Stock Price Visualizer with Past Investment Calculator

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Overview and Motivation

The web-based stock price visualizer offers an engaging interface that presents an interactive visualization of NVIDIA's stock price data. The focal point of this visualization is to trace the trajectory of NVIDIA's stock performance over time and provide a playful tool for users to explore hypothetical investment outcomes. By incorporating a combination of time-series graphs and interactive elements such as sliders and calculators, the platform stands out as more than just an information portal—it becomes a canvas where one can paint scenarios of financial 'what-ifs'.

The spark that ignited the creation of this visualization was the rock-high rise in NVIDIA's stock prices observed in recent times. As a newcomer to the stock market, I've been closely monitoring NVIDIA's stocks since August last year, often imagining the potential earnings I could have gained at different points in the timeline. This tool wasn't conceived to guide investment decisions; rather, it serves as a 'toy model' that allows individuals to envision varying investment outcomes. One might wonder, "What if I had invested a different amount at another time?" or "What if I had been bolder or more cautious with the amount I chose to invest during the same period?"

This virtual playground is not just for fantasizing about different investment strategies but also includes essential features found on professional stock tracking websites. It enables users to follow NVIDIA's stock price progression, integrating numerous indicators on the graph to enhance the tracking experience. Through this interactive and educational lens, I aim to offer users a chance to engage with financial data in a way that is both informative and entertaining, demystifying the often-complex world of stock market investments.

Data

For the subject of the visualization, I focused on a company close to my personal interests: the stock price of NVIDIA Corporation. NVIDIA, a giant in the GPU market, has seen its share of ups and downs, making it an ideal candidate for a case study in stock price fluctuations and investment scenarios.

To streamline data collection for this project, I sourced historical stock price data from Yahoo Finance, opting for the maximum tracking length available. This comprehensive dataset tracks NVIDIA's stock price for each trading day, dating back to 1999, providing us with a rich historical perspective right up to the present day. Included within the CSV file are vital data

points such as the opening price, the highest and lowest price of the day, and the closing price—each of which plays a crucial role in the construction of an informative stock price visualizer.

Yahoo Finance also offers a free API service that can retrieve real-time stock prices for selected companies. While the current project uses historical data, the API presents an exciting avenue for future enhancements. Incorporating this feature would not only simplify the data acquisition process but also enhance user engagement by allowing them to interact with the visualizer using real-time data from any company they are interested in tracking. This could extend the utility of the tool beyond a historical data explorer to a dynamic, real-time investment analysis platform.

Design and Implementation

Stock Price Visualization

NVIDIA Corporation (NVDA)
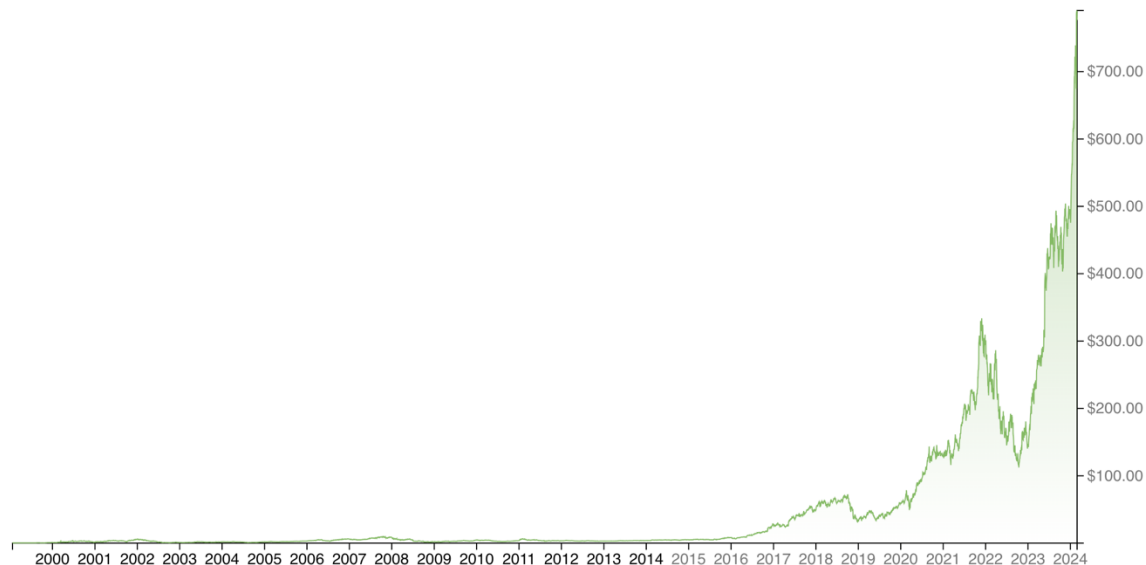
The visualization is centered around a line chart, a time-tested method for displaying stock prices over time. I used D3 to bind the historical data to the DOM elements. The chart is crafted to adjust to various screen sizes and devices, ensuring a broad accessibility.

