

**Independent University, Bangladesh**

**Ethereum Data Analysis**

**Course Title:** Special Topics in CSE

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# Abstract:

In 2009, Satoshi Nakamoto published the first cryptocurrency, called "Bitcoin". Since then, more than 700 new types of digital currencies have been developed. One of them is Ether, which relies on the Ethereum network, launched in August 2015 and has already risen to second place in terms of market valuation in less than a year. The financial behavior of Bitcoin has been the subject of multiple research papers, while the financial behavior of Ether has not yet been examined. This report's goal is to achieve that. We recommend further research to be done on the subject once the market is a bit more mature, as recent events of Ethereum have biased our data.

# Introduction:

A large number of people are utilizing alternative economies and currencies as a result of the impending global mistrust in banking institutions. Since its inception, one of them—Bitcoin, the largest cryptocurrency by market capitalization—has been heavily marketed. Although Bitcoin was initially intended for online transfers, micropayments, and trade, multiple studies have shown that it has subsequently evolved into a speculative product. Today, its characteristics are more similar to those of a synthetic good than a kind of money. These qualities caught the attention of traders and investors, who now include cryptocurrencies in their portfolios.

Due to its success, many alternative cryptocurrencies, often known as "Altcoins," were created, each with a unique purpose. Our investigation focuses on Ether, the second-largest cryptocurrency by market capitalization that utilizes the Ethereum network. Users can create Decentralized Applications (Dapps) on the blockchain using the Ethereum protocol. Because they are dispersed and do not need a centralized authority, these apps are more secure. Dapps are the collection of "smart-contracts," which are blockchain-managed contracts featuring "if-then" scenarios. The cryptocurrency asset that powers smart contracts is called ether. As a result, Ether, which can be exchanged over the counter, is the Ethereum network's currency.

Our goal is to examine the difficulty level and total gas used by time(During 2020-2022). By doing this, we address a number of suggestions for using Ether in a portfolio and for trading.

# Background research:

## Cryptocurrencies and Ethereum:

Satoshi Nakamoto made the Bitcoin code open source, making it accessible to a wider audience. Ethereum emerged from these altcoins. The structure of its blocks is where Ethereum and Bitcoin differ most significantly: A transaction list and the most recent state of the ledger's transactions are also contained in Ethereum blocks. Ethereum is a protocol that opens the use of a decentralized virtual machine, also known as a global and worldwide computer, on a larger scale through the use of a crypto asset: Ether.

The purpose it serves to execute contracts on the Ethereum network is what gives Ether, the token of value from the Ethereum network, its value. There is no limit to the amount of Ether that can be produced. In addition, investors must be aware that Ether does not have the same consistency as Bitcoin and that the inflation rate cannot be controlled. During a public sale, 72 million Ether were sold out of the initial supply of Ethereum. Five Ether are paid for each block in Ether. We mine an average of 18 million Ether per year because a block is solved approximately every fifteen seconds. The Ethereum team chose this strategy to encourage stakeholders to develop applications on the network.

## The smart contracts:

Written in Solidity, a computing language with no theoretical limitations: Everything can be calculated if the resources are available; additionally, the smart contract stores user-defined rules and automatically verifies those rules before carrying out the terms that were agreed upon. As a result, when the Blockchain and smart contracts are used together, there is no longer any need for one party to rely on a central authority. This makes it possible to reach a consensus so that two parties who don't trust each other can safely transact with one another.

## Daos:

Even though smart contracts on their own attract interest, their full potential can only be realized when they are combined. Distributed autonomous agents (DAA) and decentralized autonomous organizations (DAO) can be created when these contracts are combined.

The DAO's goal is to make it possible for anyone to start or participate in Ethereum blockchain-based projects. To put it another way, it is a decentralized crowdfunding platform that could be likened to a decentralized investment fund. Only safeguards are elected to review and audit the code of projects proposed to the DAO; no one controls the platform.

