MAJOR-2 PROJECT

Project Synopsis Report

Cryptocurrency Market Analysis

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Submitted by:

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Synopsis Project Report (2022-23)

1. Project Title

Cryptocurrency Market Analysis

1.1. Abstract

This significant project report investigates how to do a thorough analysis of the cryptocurrency market using Snowflake, Fivetran, S3 Bucket, and Tableau. A review of the cryptocurrency market and its recent expansion serves as the project's introduction. The significance of adopting cutting-edge data analytics tools and methods for evaluating and visualizing cryptocurrency data is then discussed.

The process for gathering and compiling data from various sources, such as exchanges, social media, and news sites, is covered in the report. We describe how the data collecting and processing steps of the study were automated using Snowflake, Fivetran, and S3 Bucket, which helped to cut down on the time and labour needed for manual data processing.
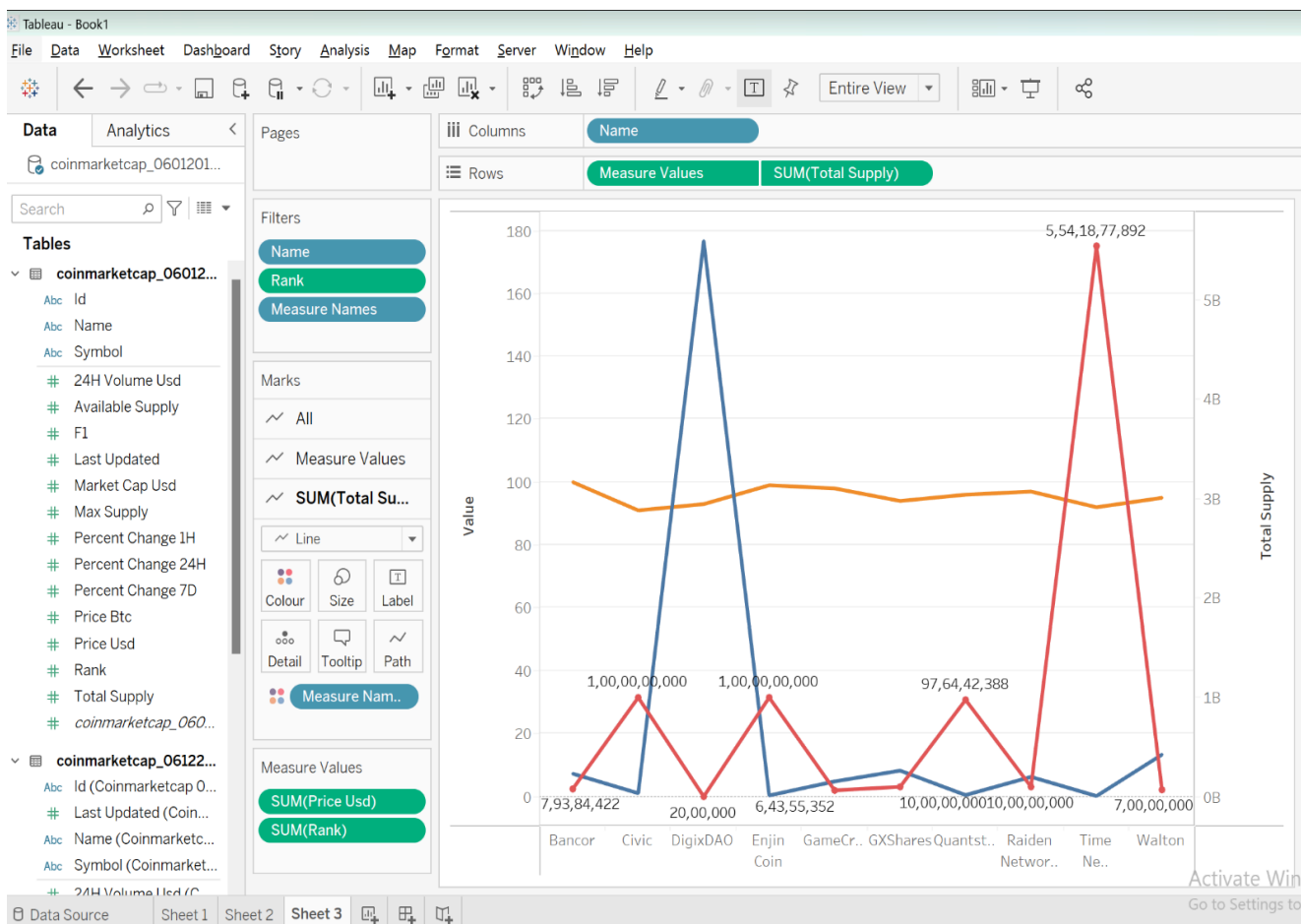
Fig 1. Trend line analysis on Tableau for the current market status of cryptocurrency

