DESIGN SYSTEM FOR MINING ALTCOIN USING GPU (GRAPHICS PROCESSING UNIT)

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ABSTRACT

Cryptocurrency is a standard currency system, allowing users to make virtual payments for goods and services that are free from. Cryptography for legitimate and unique transaction information. Bitcoin is the first successful decentralized cryptocurrency. Launched in 2009 by the developer satoshi nakamoto pseudonym (unknown name)
Mining is a mining activity using a specific device whose process through solving a mathematical problem (puzzle) based on a certain level. Someone mining a coin using must use a device that can use CPU, GPU or FPGA or use ASIC depending on what algorithm we want to use.
Based on the conclusions and results of the mine using a heat-resistant GPU on the damaging power tools present in the apparatus

Keywords: Cryptocurrency, Bitcoin, Mining, GPU, mining tool

1. INTRODUCTION

The Cryptocurrency market is evolving quickly and erratically in today's world. Since the launch of Cryptocurrency bitcoin as a pioneer in January 2009 and more than 550 Cryptocurrency developed at the time, the vast majority have succeeded. Developer Bitcoin Satoshi Nakamoto Pseudonim (Still unnamed) is the first successful decentralized Cryptocurrency [1]. There are two ways to get cryptocurrency ie buy it directly from the market or by way of mining (mining).

Cryptocurrency is a digital currency system that functions like a standard currency, allowing users to make free goods and services payments from a trusted Central Authority. Cryptocurrencies rely on transmitting digital information utilizing cryptographic methods to ensure legitimate and unique transactions [1]. altcoin or coin alternatives are coin-coins that appear after the presence of bitcoin. Mining is a mining activity using a specific tool. The process through solving a series of mathematical problems (puzzles) based on certain difficulty levels. to start mining requires a mining device, can use CPU, ASIC and GPU.

In Altcoin mine using the equihash algorithm using GPU (Graphics Processing Unit) we need to configure the mining tools to connect to pools to start mining and confusing configuration has its own constraints due to un-connected tool to pools. In the mine process we must often monitor the state of the tool. If the mining tool is used in excess and not in control it will experience damage to its components. This damage is caused by the increase of heat temperature in mining tool in mining process.

An application is needed to mine altcoin using Equihash Algorithm to control mining tools, detect the heat of mining tools and applications that can automatically stop after reaching the maximum thermal limit. In this final project will be made System Design To Mining Altcoin Algorithm Equihash Using Gpu (Graphics Processing Unit)

1.1 Identification of problems

Based on the background that has been described previously, it can be identified as follows

1. In mining Altcoin using Equihash Algorithm we need a mining tool using GPU (Graphics Processing Unit) in the process of mining long enough to damage the mining equipment caused by the increase in heat temperature inside.

2. Configure mining tools to connect to the pools and fill out confusing settings.

1.2 Purpose and objectives

The purpose of this research is to create a system design to mine Altcoin Algorithm Equihash using gpu (graphics processing unit) while the goal is:
1. To control altcoin mining equipments algorithm equihash at the time of mining process to avoid damage caused by heat temperature rise in mining equipment because later there is time arrangement for how long we will do coin mining and mining process will stop at the hot temperature that is inside reach the specified limit.
2. To create an application that can configure directly without having to open the existing file inside.

2. RESEARCH CONTENTS

2.1 Cryptocurrency

Cryptocurrency is a virtual currency system that functions like a standard currency, allowing users to make virtual payments for goods and services that are free from central trusted authorities. Cryptocurrencies rely on cryptographic information transmission methods to ensure legitimate and unique transactions. bitcoin is the first successful decentralized cryptocurrency. Launched in 2009 by the developer satoshi nakamoto the pseudonym (unknown name)

2.2 Bitcoin

Bitcoin is the first open source, peer-to-peer digital currency proposed in 2008 Paper published under the name Satoshi Nakamoto. Nakamoto began his paper stating that "Trade on the Internet has relied almost exclusively on financial institutions that are trusted as trusted third parties to process electronic payments.While the System works reasonably well for most transactions, however the system is still experiencing a disadvantage model-based weakness further trust, the presence of a trusted intermediary raises transaction costs, "cuts the possibility for small casual transactions." In addition, trusted intermediaries are pressed to collect as much information about possible parties to control transaction costs.So Nakamoto is trying to create a true coin, completely remove the trusted central authority and replace trust with cryptographic proof This system will have additional benefits of low transaction costs, low latency (time for transactions), and false anonymity [1].

