equity.

Formula - Debt-to-Equity Ratio = Total Liabilities/Shareholder's Equity

Example – Total Liabilities = $15 million

Shareholders' Equity = $25 million

Debt-to-Equity Ratio = $15,000,000/$25,000,000 = 0.6

Interpretation – 0.6 debt-to-equity ratio means 60 cents of debt per dollar of equity.

5)- **Free Cash Flow** – It measures the cash available for distribution to a company's security holders, indicating financial flexibility and cash generation ability.

Formula - FCF = Operating Cash Flow – Capital Expenditures

Example – Operating Cash Flow = $7 million

Capital Expenditures = $2 million

FCF = $7,000,000 - $2,000,000 = $5,000,000

Interpretation – FCF $5 million suggests the amount available after capital expenditures, indicating a healthy company.

Relationships B/w KPIs

- **EPS & Revenue Growth** - Higher Revenue growth can increase net income & EPS, provided costs are managed effectively.
- **ROE & Debt-to-Equity Ratio** – Higher ROE shows efficient equity use, high debt-to-equity ratio can temporarily inflate ROE while increasing financial risk.
- **FCF and Debt Management** – Strong FCF enables debt management and reduction, improving the company's debt-to-equity ratio.

Conclusion-

These key metrics are crucial for analyzing company performance.

Top Trading KPIs for Stock Analysis-

These KPIs are super helpful for traders to make informed decisions.

By this section, you'll understand these KPIs-

a)- Relative Strength Index (RSI)

b)- Bollinger Bands

c)- Moving Average Convergence Divergence (MACD)

d)- Beta

e)- Price-to-Earnings Ratio (P/E Ratio)

a)-**Relative Strength Index (RSI)** - It is a momentum oscillator that measures speed and change of price movements, speed and change of price movements, ranges from 0 to 100 & helps identify oversold conditions in a market.

Formula – RSI = 100 – 100/(1+ (Average Gain/Average Loss))

Example – Average Gain of 1.5%

Average loss of 0.5% over 14 days

RSI = 100 – 100/(1+(1.5/0.5))

RSI = 100 – 100/4

RSI = 100 – 25

RSI = 75

Interpretation – RSI over 70 suggests a stock is overbought, while below 30 indicates it may be oversold.

b)- **Bollinger bands** include a middle band (SMA) and two outer bands (standard deviations from the SMA), indicating volatility and potential price movements.

Components – 1)- Middle Band: 20-day simple moving average (SMA)

2)- Upper Band: SMA + (2 * standard deviation)

3)- Lower Band: SMA – (2 * standard deviation)

Example – 20-day SMA of a stock = $50

Standard deviation = $5

Upper Band = 50 + (2*5) = 50 + 10 = $60

Lower Band = 50 – (2*5) = 50-10 = $40

Interpretation – Prices near upper band indicates overbought conditions, Prices near the lower band suggests oversold conditions.

c)- **Moving Average Convergence Divergence (MACD) –** It is a trend-following momentum indicator showing relationship between two moving averages of a security's price.

Components – 1)- MACD Line: 12-day EMA – 26-day EMA

2)- Signal Line: 9-day EMA of the MACD Line

3)- Histogram: MACD Line – Signal Line

Example – If the 12-day EMA of a stock is $52 and the 26-day EMA is $50

MACD Line = 52-50=2

If the 9-day EMA of the MACD Line is 1.5, then:

Histogram = 2-1.5 = 0.5

Interpretation – Positive MACD line indicates a bullish signal, Negative MACD line indicates a bearish signal.

d)- **Beta -** It measures a stock's volatility relative to the market. Beta 1 means it moves with market, above 1 indicates higher volatility, and below 1 indicates lower volatility.

Example – Stock with beta of 1.3 = 30% more volatile than the market.

Stock with beta of 0.8 = 20% less volatile than the market.

Interpretation – High-beta Stocks = Riskier but can yield higher returns.

Low-beta Stocks = More stable but may offer lower returns.

e)- **Price-to-Earnings Ratio (P/E Ratio) -** It's a valuation ratio that compares share price to earnings per share, showing investor willingness to pay per dollar of earnings.

Formula – P/E Ratio = Market Value per share/Earnings per share (EPS)

Example = If a stock is trading at $100 per share, and it's EPS is $5.

P/E Ratio = 100/5 = 20

Interpretation – P/E Ratio of 20 means investors are willing to pay $20 for every $1 of earnings.

Relationship B/w Trading KPIs-

- **RSI and Bollinger Bands** – Overbought RSI near the upper Bollinger Band may signal a sell.
- **MACD and Beta** – Higher-Beta stocks with bullish MACD signals offer high-reward but higher risk.
- **P/E Ratio and MACD** – A low P/E ratio and bullish MACD crossover may signal stock growth potential.

Conclusion –

Master these KPIs to enhance your trading strategies.