The creation of a variety of interactive and insightful visualizations, including those showing price movements, market capitalization, trading volume, and sentiment analysis, is then covered. These representations make it easier to spot patterns and trends in the cryptocurrency market and improve our ability to study it.

Overall, this report provides an extensive analysis of the cryptocurrency industry and showcases the implementation of contemporary data analytics methods and tools, making it a vital tool for anybody with an interest in both cryptocurrency and data analysis. [1].

2. Introduction

With a market capitalization of more than $2 trillion as of September 2021, the cryptocurrency market has emerged as a fresh and quickly expanding financial class. A number of factors, such as the expanding use of digital currencies, the rising interest of institutional investors, and the introduction of novel use cases for blockchain technology, have propelled this sector. But, the bitcoin industry is also very risky from a geopolitical and regulatory perspective. Hence, in order to properly comprehend the market's potential and threats, a thorough analysis must be done.

We present a thorough overview of the cryptocurrency market in this report, covering its background, prospects, regulatory environment, key players, competitive landscape, and emerging trends. We also look at the dangers and difficulties of investing in cryptocurrencies as well as the potential market effects of technological development and geopolitical events. Using the alias Satoshi Nakamoto, some individual or group of individuals established the first cryptocurrency, Bitcoin, in 2009. A distributed ledger known as the blockchain serves as the foundation for Bitcoin, a decentralized digital currency. Every Bitcoin transaction is verifiable and safe since every transaction is recorded on the blockchain.

Many more cryptocurrencies, including Ethereum, Litecoin, Ripple, and Bitcoin Cash, have appeared since the invention of Bitcoin. While these cryptocurrencies share some traits with Bitcoin, they also have their own special qualities and applications [2].

Throughout the past ten years, the bitcoin market has experienced enormous growth. The market value of all cryptocurrencies hit $800 billion in 2020, and it increased further in 2021. A number of factors, including the rising use of digital currencies, institutional investors' increased interest, and the appearance of new applications for blockchain technology, have contributed to the rising popularity of cryptocurrencies.

Several variables are responsible for the huge development potential of the bitcoin business. One major factor fueling development is the rising use of digital currencies, which is being fueled by the expansion of digital payment systems and the advent of cryptocurrencies in e-commerce. The COVID-19 pandemic, which has hastened the trend towards cashless payments, has also boosted the acceptance of cryptocurrencies.

The most well-known cryptocurrency, Bitcoin, wants to replace the dollar as the standard unit of exchange. The goal of Ethereum, on the other hand, is to develop a platform for decentralized computing that can be used to develop decentralized apps. With its decentralized payment system, Ripple wants to enable international money transfers [3].

Significant risks for investors and dealers in the market also stem from the absence of a defined regulatory framework and the rising threat of cyberattacks. A major obstacle to the market's expansion and sustainability is the growing environmental issues connected to the resource-intensive mining method used to create several cryptocurrencies.