2.2.1 Blockchain

Blockchain is a decentralized peer-to-peer technology. With blockchain technology can transmit any data without the need to rely on one server can be seen in Figure 2.**1**



Picture 1 Data Storage Using Blockchain [1]

2.2 GPU (Graphich Processing Unit)

The GPU is a special circuit designed to quickly manipulate and alter such memory in such a way that it speeds up the development of images in a frame buffer intended for output for display. The GPU was defined and popularized by Nvidia in 1999, which markets the GeForce 256 video card as "the world's first GPU, which is a single processor chip integrated with transformation, lighting, triangle setup / clipping, and a render engine capable of processing at least 10 million polygons per second ". While the nvidia rival company ATI Technologies does not want to use the term created by nvidia, ATI creates a different term VPU (short for Virtual Processing Unit) by presenting Radedon 9700 graphics card in 2002

2.3 Equihash

Centralized mining is perhaps one of the biggest challenges facing the digital currency. Many Bitcoin properties, such as sensor resistance and multiple spending protection, rely heavily on a decentralized mining landscape. But over the years, the Bitcoin mining system has been increasingly centered into fewer hands and fewer geographical areas. There are several explanations for this trend. But one of them is the emergence of special mining hardware: ASIC chips and miners. In an attempt to solve this problem, scientists at the Interdisciplinary Center for Security, Reliability and Trust (SnT) of the University of Luxembourg have developed a mathematical algorithm called "Equihash." Equihash is the idea of Prof. Alex Biryukov, head of the SnT research group "CryptoLUX" - focuses on the transfer of research and technology in cryptology - and researcher CryptoLUX. Dmitry Khovratovich. The algorithm was first introduced at Network and Distributed System Security Symposium 2016 in San Diego. Perhaps its most significant success to date, Zcash, a new decentralized and open source digital currency aimed at setting new standards for privacy and anonymity through the use of innovative cryptography, announced the integration of Equihash in April 2016. In a post titled "Why Equihash ?, "Zcco founder Zooko Wilcox and engineer Jack Grigg noted that Equihash has a highly efficient verification that could allow light clients on restricted devices and Zcash clients inside Ethereal. But the main reason for Zcash's tech enthusiasm is, indeed, Equihash's opposition to ASIC mining. "Equihash is a memory-oriented Proof-of-Work, which means how much mining you can do is largely determined by how much RAM you have," Wilcox and Grigg said. "We do not think anyone could build a cost-effective, specialized hardware for mining in the future." Wilcox and Grigg added that it is unlikely that a great optimization Equihash can provide miners who know the optimization. an advantage [5] .

2.4 Mining

Mining is a mining activity using a specific device that processes through solving a series of mathematical problems (puzzles) based on certain difficulty levels. Someone mining a coin using a mining device that can use CPU, GPU or FPGA or use ASIC depends on what algorithm we want to use. In the mining of our coins will not always experience the advantage there will be losses

obtained because every block that we can not always valid because it could not fail to get a new block which means not getting a coin or not in accordance with costs incurred.

2.5 Mining Pools

Mining pools is the way the miners work together in getting bitcoin because if we mine themselves have a high risk with the pools every miner will get a coin from every blocknya divided by how much hastrate speed in use the higher the hastrate the greater also get bitcoin obtained

2.6 Analisys Sistem

System analysis is the decomposition of a complete information system into its component parts that is identifying, evaluating problems and obstacles that occur in order to become a reference of the improvements. System analysis aims to understand the system to be built. The steps that must be done is to do some analysis. The following discussions are problem analysis, system architecture analysis, non-functional requirements analysis and functional requirements analysis. From the results of the analysis can be designed or repaired into a system more effective and efficient

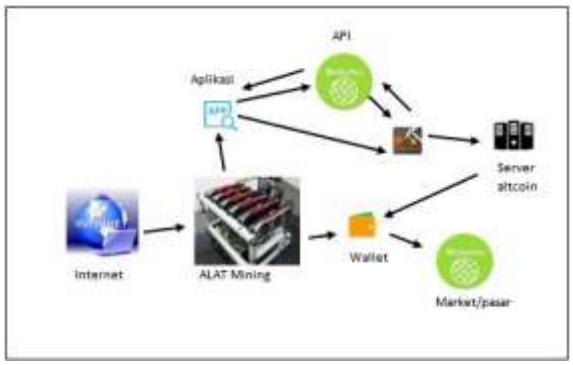
2.7 Problem Analysis

Cryptocurrency is also called Altcoin obtained by buying in the market that has been provided or by way of direct mining. To mine Altcoin primarily using the equihash algorithm requires a tool for the mining process. The tool to be used is the GPU (Graphics Processing Unit) where at the start of the mining process the temperature rise level must be in control because with too long to do mining process tools that have been made will be damaged due to the increase in excessive heat temperature.

