Base Info

Project title: Cryptocurrency Spy

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Link to project repository:
https://github.com/Luke-Skycrawler/CryptocurrencySpy

Background and Motivation

Cryptocurrency has been a worldwide phenomenon, leading to multiple issues of why is it popular, how can it be influential and how can it be trusted, and so on. The technique behind it is intriguing and worth more attention from the crowds. As an economic phenomenon, it has direct relations with the concept of 'value'. With deeper understanding and more knowledge, we can learn how to invest our money more wisely, potentially gaining profits from it. Besides, there are a lot of factors that influence the price of a cryptocurrency, which makes it suitable as our target to analyze.

By definition, cryptocurrency is a decentralized and thus fraud-proof currency. All confirmed transactions are stored in a public ledger and all identities of coin owners are encrypted to ensure the legitimacy of record keeping. Therefore it eliminates the need for central authorities such as banks or governments.

The main difference between cryptocurrency and traditional currency is that cryptocurrency is not controlled by the government and therefore actually owned by the coin owners. There are other benefits that cryptocurrency can bring, such as no limits to the funds you can transfer, no possibilities that your accounts can be hacked, and no central point of failure.

Like any market, the behavior of cryptocurrency has been intricate and worth analyzing effort. Tracking and predicting the behavior of the market has been the holy grail for economists, and it is particularly attractive because it is beneficial and profitable in a direct and instant way.

Project Objectives

- To understand the trends and to provide guidance and perspective on how we should perceive the phenomenon in our best interest.
- To present how cryptocurrency works and how it influences the world in an intuitive way, and to inspire insights on how it evolves over time.
- To learn the data processing and visualization techniques and design principles to present complex data.
- To master the skill of presentation.

Data

In the present sense, downloading of cryptocurrency data has been eased so much with the involvement of commercial companies. Commercial crypto dataset providers provide historical cryptocurrency data as well as real-time data and intraday cryptocurrency financial data feeds for download purposes. Some of the most prominent crypto data providers include Cryptodatadownload, Cryptodatum, Coinmetrics, Kaiko, and Kaggle.

On the other hand, several information-rich cryptocurrency datasets are also available to the public for query and download. For example, In 2018, Google Cloud released datasets consisting of the blockchain transaction history for Bitcoin and Ethereum, to boost the study of historical price action and to help understand cryptocurrency.

In our project, the open datasets are our primal choice and the commercial sources are reserved as a backup. The public dataset we are using can be accessed at Introducing six new cryptocurrencies in BigQuery Public Datasets—and how to analyze them | Google Cloud Blog. It includes the bulk historical data of the most common cryptocurrencies, including Bitcoin Cash, Dash, Dogecoin, Ethereum Classic, Litecoin, and Zcash, which may need further pruning to reveal thoughtful insights.

Data Processing

The bulk data is not feasible via download but we can view part of it via online queries and download the result in .csv format.

After we gained the raw data, we use python scripts to do the following processing steps,

1. Sift out the valid data (the data without missing elements), making sure every data entry has the same amount of information and in the same format.
2. Calculate necessary derived values for presentation if needed, where we expect most data from step 1 can be directly used.

Visualization Design

We expect to explain the essential information about cryptocurrency in the following aspects:

- **Present State**: we want to visualize the market share of different cryptocurrencies. If possible, we may use a comparison of the number of transactions and prices with the stock market to get a sketch of the scale and popularity of the cryptocurrency market.