Numerous new phenomena may influence how the bitcoin market develops in the future. Stablecoins are cryptocurrencies that are tied to a stable asset, like gold, and are one of the most significant trends.
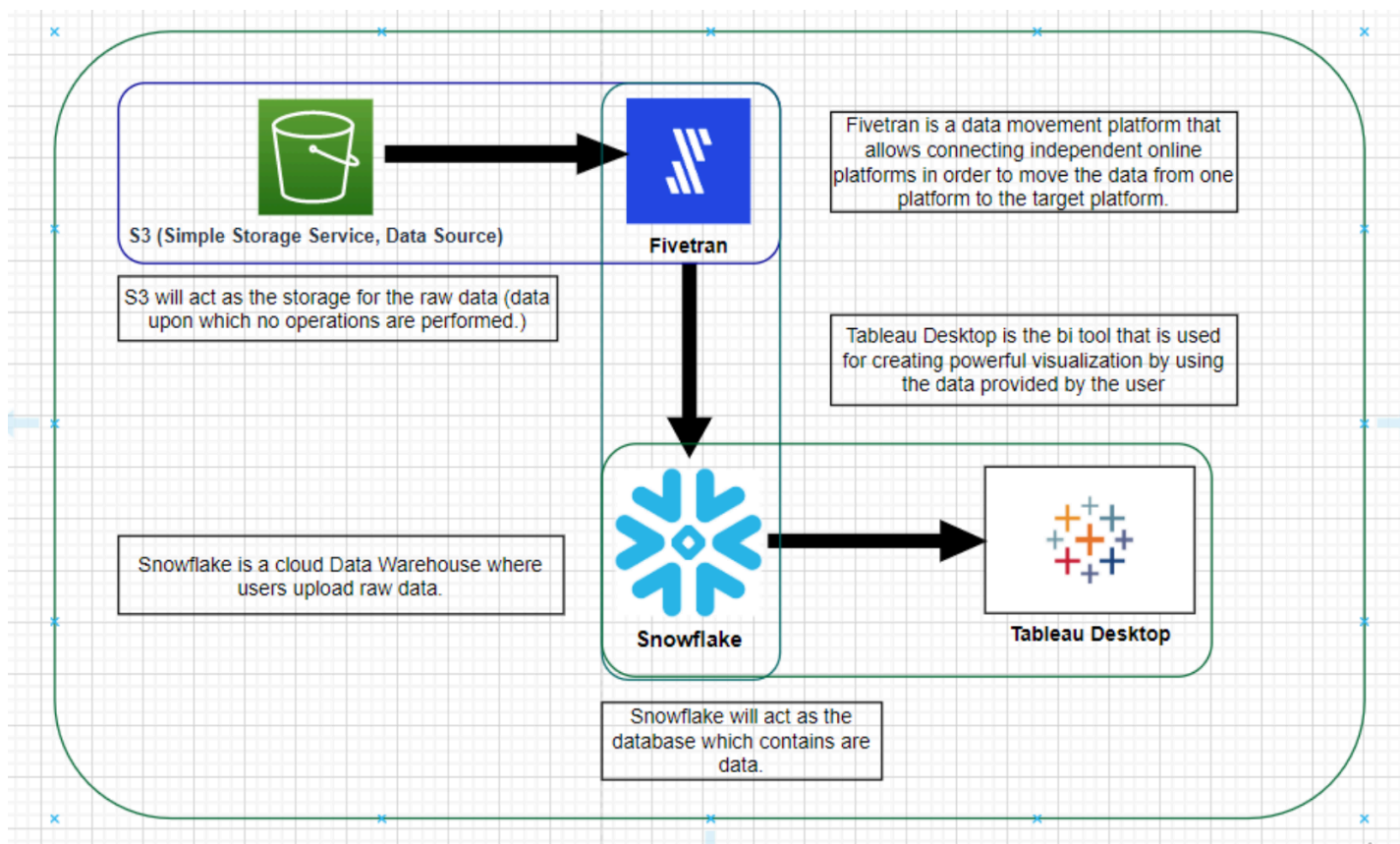
3. Architecture Overview

Fig 2: Diagrammatic Representation of the data flow

4. Literature Review

Park et. al [1] proposes utilizing visual analytics to study Twitter and Reddit data to examine the relationship between social media marketing communication and bitcoin reputation. The study demonstrates the role of social media in influencing the reputation of cryptocurrencies by concluding that good social media sentiment and high engagement levels are associated to increased coin reputation. About the significance of social media as a tool for increasing the reputation of bitcoin products or services, this research offers insightful information for cryptocurrency entrepreneurs, investors, and marketers.

Mikhaylov et. al [2] proposes that cryptocurrency industry from the standpoint of open innovation. The study looks at how many aspects, including user behavior, technological advancements, and legal frameworks, affect the development and use of cryptocurrencies. The research also looks at how open innovation strategies, like crowdsourcing and collaborative development, might help the bitcoin sector grow and endure. The author provides insights into the difficulties and opportunities facing the cryptocurrency business and discusses potential tactics for promoting innovation and growth in this field through a thorough review of the body of existing research and empirical data. Overall, the work contributes significantly to the developing field of cryptocurrency research and illuminates the dynamics of innovation in decentralized digital ecosystems.