For configuration tools that will be used also must be true and connected to pools to be able to start the process of mining if one in the configuration tool will not be connected to the pools. For confusing configuration process is still a constraint when starting mining.

2.6.1 System Architecture Analysis Tools Mining

In system architecture in mining tool has some component that is wireless modem sending internet signal to mining tool then captured by wireless signal catcher claymore application is useful to integrate in order to connect to website miningrigrentals.com (place of rental of tool) which then mining tool made can be rented to others or can also be used for own mining which is configured again into the pool. Pool will connect to the altcoin server to get the coin. The altcoin server will send the coin to the wallet after it is sent and receive the coins we can send our coins to the market and be sold to earn money. The process can be seen in Figure 2.1



Picture 2.2 Tools Architecture Mining

1. Wireless modem

Mifi is a wireless router device that acts as a wifi hotspot and is a wifi hotspot device to share internet services that internet access is obtained from cellular networks and then distributed to several wifi receiver devices such as smartphones.

2. Usb wifi adapter

Usb wifi adapter serves to capture wifi signal didaerah wifi hotspot that is used for laptop or computer. The acceptable distance when in the room is about 100 meters and for outside the building up to 200 meters.

3. Tool mining

Tool mining serves as a tool to mine a coin with certain criteria and has a variety of algorithms in it depending on the type of tool. The mining tool in Figure 3.1 is built using a gpu where the speed it accrues depends on how much gpu capacity is used and how many bits there are.Application GPU Miner

4. Application GPU Miner serves as a connecting app between mining tool to server rental tool or to pool (where to mine coins) to get digital coins.

1. Wallet

Wallet serves as a place to store the balance of coins obtained from the mining by using the tool efficiently and easily.

2. Fire Suprnova.cc

Miningrigrentals.com serves as a rental place dedicated to the miners who want to rent mining tools or tools that want to rent.

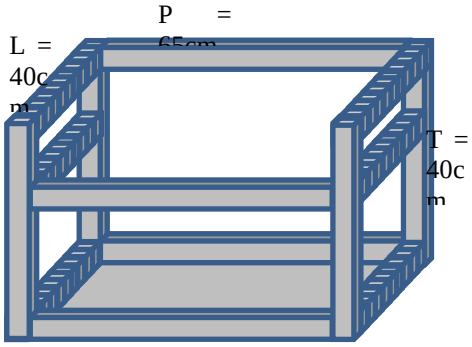
3. Pool

Pool serves as a place to mine a coin connected to a coin server that is running on this website we can mine simultaneously with others but the reward will be divided depending on the speed of the hash that we use

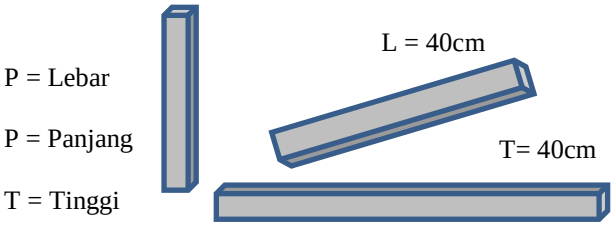
4. Tool Design.

The mining tool created using the gpu as the core of the tool to be created. Materials needed to make mining tools such as GPU, Ram, Harddisk, modem, usb wifi adafter, powersupply. The size of the

mining tool casing to be made Length 65 cm 40 cm wide and 40 cm for height can be seen in Figure 3.2



Gambar 2.3 Casing GPU miner

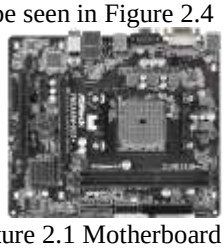


Picture 2.3 Pecahan Casing GPU miner

i. Component Selection

The selection of components to be used in the design of making the mining tool is necessary because it affects the speed of hastrate and coin obtained. The greater the hastrate obtained the greater the coin obtained, it is worth noting some components that must be considered is the quality of components, component capacity, and for the efficient price issued. To assemble mining tools using GPU (Graphics Processing Unit) which is now built requires several components including:

1. The motherboard used asrock fm2a68m-dg3 + can be seen in Figure 2.4



Picture 2.1 Motherboard

1. Hardisk used at least 250 GB and not glued by the brand. In this design is used Seagate hard drive can see in figure



2.5

Picture r 2.2 Harddisk

. Ram used min 4 GB recommended using 8 GB ram to support a more stable walking tool. Can be seen in Figure