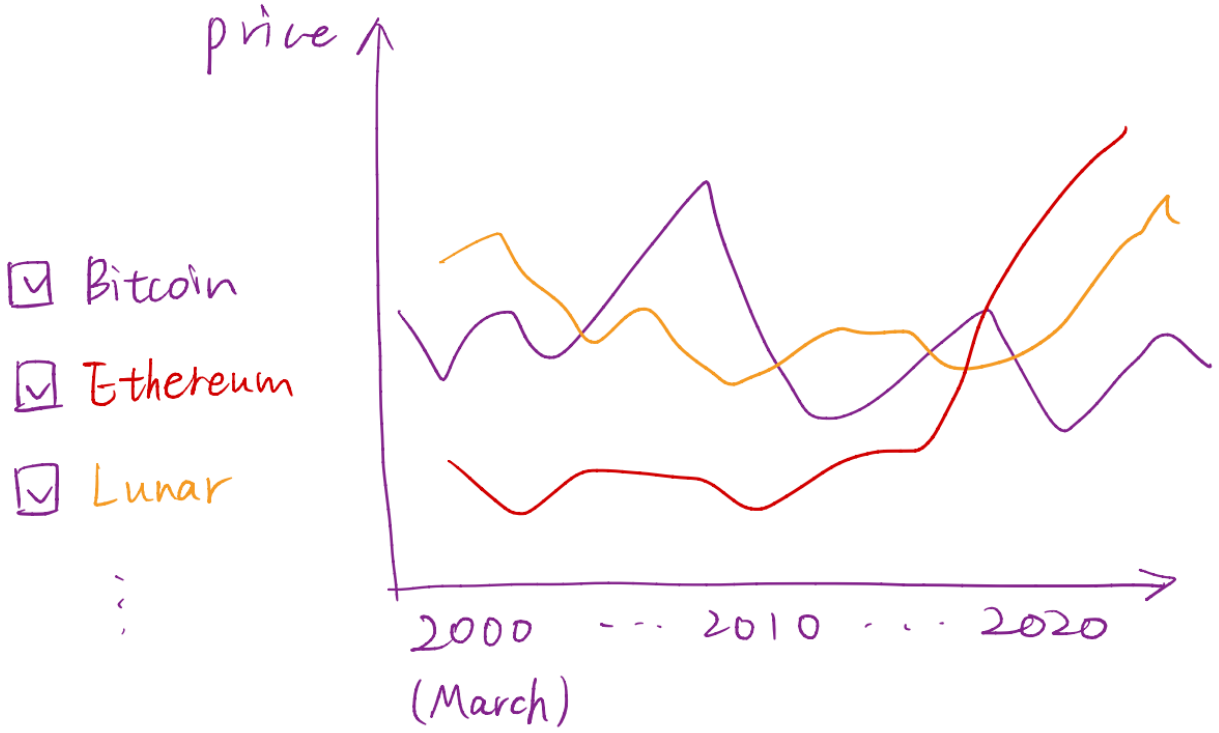
- **History**: we want to show how cryptocurrency gained its popularity, and how it has evolved over time. Theoretically, the blockchain contains all past transactions, we could try to visualize the transactions and get a peek at the pattern of user behavior and how it is most commonly used.

- **Principles:** Showing how the blockchain grows and splits, and how the protocols evolve is an interesting topic to present.

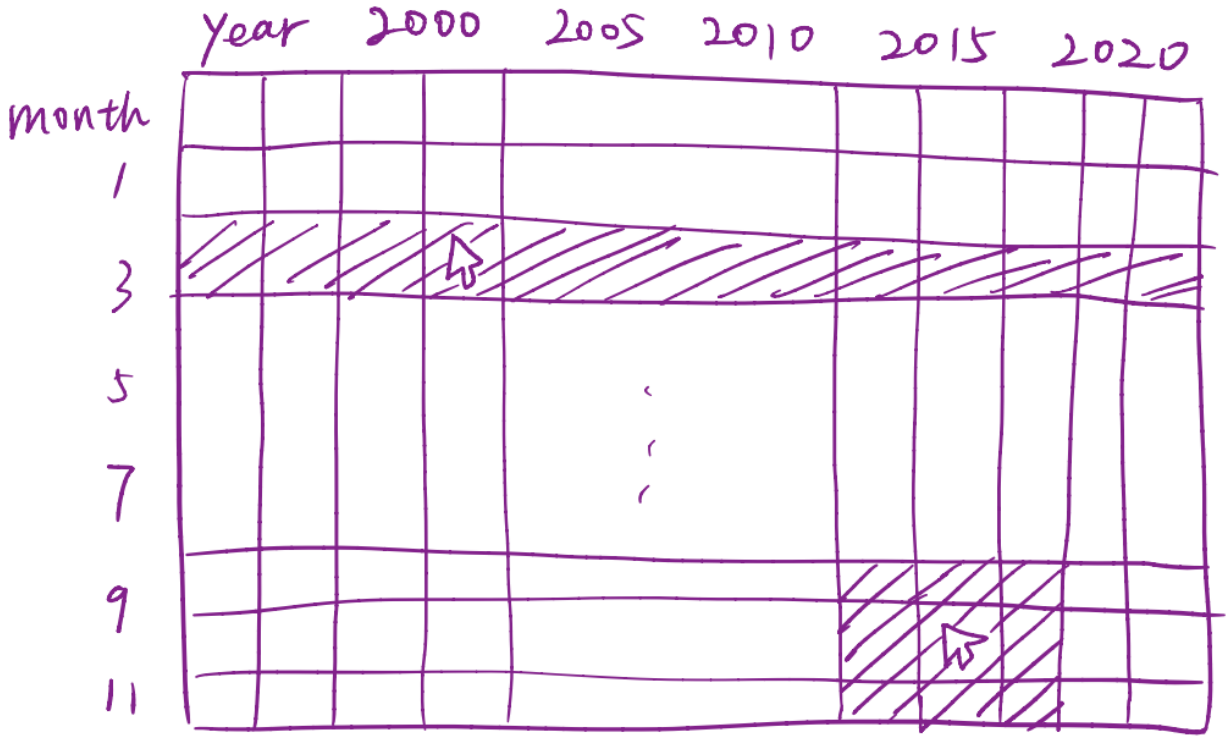
- **Real-world Impact:** We want to show how cryptocurrency interacts with the world. For example, the price of cryptocurrency may depend on the price of GPUs and the electricity cost.