Farel et. al [3] states offer an in-depth examination of the sector, covering subjects like the development of cryptocurrencies over time, their technical underpinnings, and the various societal, economic, and governmental factors that affect their adoption and growth. The market size and business dynamics of cryptocurrencies are examined in the study, as well as how power and income are distributed among various stakeholders. The influence of

cryptocurrencies on security, privacy, and financial stability are some of the potential hazards and advantages covered in the study. The author gives insights into the opportunities and problems facing the bitcoin sector and suggests potential tactics for tackling them through a critical study of the current literature and empirical data.

Mnif et al. [4] present multifractal analysis to assess the COVID-19 pandemic's effects on the cryptocurrency market. They look at how the market responded to significant occurrences and adjustments to the world's financial markets during the pandemic, such as the release of government stimulus plans and the drop in oil prices. The study discovers that throughout the epidemic, the cryptocurrency market was very volatile and multifractal, with both positive and negative returns displaying long-range dependence and multifractal behavior. The authors also note that compared to the pre-pandemic period, the market was more stable and predictable during the pandemic period.

5. Problem Statement:

A comprehensive analysis of the cryptocurrency market is necessary because of the increasing recognition and complexity of cryptocurrencies. To adequately analyze and comprehend the dynamics of the market, however, the enormous amount of information compiled by cryptocurrency transactions and exchanges poses an important challenge. Quantitative analytical methods have been utilized, but they are inefficient at spotting patterns, trends, and correlations that aren't always apparent. Thereby, a more efficient system of studying the cryptocurrency market is recommended.

For instance, if a financial firm specializing in cryptocurrency investments is looking for ways to improve their investment strategies. They realize that the vast amount of data generated by the cryptocurrency market makes it difficult to effectively analyze and understand the market's behavior. The firm decided to implement a data analysis pipeline using visual analytics tools like Tableau. By leveraging Tableau's powerful data visualization capabilities, the firm can identify patterns and trends in the cryptocurrency market that were previously difficult to uncover. This leads to more informed investment decisions and better returns for the firm's clients. The use of Tableau also enables the firm to communicate their findings to a broader audience, making it easier for decision-makers to act upon the insights.

1. A thorough examination of the cryptocurrency market is required due to the emergence and widespread adoption of cryptocurrencies.

2. Due to the market's massive data production from transactions and exchanges, it is difficult to effectively assess and understand its dynamics.

3. The bitcoin market has been examined using conventional quantitative analytical techniques.

4. These techniques are ineffective at identifying hidden patterns, trends, and correlations, thus, a more effective method of studying the bitcoin market is advised.

6. Objective

The objective of this technical project is to create a thorough and effective data pipeline for Tableau, Snowflake, Fivetran, and S3 to analyze the bitcoin market. By offering dynamic and understandable visualizations of bitcoin market patterns and behaviors, the aim is to facilitate smart decision-making.

Setting up a data pipeline with Fivetran connectors will be required for the project to pull data from various bitcoin exchanges and transactions. The information will subsequently be safely and effectively stored in a Snowflake data warehouse. S3 will be used for data transit and storage, further optimizing the pipeline. The pipeline will guarantee data completeness, quality, and consistency as well as the accessibility of real-time data for analysis.

Develop a comprehensive data pipeline for cryptocurrency market analysis using Snowflake, Fivetran, S3, and Tableau.

Extract data from various cryptocurrency exchanges and transactions using Fivetran connectors and store them in a Snowflake data warehouse.

Analyze data using Tableau for interactive visualizations, identifying trends, patterns, and correlations in the cryptocurrency market.

Improve decision-making by providing intuitive and interactive visualizations.

Contribute to the understanding and adoption of cryptocurrencies in the financial industry.

7. **Methodology**

As a result of the enormous amount of data that needs to be gathered, cleansed, and analysed, cryptocurrency market analysis can be complicated. Snowflake is a cloud-based data warehousing platform that can store and manage enormous amounts of data, and Fivetran is a potent data integration tool that can be used to build a pipeline for gathering data from distant S3 repositories. With the help of the potent data visualization application Tableau, interactive dashboards that offer insightful analyses of the bitcoin market may be made. Below are some key methodologies that will be followed for the entire timeline including the initial stages till the final stages of the project.