One of the standout features of the visualization is the use of a gradient color fill beneath the stock price line. This aesthetic choice was implemented to offer a visual representation of the stock's rise and fall. The gradient starts with a stronger hue at the top, representing higher stock values, and gradually fades out towards the bottom of the chart, symbolizing lower values.

I began by defining the dimensions and margins of the chart. Using D3, I set up the time scale for the x-axis and the linear scale for the y-axis, mapping out the domain for both based on the dataset. In the SVG element, I appended a 'defs' block to define the linear gradient, which I

assigned an ID for reference. Within this gradient definition, I added two 'stop' elements that specified the color and opacity levels for the start and end points of the gradient. I bound the parsed and processed data to the SVG path elements. The line generator function from D3 plotted the stock prices over time, while the area generator function created the filled area under the line. I applied the gradient to this area, creating a visual emphasis on the stock's trajectory. The gradient itself is styled to reflect NVIDIA's branding, with a shade of green (#85bb65) that is recognizable to those familiar with the company. This design choice not only adds aesthetic appeal but also subtly reinforces the subject of the visualization.

Slider

NVIDIA Corporation (NVDA)
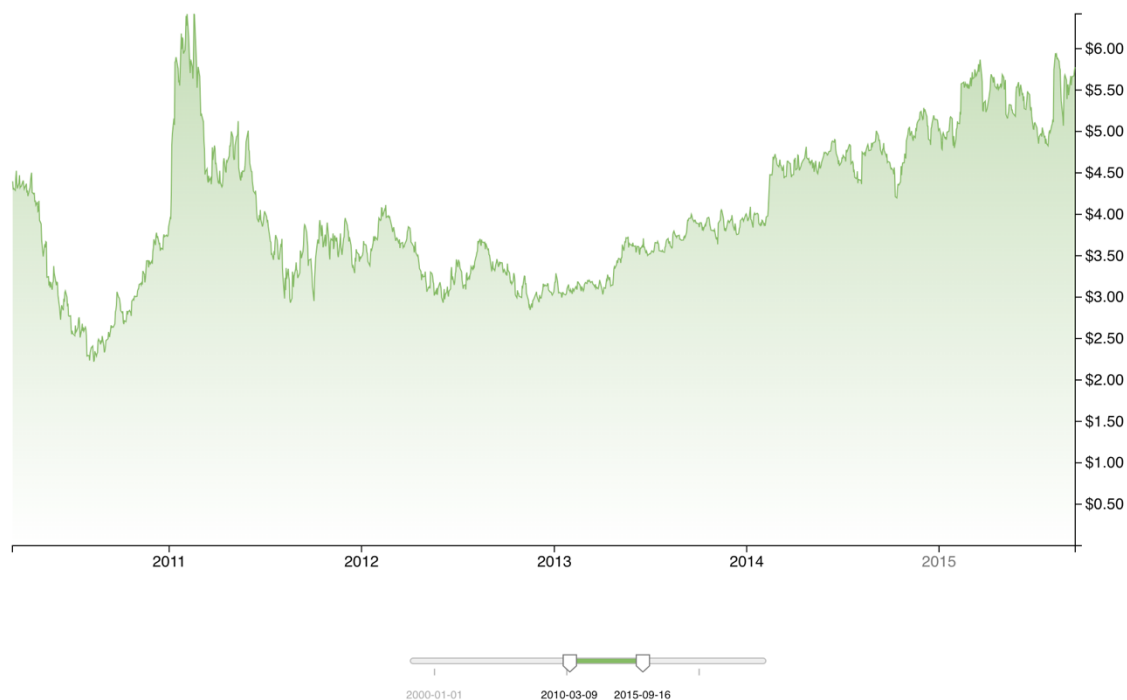
To enhance user interactivity in the NVIDIA stock price visualization, I implemented a slider function. This feature allows users to select and view specific time periods within the extensive timeline of NVIDIA's stock data. I utilized the d3-slider module for its simplicity and compatibility with D3. The slider is configured with minimum and maximum values corresponding to the earliest and latest dates in the dataset. It's designed with a width proportionate to the overall graph to maintain balance and usability. I bound the slider to the same dataset that drives the stock price line chart to ensure coherence between the slider's input and the data output on the graph. This binding is crucial for the slider to correctly filter the stock price data as the user adjusts the range. As the user interacts with the slider, an 'onchange' event listener triggers updates to the chart. This listener calls a function that adjusts the domain of the x-axis scale to the new date range selected by the slider. Consequently, the chart re-renders the line and the area elements to reflect only the data within this new range.
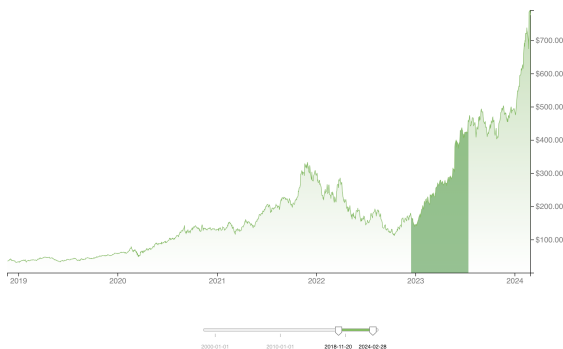
NVIDIA Corporation (NVDA)

