

RISK ANALYSIS OF BITCOIN MINING ON CLIMATE CHANGE

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Executive Summary

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Introduction

Cryptocurrency is acknowledged to be one popular trading currency across nations due to its security and high potential marketing values. Yet, the most attractive feature of cryptocurrency is the decentralized algorithm whereas none individual or group nor government have command to manipulate its value. Among hundreds of different cryptocurrencies, Bitcoin is one of the largest and the most trustworthy cyber currency on the market today. Unlike earning government issued currencies in traditional manners, “earning” Bitcoin or Bitcoin mining only requires a computer(s) that executes a certain algorithm despite nationality or geographical location. Since Bitcoin mining does not require much physical talent but a piece of hardware and electricity, this non tangible activity became popular and the Bitcoin mining activity peaked out globally during the pandemic and is still growing.

Most Bitcoin mining occurred in China, according to IP addresses from so-called hashers that used certain Bitcoin mining pools in 2021. Likely this is connected to energy prices worldwide. Bitcoin requires energy for hashing, or the PC processing power needed to build the blockchain. Simply put, the more hashing occurs, the more Bitcoin is being mined.

Describe the goals and objectives (i.e., what are you trying to accomplish in the study?)

We are trying to find out how Bitcoin mining is affecting the global temperature change. It also depends on the type of energy sources in countries where most of the mining is done. To find out the contribution of the Bitcoin industry to the % change in global temperature.

Define the scope of the study (i.e., what is the focus of your analysis?)

The main focus of the study is to assess the risk of increased Bitcoin mining on the climate compared to other industries. The scope of this project is mostly limited to China, USA and Russia - three major countries where Bitcoin is mined approximately 70% in May 2021.

Material and Methods

Data Sources

Data is obtained from Cambridge center for alternative finance- It provides us the data of hashrate. The more the hashing occurs the more Bitcoin is being mined.

1. https://ccaf.io/cbeci/mining_map

Climate data on surface temperature changes is being considered for the course of this project.

2. Berkeley Earth - <http://berkeleyearth.org/data/>

Energy Mix

3. BP - <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>
4. Our World in Data - <https://ourworldindata.org/energy-mix>

Correlation Analysis

A correlation study will be conducted on the number of Bitcoins mined per year to the average global temperature change to see if there is any relation between the two. Pearson correlation coefficient is to be calculated by Sandeep Dasari and it will be confirmed by running some hypothesis testing using either t-test or ANOVA f-test.

Data Visualization

[Tsz-Yi Yang](#). Land temperature at global scale and within Top 4 Bitcoin mining countries in the U.S., Russia, Mainland China, and Kazakhstan from 1960 - 2020. Data visualization will be performed in Python using Pandas, Numpy, Scikit-learn, Plotly, Seaborn. Potential graphical demonstration includes Box-Plot, histogram, dot plot, etc.

Bayesian Network Model [11/29/2021]

Devarsh Raval , [Tsz-Yi Yang](#). The goal is to determine if Bitcoin mining contributes to the global surface temperature incline at an increment of 0.4 °C. Analyze the probability of surface temperature increases due to the increasing electricity consumption from Bitcoin mining. AgenaRisk will be used for Bayesian Network analysis.

Time Series Prediction

Sandeep Dasari . The long-short-term-memory (LSTM) will be used to build the predictive model to predict Bitcoin mining trends for next two year. LSTM networks are a type of recurrent neural network (RNN) which is capable of learning order dependence in time sequence prediction problems. The prediction from the LSTM model will be compared with the result from Bayesian Network analysis.

Risk Matrix [optional]

Showing the risk/contribution of crypto currency along with other industries to global climate change to be done by everyone in the team after assessing all the factors involved.

Conclusion (Team's Progress) [12/03/2021]

The team has collected all the data and has a preliminary plan of what all deliverables will be needed and assigned tasks to each team member.

References

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