Identifying the key metrics also called as KPI or key performance indicator that we want for further analysis of the market and track in the respective dashboard, such as price trends, trading volumes, market capitalization, and other relevant data points.

Creating a S3 repository and then loading dataset obtained from Kaggle into S3 bucket.

Setting up a Fivetran account to further set up a pipeline and bring the data uploaded in the S3 bucket to Snowflake warehouse this process is also called external staging .

Create connectors with the essential information required to extract the relevant data and load it into Snowflake.

Connect Tableau to Snowflake by creating a new data source.

Choose the Snowflake option and provide the necessary credentials to establish the connection. Choose a dashboard template or create a custom layout for your dashboard.

Decide on the visualizations that have relevancy for further analysis comprising of charts such as line charts, bar charts, scatter plots, and heat maps. Drag and drop the relevant metrics onto the dashboard and arrange them in a logical and intuitive way.
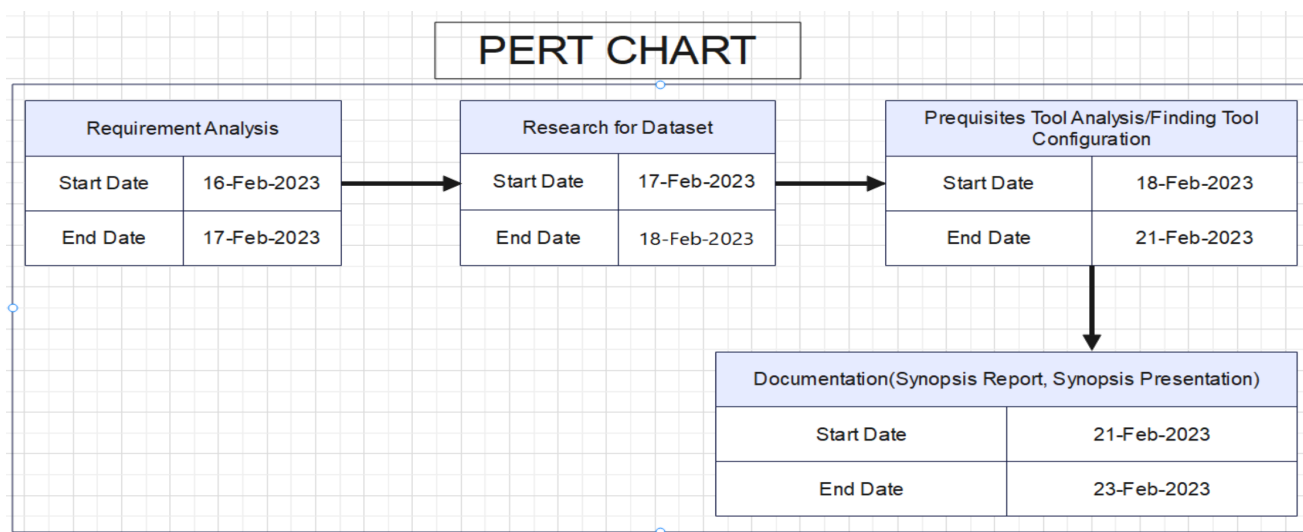
Use Tableau desktop to create visualization tools to create charts, graphs, and other visualizations that display the data in a clear and concise manner.

Apply appropriate filters such as action filters and parameters to allow the user to interact with the data and adjust the dashboard according to their needs.

Include a title, subtitle, and explanatory text to provide context for the dashboard and help the user understand the data.

Test the dashboard to ensure that it is functioning properly and displaying accurate data. Iterate on the design and functionality of the dashboard.

8. Pert Chart

PERT CHART

Requirement Analysis		Research for Dataset		Prequisites Tool Analysis/Finding Tool Configuration	
Start Date	16-Feb-2023	Start Date	17-Feb-2023	Start Date	18-Feb-2023
End Date	17-Feb-2023	End Date	18-Feb-2023	End Date	21-Feb-2023

Documentation(Synopsis Report, Synopsis Presentation)	
Start Date	21-Feb-2023
End Date	23-Feb-2023

9. Technical Stack

1. Pipelining Tool: Fivetran

2. Warehousing Platform: Snowflake

3. Database: (Relational) SQL

4. Source Storage: S3 Bucket

5. Dashboarding Software: Tableau Desktop

6. Data Cleaning Tools: Tableau Prep / Alteryx

10. SWOT Analysis

1. Strength

1.1 The efficient and accurate data extraction is ensured using Fivetran to establish a pipeline for data collection.

1.2 By using Snowflake as a warehouse, data is safely kept and readily accessible for analysis.

1.3 Easy visualization and dashboard creation are made possible by Tableau's connection to the Snowflake warehouse.

1.4 There is a rising need for insights and research in cryptocurrency market analysis.

2. Weakness

2.1 Dependence on data sources for accurate data collection may result in inaccurate analysis if data sources are unreliable.

2.2 The bitcoin market may become unstable and unclear as a result of a lack of regulation.

2.3 Because cryptocurrency market analysis involves specific knowledge and abilities, the pool of people who can perform it may be small.

3. Opportunity

3.1 The growing interest in cryptocurrencies offers a chance for the discipline of cryptocurrency market analysis to advance.

3.2 The usage of cutting-edge tools like Tableau, Fivetran, and Snowflake creates a chance for the creation of novel analysis methods.

3.3 The market for cryptocurrencies is seeing an increasing need for data-driven insights, which opens the door for the creation of new goods and services.

4. Threat

4.1 The unstable and unpredictable market conditions that the volatile cryptocurrency market may provide may have an impact on the analysis's accuracy.

4.2 People and organizations engaged in bitcoin market analysis may face legal and financial risks because of the absence of regulation in the cryptocurrency market.

4.3 The project's success may be threatened by competition from other businesses and individuals who are also performing market analyses of cryptocurrencies.
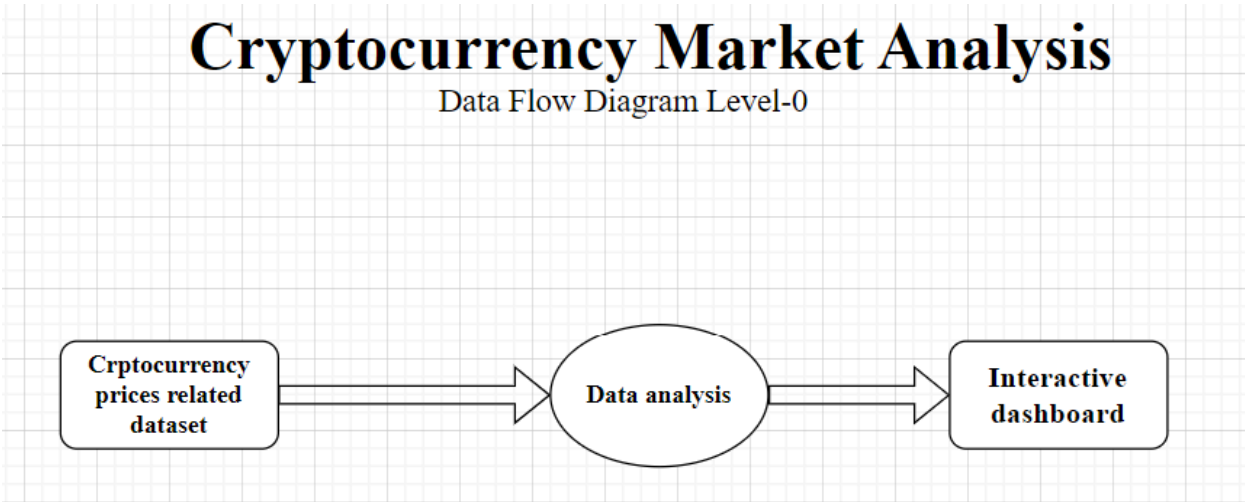
11. Technical Diagrams