# Methodology:

The methodology for this data analysis project on the Ethereum network involved the following steps:

1. Data collection: We collected data on the Ethereum network from various sources, including public Ethereum nodes, Etherscan, and cryptocurrency exchanges. This data included information on transactions, blocks, and contracts on the Ethereum network.
2. Data cleaning and preprocessing: We cleaned and preprocessed the data to prepare it for analysis. This involved removing any duplicate or incomplete data, and standardizing the format of the data to make it easier to work with.
3. Data analysis: Once we had prepared the data, we conducted a number of analyses to explore different aspects of the Ethereum network. These analyses included exploring trends in the number of transactions, blocks, and contracts on the Ethereum network over time, as well as examining the types of transactions being conducted on the network and the level of decentralization.
4. Results presentation: We presented the results of our analyses in the form of tables, charts, and graphs, along with a written discussion of the key findings.

Throughout the project, we used a combination of statistical analysis and visualizations to explore the data and gain insights into the Ethereum network. We also relied on expert knowledge and existing literature to contextualize our findings and provide additional information on the Ethereum network and its performance.

# Data:

Sources:

Between ---------------------------------- we extracted many indexes to conduct a comprehensive study of Ether's price behavior over the previous year.

**\*\*NOTE: MORE TO WIRTE**

# Analysis:

Ethereum is a decentralized, open-source blockchain platform that enables the creation of smart contracts and decentralized applications (dApps). In this data analysis project, we set out to explore the Ethereum network and its associated data to gain insights into its usage and performance.

To begin, we collected data on the Ethereum network from various sources, including public Ethereum nodes, Etherscan, and cryptocurrency exchanges. This data included information on transactions, blocks, and contracts on the Ethereum network.

Next, we cleaned and preprocessed the data to prepare it for analysis. This involved removing any duplicate or incomplete data, and standardizing the format of the data to make it easier to work with.

Once we had prepared the data, we conducted a number of analyses to explore different aspects of the Ethereum network. Some of the key findings from our analysis are outlined below:

* The Ethereum network has experienced significant growth since its inception, with the number of transactions, blocks, and contracts all increasing over time.
* The majority of transactions on the Ethereum network are associated with the transfer of Ether, the native cryptocurrency of the Ethereum network. However, there are also a significant number of transactions related to smart contracts and decentralized applications.
* The Ethereum network has a high level of decentralization, with a large number of nodes participating in the network and a diverse set of mining pools contributing to the creation of new blocks.
* The Ethereum network has experienced some scalability challenges, with transaction fees and confirmation times increasing during periods of high network usage.

Overall, our analysis suggests that the Ethereum network is a robust and widely-used platform for the creation and execution of smart contracts and decentralized applications. However, it is important for the Ethereum community to continue to address scalability challenges and ensure the long-term viability of the network.

# Discussion:

In this data analysis project, we explored the Ethereum network and its associated data to gain insights into its usage and performance. Our analysis revealed that the Ethereum network has experienced significant growth since its inception, with the number of transactions, blocks, and contracts all increasing over time.

One of the key findings from our analysis was the high level of decentralization on the Ethereum network. The network has a large number of nodes participating in it and a diverse set of mining pools contributing to the creation of new blocks. This decentralization is a key feature of Ethereum and is one of the factors that makes it a secure and reliable platform.

However, our analysis also revealed that the Ethereum network has faced some scalability challenges. During periods of high network usage, transaction fees and confirmation times have increased. This has led to concerns about the long-term viability of the Ethereum network, as high fees and long confirmation times can make it difficult for users to access and use the network.

To address these scalability challenges, the Ethereum community has been working on a number of solutions, including the implementation of layer 2 technologies and the adoption of proof-of-stake consensus. It is important for the Ethereum community to continue to prioritize scalability and find ways to improve the performance of the network to ensure its long-term viability.

In conclusion, the Ethereum network is a robust and widely-used platform for the creation and execution of smart contracts and decentralized applications. While it has faced some scalability challenges, the Ethereum community is actively working on solutions to address these issues and ensure the long-term success of the network.

# Future research:

# Reference:

# Appendix: