Data Warehousing

LAB PROJECT

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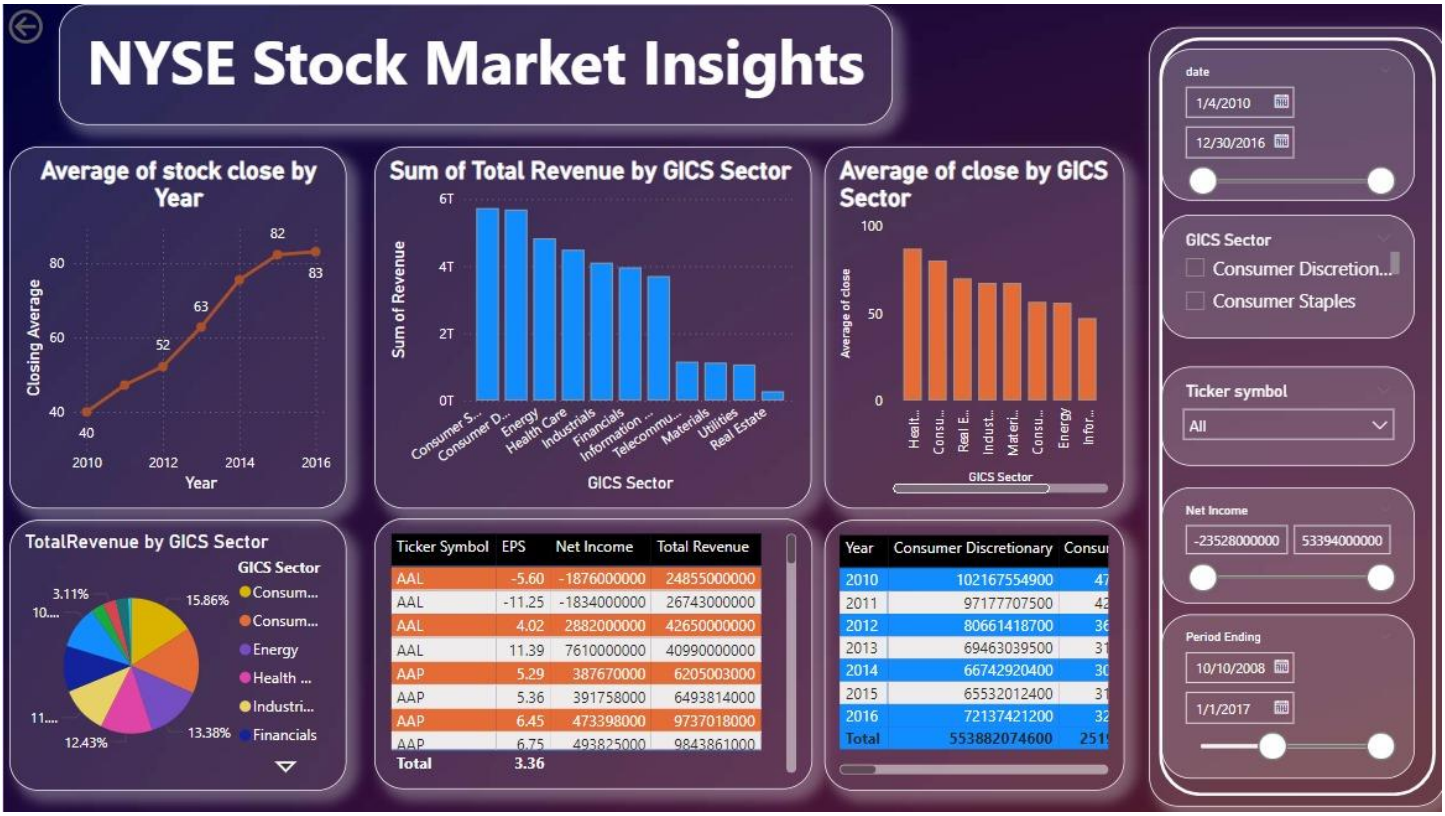
Section 1: Power BI Dashboard

Dashboard Overview

The Power BI Dashboard provides a detailed view of NYSE stock trends and company performance. The visuals are designed to highlight key metrics, trends, and insights for better decision-making.



Visuals and Insights

Stock Price Trend (Line Chart)

Data Source: prices-split-adjusted table.

Fields Used: Date (X-Axis), Close Price (Y-Axis).
Insights: The line chart shows the trend of stock prices over time, enabling users to identify upward or downward movements for specific companies.
Sector-Wise Trading Volume (Bar Chart)

Data Source: prices-split-adjusted (Volume) and securities (Sector).

Fields Used: Sector (X-Axis), Total Volume (Y-Axis).