Activity Diagram for Cryptocurrency Market Analysis

Cryptocurrency Market Analysis

Data Flow Diagram Level-0
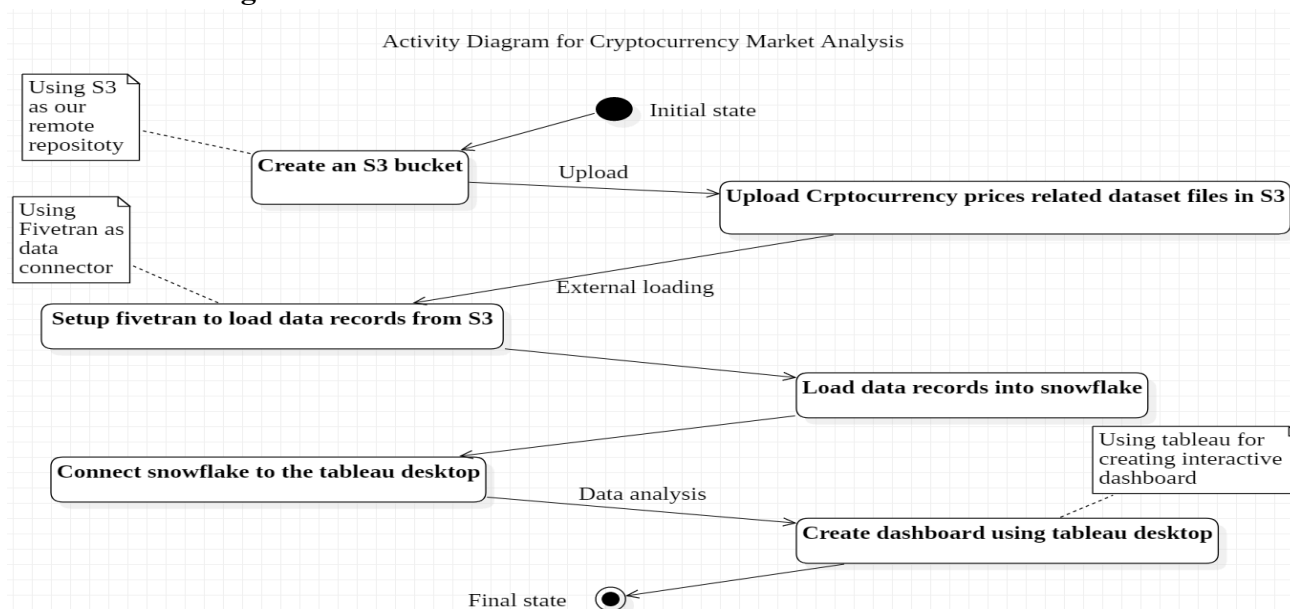
Fig 4 :   Fig 3: Activity Diagram (The diagram depicts the flow from one activity to another activity for   DFD
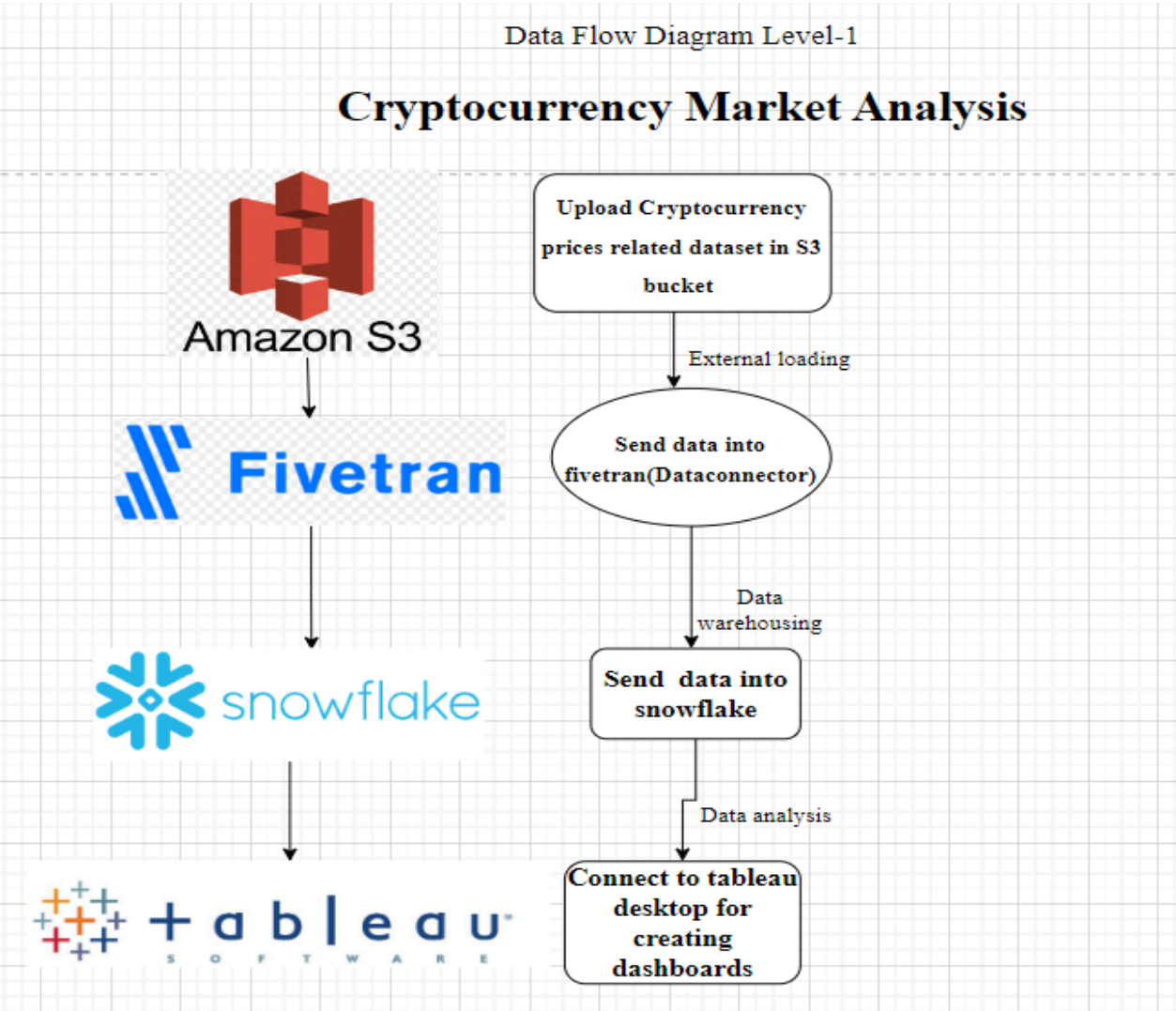creating the crypto analysis dashboarding.)