To present the above topics, we have designed the following visualizations.

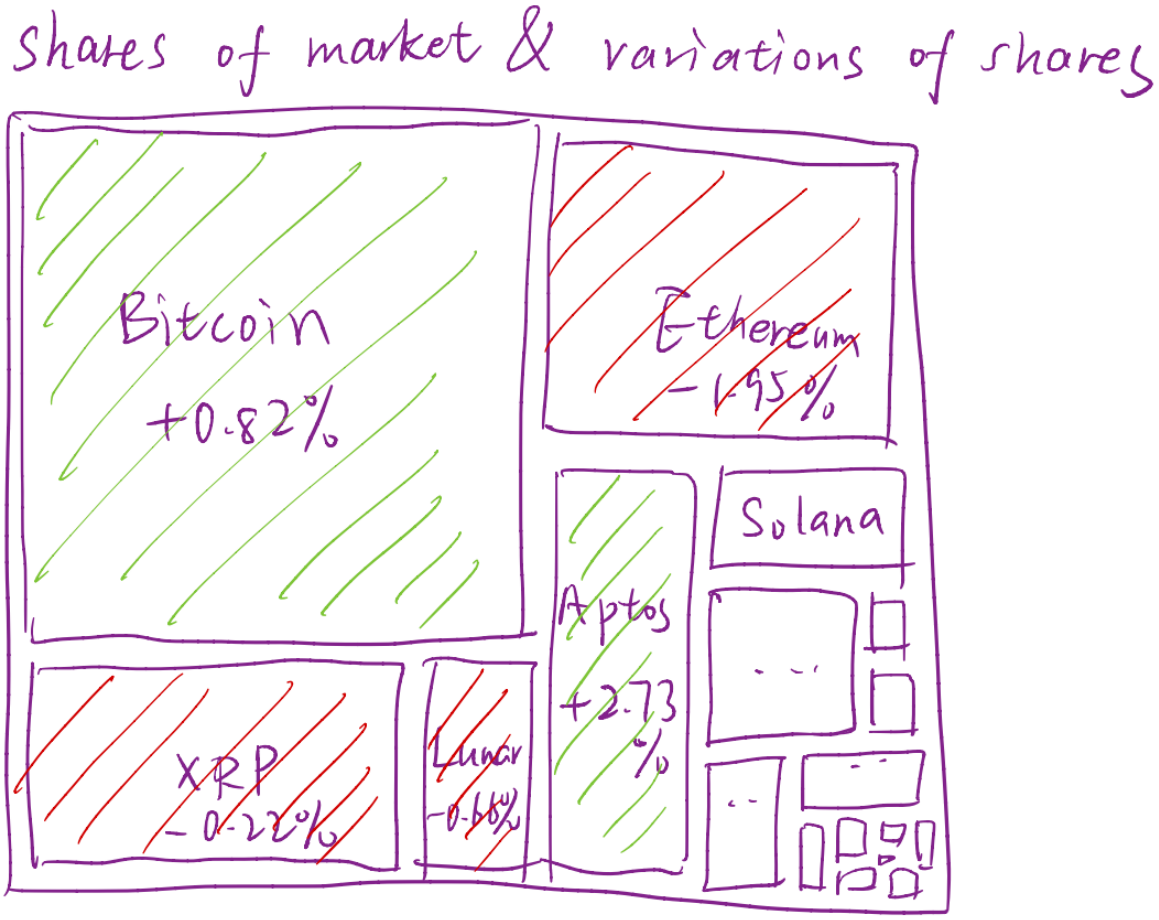
Line charts: Price history or number of total transactions