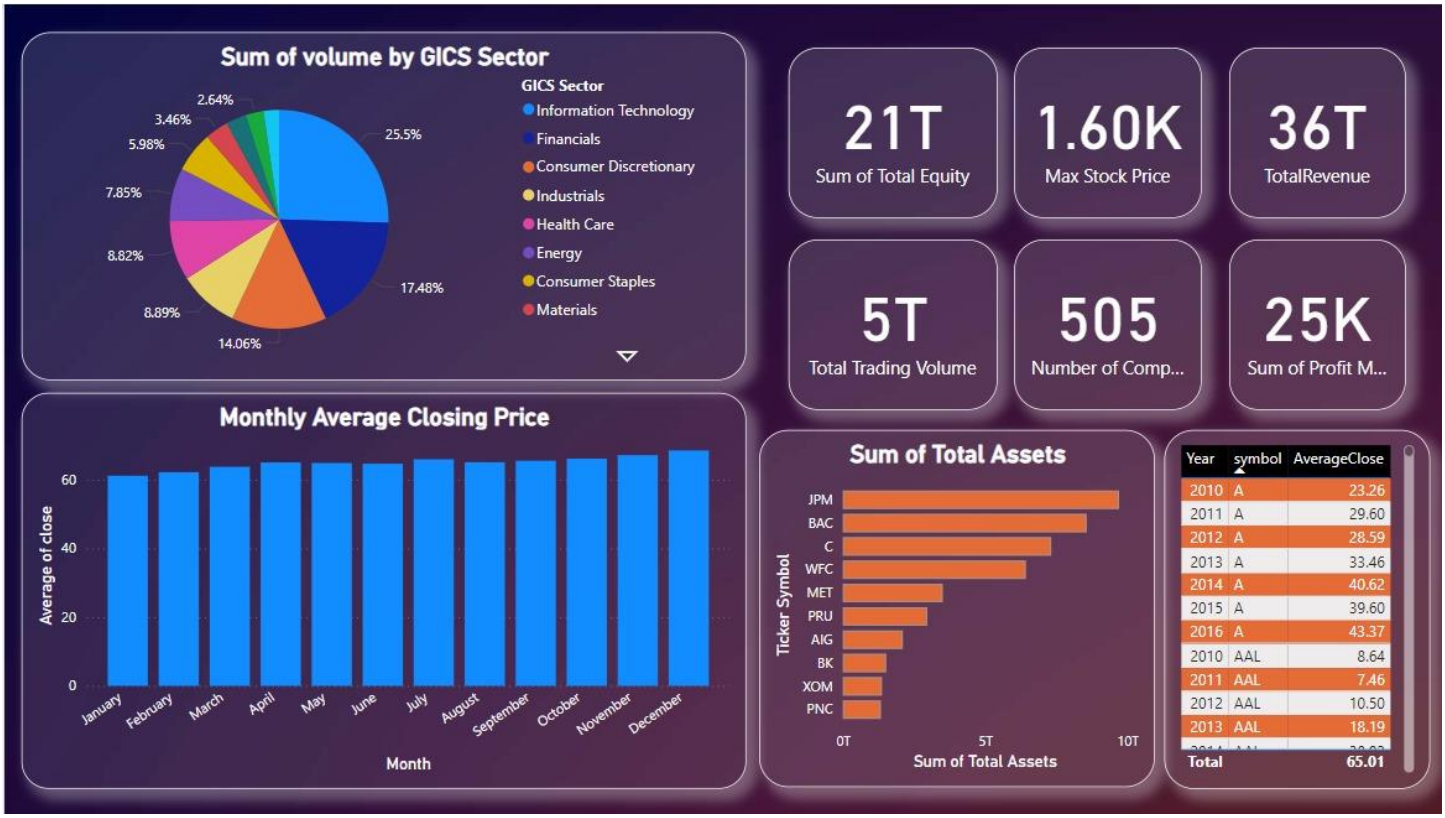
Insights: Financials and Technology sectors recorded the highest trading volumes, indicating high investor interest.
Average Closing Price by Sector (Column Chart)

Data Source: prices-split-adjusted and securities.

Fields Used: Sector (X-Axis), Average Close Price (Y-Axis).
Insights: The Technology sector had the highest average closing price, showing strong market performance.
Top 5 Companies by Volume (Table)

Data Source: prices-split-adjusted.

Fields Used: Ticker Symbol, Company Name, Total Volume.
Insights: Lists the most actively traded stocks, helping identify high-demand companies.
Slicers



Filters Used: Date Range, Sector, Company Name.
Purpose: Allows users to customize the data view dynamically and focus on specific segments.

Section 2: Formal Data Analysis Report

1. Dataset Overview

The dataset includes data from the New York Stock Exchange (NYSE), covering stock prices, company details, and financial fundamentals.

Tables Used:

Prices-Split-Adjusted: Historical stock prices adjusted for splits, including open, close, high, low, and volume data.
Securities: Metadata about companies, such as sector, industry, and HQ location.
Fundamentals: Financial metrics extracted from annual 10-K filings, such as revenue, earnings, and net income.
Domain: Financial markets, specifically stock trading and company performance.