diagram level 0

Fig 4: DFD level 1 diagram

12. Area of Application

The pipeline set up by Fivetran for the bitcoin market analysis dashboard can be used in several contexts, including:

1. Investment Management: Based on the data presented on the dashboard, investment managers can use the dashboard to track the performance of various cryptocurrencies and make wise investment decisions.

2. Trading: With the data provided on the dashboard, traders may watch the prices of different cryptocurrencies and make well-informed trading decisions.

3. Research: Researchers can use the dashboard to examine market trends and patterns for cryptocurrencies, which can help them spot areas that warrant additional investigation.

4. Financial Reporting: Using the dashboard, financial analysts can create reports on the performance of different cryptocurrencies and give stakeholders insights.

5. In conclusion, the bitcoin business can use the dashboard for market analysis using Fivetran, Snowflake, and Tableau for a variety of purposes, such as investment management and regulatory compliance.

13. Software Requirement

1. Hardware requirements
- Processor: Intel Core i5 or higher
- RAM: 8 GB or higher
- Storage: 256 GB SSD or higher
- Internet Connection: High-speed internet connection

2. Software requirements
- Operating System: Windows 10 (As Tableau Desktop is not supported in MacOS)
- Fivetran Account: To set up and manage the pipeline.
- Snowflake Account: To store and manage the data warehouse.
- Tableau Desktop: To create visualizations and analyze the data.
- Web Browser: Google Chrome, Firefox, Safari, or Microsoft Edge

14. References

[1] Park, Sejung, and Han Woo Park. "Relations between reputation and social media marketing communication in cryptocurrency markets: Visual analytics using Tableau." International Journal of Contents 17.1 (2021): 1-10.

[2] Mikhaylov, Alexey. "Cryptocurrency market analysis from the open innovation perspective." *Journal of Open Innovation: Technology, Market, and Complexity* 6.4 (2020):

197.

[3] Farell, Ryan. "An analysis of the cryptocurrency industry." (2015).

[4] Mnif, Emna, Anis Jarboui, and Khaireddine Mouakhar. "How has the cryptocurrency market performed during COVID 19? A multifractal analysis." *Finance research letters* 36 (2020): 101647.