2.6

Picture 2.3 RAM

1. For internet connection is not fixed on the modem alone may use any way that is most important to connect to the internet and must be considered connections that labat can affect the speed generated. For the development of this mining tool for example using a wireless modem and aided with usb wifi adapter as a receiver wifi signal can be seen in Figure 3.7



Picture 2.4 modem wireless dan usb wifi adapter

. The power supply used is recommended hyper m 600watt can be seen in figure



2.8

Picture 2.5 Power Supply

The keyboard and mouse used can use any of which are not glued to use a particular brand. The keyboard and mouse can be seen in Figure 2.9



Picture 2.6 Keyboard dan Mouse

. A recommended monitor that has a great degree of color depth. Can be seen in Figure



2.10

Picture 2.7 monitor

1. The processor used recommended from AMD min A8 can be seen in figure



3.11

Picture 2.8 Processor

i. Konfigurasi Alat mining

To configure mining tools using Equihash algorithm first prepare the tools that have been made then make sure the internet connection is current and this is beberpa stage in configure the tool as follows:

1. First Stage (preparation)

(a) Prepare the gpu mining tool

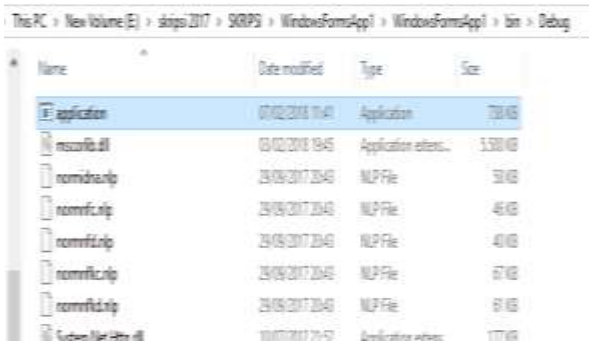
(b) Prepare an Internet connection

(c) Prepare the driver (motherboard, VGA)

(d) Prepare the application (claymore, mozilla, winrar)

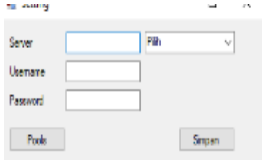
2. Stage instalasi

(a) Install Os (window 7,8,10)
(b) Install motherboard drivers according to brand and type
(c) Install VGA driver
(d) Connect the internetStage **konfigurasi**



Picture 2.9 open file

(b) Open the settings then fill them correctly and must match the pools



Picture 2.11 Setting

(b) Open mozilla browser then go to http://zcash.miningpoolhub.com first listing on its site as this is a place to mine



Zcash

Picture 2.10 pools

d) After register click getting strated as circled in the picture there is a server that we can choose to mine choose one by copying it.



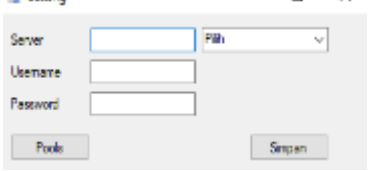
Gambar **Error! No text of specified style in document.**.11 Getting Started pools

(a) Click the worker input username or password to be entered into zcash settings



Picture 2.12 Worker pools

(e) Replace the server with the server located at http://zcash.miningpoolhub.com Change also password and usernamenya already made then save by press Ctrl + S then close by click the X button



Picture 2.13 menu setting

(b) Run Aplication



Picture 2.14 Program running

(g) This is the view where the tool works properly



Picture 2.15 programs that are running and working properly

(c) Then check back to the website http://zcash.miningpoolhub.com click the dashboard and it will show you the details of mining that is running.

2.7 Pengujian

Testing this system is the next stage after the implementation phase that aims to see the deficiencies in the application built. Testing the system used is using black box testing Techniques where the test is not too concerned about the structure (Source Code) of the program created, but rather to find errors that terdadapat on applications built. Functional design.

2.7.1 Test Plan

The test plan is done in two stages. The first stage is to test the application functionality by using blackbox method. Then for the second phase focus on the assessment conducted with questionnaires distributed to 30 potential users directly.