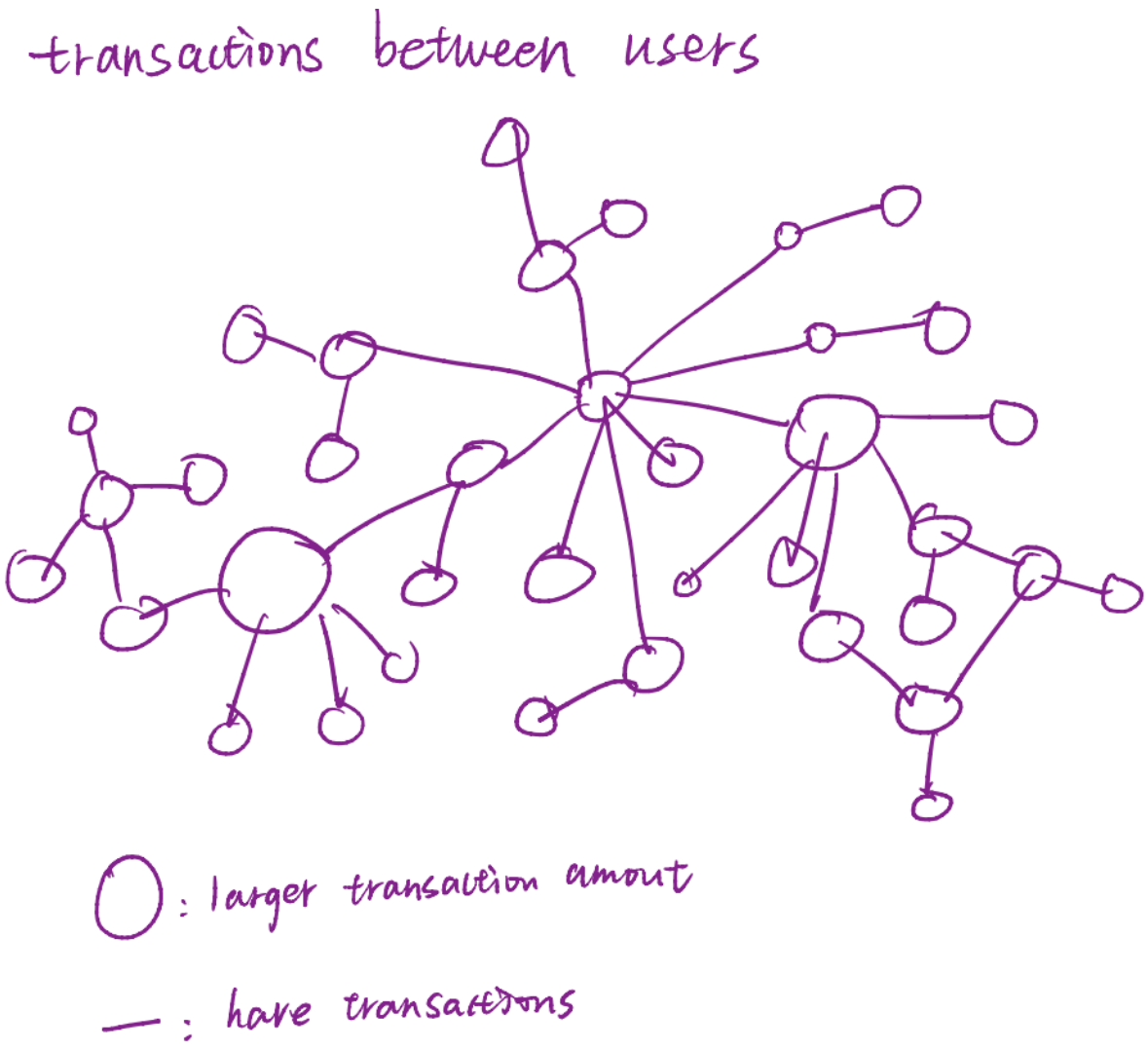
Brush select time range: by selecting year and month on this grid (the selection will be highlighted by a different color on the grid), we then plot a line chart in that time range.



Heatmap: The areas of rectangles indicate the market shares. The color (either green or red) indicates whether the share is increasing or decreasing. The amount of the increase or decrease compared to the last month or year can be read from the text inside the rectangle.



Force-directed map: transactions between users (indicated by circles), larger circles mean larger amount of transactions. The lines indicate that there are transactions between two users. When hovering on a line, the amount of transaction will be displayed on the line as text; while not hovering, the text will not be displayed to make the map be viewed more clearly.



Must-Have Features

1. Line charts (lines of price or transaction, axes, labels, ticks)
2. Treemap (assignments of different areas, coloring, text display)

Optional Features

1. Time-range selections with brushes (highlight the time range, and update on the line chart…)
2. Force-directed tree (tree node display, hover and click interactions…)

Project Schedule

Make sure that you plan your work so that you can avoid a big rush right before the final project deadline, and delegate different modules and responsibilities among your team members. Write this in terms of weekly deadlines.

	Haoyang Shi	Yintong Shang
10.24 - 10.30	Collecting and processing data	
10.31 - 11.6	Treemap	Line chart
11.7 - 11-13	Treemap	Line chart
11.14 - 11.20	Force-directed tree	Brush selections
11.21 - 11.27	Force-directed tree	Brush selections
11.28 - 12.2	Final refinement	