GICS Sector	2010	2011	2012	2013
Utilities	20340013600	20848011900	18896707700	18886355
Telecommunications Services	19775265900	22816212700	15473018200	13480116
Real Estate	17265580900	17128822900	13896118000	14156145
Materials	28222700100	26314719800	20488567900	18345783
Information Technology	228816295000	216393042700	180291678300	173297628
Industrials	73783695500	71579451800	57185599100	50297721
Health Care	73869178200	68629900700	55511684400	54464294
Financials	160073922700	157110166000	135608491400	96133791
Energy	54580041000	50560440900	43929131100	38833638
Consumer Staples	50710518800	46319542000	39340784200	33644627
Consumer Discretionary	119621915300	115190146900	93805031400	80509358
Total	847059127000	812890458300	674426811700	592049461

2. Data Preprocessing

Cleaning Steps:

Handled missing values:
Filled null values in the "Date First Added" column in the Securities table with "Unknown."
Checked for duplicate rows and removed them.
Transformations:

Created relationships between the tables:
Ticker Symbol as the common key linking all tables.
Calculated new fields:
Percentage change in stock price (% Change = (Close - Open) / Open).
Aggregated metrics, such as total trading volume and average closing price.
Standardized date formats and column names for consistency.

3. Feature Selection

Chosen Features:

Date: For time-series analysis.
Close Price, Open Price, Volume: To analyze stock performance.
Sector, Industry: For sectoral and industry-wide comparisons.
Financial Metrics (Revenue, Net Income): To evaluate company fundamentals.
Reason for Selection: These features allow comprehensive analysis of stock price trends, market activity, and financial health.

Purpose and Analysis:

Chart 1: Stock Volatility

- **Purpose**: Displays the standard deviation of stock closing prices across various symbols.
- **Insight**: Stocks with higher standard deviations exhibit greater volatility. For instance, symbols on the far right represent more volatile stocks, suggesting higher risk but also potential for greater returns.

Chart 2: Average of Stock Close by Year

- **Purpose**: Tracks the yearly average stock closing price over time.
- **Insight**: There is a clear upward trend in stock prices from 2010 to 2016, indicating a bullish market trend and improving investor confidence over these years.

Chart 3: Sum of Volume by Year and GICS Sector

- **Purpose**: Displays the yearly trading volume aggregated by sectors.
- **Insight**: Trading activity has declined over the years, possibly reflecting market saturation or decreased investor activity. Information Technology and Financials dominate the trading volume.

Chart 4: Total Revenue by GICS Sector

- **Purpose**: Highlights the proportion of revenue contributed by different sectors.
- **Insight**: The **Financials** and **Information Technology** sectors contribute significantly to total revenue, indicating their dominance in the market.

Chart 5: Monthly Average Closing Price

- **Purpose**: Tracks the monthly average closing price across the year.
- **Insight**: Prices remain relatively stable across months, with minimal seasonal impact, reflecting consistent market behavior.

Chart 6: Sum of Total Assets

- **Purpose**: Lists top companies by total assets.

- **Insight**: JPM and BAC lead in total assets, indicating their financial strength and potential market influence.

Chart 7: Average Close by GICS Sector

- **Purpose**: Compares average closing prices across sectors.
- **Insight**: The **Health Care** sector has the highest average stock price, reflecting strong performance or higher valuations in that sector.

Chart 8: Total Revenue by Year (Consumer Discretionary and Consumer Staples)

- **Purpose**: Tracks revenue trends for specific sectors.

•**Insight**: Revenues have grown consistently in these consumer sectors, driven by increasing demand and market expansion.

5. Insights and Recommendations

Key Trends:

Technology sector shows the highest average closing price, indicating strong investor confidence.
Financials sector leads in trading volume, reflecting high liquidity and market activity.
Companies with consistent revenue growth (e.g., WLTW) have steady stock price increases.
Anomalies:

High volatility in some stocks (e.g., sudden price drops or surges) warrants further investigation.
Recommendations:

For Investors: Focus on Technology and Financials sectors for growth and liquidity.
For Companies: Improve fundamentals (e.g., revenue and earnings) to attract more investment.
Future Analysis: Analyze specific companies with extreme price fluctuations or consistent performance.
Conclusion

The New York Stock Exchange (NYSE) in 2016 was the largest stock exchange in the world by market capitalization. Located in New York City, it served as a platform for buying and selling shares of publicly traded companies. Here's a simple overview of its key aspects in 2016:

1. **Trading System**: NYSE operated a hybrid system that combined electronic trading with traditional floor trading. Traders could place orders online or through floor brokers who handled transactions in person.
2. **Listings**: It hosted some of the world's biggest companies, like General Electric, Coca-Cola, and ExxonMobil. Companies listed on the NYSE were subject to strict regulations to ensure transparency and investor trust.
3. **Market Performance**: In 2016, the stock market experienced fluctuations due to global events like Brexit and the U.S. presidential election, which influenced investor sentiment.
4. **Indexes**: The NYSE tracked performance through key indexes like the Dow Jones Industrial Average (DJIA) and the S&P 500, reflecting the health of the market.
5. **Role in Economy**: The NYSE acted as a vital hub for economic activity, allowing businesses to raise capital and investors to grow their wealth. It also played a key role in setting the tone for global financial markets.

This analysis provided a comprehensive overview of NYSE stock trends and company performance. The Power BI dashboard effectively visualized key insights, enabling better understanding and decision-making. Further enhancements could include predictive modeling for stock prices and sentiment analysis of financial news to complement the dataset.