To enhance interactivity, I implemented tooltips that display the stock price and corresponding date when hovering over any point on the line. The tooltip appears alongside a vertical line that tracks the cursor movement across the chart, providing instant and precise data points as users move their mouse. The red dots and lines that appear over the graph provide a visual cue that highlights the exact value and date of the stock price where the user's mouse is pointing. They are created using SVG elements (circle for the dot and line for the vertical and horizontal lines) that are only made visible upon mouseover.

Area selection

By selecting a historical area, users can contextualize current performance within historical performance. This helps in understanding whether current price movements are within a normal range or if they signify an outlier event. On the mousedown event, mouse captures the

starting point of the selection. This is the initial x-coordinate from where the user intends to start the selection. It marks the beginning of the interaction. For the continuous 2 clicks, the dates and prices of each selected dates are recorded and compared, and a highlighted area will be created in between. The selected area can be highlighted by filling the dynamic rectangle with a semi-transparent color or altering the opacity of the area within the bounds of the selection. The color is either red or green, determined by the price comparison between the two selected dates. This provides immediate visual feedback on the selected range.

Market Value Calculation

NVIDIA Corporation (NVDA)

An essential feature of the NVIDIA Corporation stock price visualization is the 'Market Value Calculation' functionality. This interactive tool calculates the potential value of an investment made at a chosen point in time, based on the stock's historical data. It serves to provide users with an illustrative example of how an investment would have performed over a selected period. The design philosophy behind this feature was to provide an intuitive and user-friendly interface for exploring "what-if" scenarios. The goal was to allow users to input hypothetical investment amounts and dates, then instantly see the outcome without overwhelming them with complexity. Users are provided with input fields where they can enter the initial investment amount and select 'Buy' and 'Sell' dates using the slider or by clicking on

the chart. Event listeners are attached to the input fields, slider, and the chart. These listeners trigger the calculation function when the user makes a selection or inputs a value. The calculation function first retrieves the stock prices corresponding to the selected 'Buy' and 'Sell' dates from the dataset, and then Calculates the number of shares that could have been purchased initially with the input amount. After that, it computes the final market value of these shares at the selected 'Sell' date and updates the display to show the result.

Evaluation

The project set out to answer questions about NVIDIA's stock price evolution over time, and the visualization provided clear answers. The data showed not only the company's growth but also how market events influenced stock prices. The 'Market Value Calculation' feature allowed us to explore hypothetical investment scenarios, providing a tangible way to understand the stock's volatility and investment potential.

While the current visualization serves its intended purpose, several enhancements could be implemented to improve it further:

- Real-Time Data Integration: Incorporating real-time stock prices would make the tool more relevant for current and prospective investors looking to make informed decisions based on the latest market conditions.
- User Customization: Allowing users to customize the display settings, such as choosing different chart types or adding and removing specific data points, would cater to a broader range of user preferences and needs.
- Advanced Analytical Tools: Integrating more advanced financial analytical tools, such as moving averages or predictive models, could transform the visualization from an informative tool into an invaluable resource for serious investors.