2.7.2 Scenario Testing

Testing scenarios performed for software built using two stages: first scenario testing functionality and acceptance can be seen as follows:

1. Functionality Testing Scenario

The functional scenarios tested on the altcoin mining system using gpu on this test will be tested using the blackbox method. Tests are performed on the software to ensure that the applications that are created run correctly to fit the expected needs and objectives. Testing using the following black box is the test plan that will be done can be seen in table 2.1

Table 2.1 Scenario Testing

No	Class test	Test item	Type tess
1	Start	Start Checking gpu installed and start mining	*Black box*
2	*Setting*	Setting Setting up to connect to pools which then connect to cryptocurrency server	*Black box*
3	Help	Help Displays how to assemble the mining rig using GPU and setting it	*Black box*
4	Pools	Pools Runs the link process to the pools (where to mine)	*Black box*
5	Timer	Timer Runs the timer to turn off the automatic mining tool	*Black box*

2.7.3 Test Results

From the tests conducted in accordance with the scenario plan that has been made before. The results obtained obtained test results functionality and beta results.

2.7.3.1 Functionality

Functional test results obtained

a. Start Testing

Testing start is to start mining which in settingannya is correct and if setting which is wrong then will not connected with server and mining will not run (function)

Table 2.2 Start Testing

Started start test (Data true)			
Data Input	Expected	Observation	Conclusion
Click the star button	Start mining and connect to server pools	Selected input data is automatically connected to server pools	[√] received [] rejected
Started startup test (wrong data)			
Data Input	Expected	Observation	Conclusion
Click the star button	The system does not recognize the format of the settings	The system can not be connected to the server	[√] received [] rejected

b. Testing Setting

Test settings is to add the correct settings and will be saved if not so to add the settings will not be saved

Table 2.3 Testing Setting

Started start test (Data true)			
Data Input	Expected	Observation	Conclusion
Server: zen.suprnova.cc Username :	data will be saved	The filled input data will be	[√] received [] rejected

catsick22.1 Port:3618 Password:1		automatically saved by the system	
Started startup test (wrong data)			
Data Input	Expected	Observation	Conclusion
Server: zet.suprnova.ccc Username : catsick22.1y Port:3610 Password:1	The system does not recognize the format of the settings	The system will not save	[√] received [] rejected

C Testing Help

Testing help is to see how to display information about how to assemble mining rig using gpu and how to setting.

Table 2.4 Testing Help

Started start test (Data true)			
Data Input	Expected	Observation	Conclusion
Choose the help button	Displays information on how to assemble mining rig using gpu and its settings	The system will display data how to assemble the mining rig and its settings	[[√] received [] rejected
Started startup test (wrong data)			
Data Input	Yang diharapkan	Observation	Conclusion
Not Selecting help button	The system will not display information	The system can not display mining rig information.	[√] received [] rejected

d.Testing Pools

Pools testing is to see how the website for miners works well with information about their website

Teble 2.5 Testing Pools

Started start test (Data true)			
Data Input	Expected	Observation	Conclusion
Choose one of the pools	Go to website pools.	The system will automatically move to move to the website	[√] received [] rejected
Started startup test (wrong data)			
Data Input	Expected	Observation	Conclusion
Not Selecting help button.	The system will not display the information.	The system can not display mining rig information.	[√] received [] rejected

e. Timer Testing

The Timer test is to see the mining tool dapt be controlled to automatically turn off with a prearranged time

Table 2.6 Testing Timer

Started start test (Data true)			
Data Input	Expected	Observation	Conclusion
Enter the time duration.	Will process the data of the time duration for the mining tool to die after the timer that has been set is completed.	The system performs the tool's shutdown after the set time has been completed	[√] received [] rejected
Started startup test (wrong data)			
Data Input	Expected	Observation	Conclusion
Not entering data.	The system will not display the information.	The system can not display mining rig information.	[√] received [] rejected

2.7.3.2 Acceptance Test Results

Acceptance testing is done to find out how the user response about the application of mining tools using gpu. Assessment and percentage range using Likert scale in each statement. Here is a questionnaire given to 30 respondents

Calculation of questionnaires conducted using Likert scale. According to Sugiono, Likert Scale is used to measure attitudes, opinions and perceptions of a person or group of people about social phenomena. Social phenomenon here is the response of respondents regarding the application of mining using gpu.

Table 2.7 results first question

Answer Category.	Bobot	Frequency of Answer	Total value	Percentage Value (%)
Strongly agree.	5	10	50	(127/(30x5)) x 100 = 84,6%
agree.	4	17	68	
Doubtful	3	3	9	
disagree.	2	0	0	
Strongly disagree.	1	0	0	
Total		30	127	

Table 2.8 Results of Question Two

Answer Category.	Bobot	Frequency of Answer	Total value	Percentage Value (%)
Strongly agree.	5	19	95	(136/(30x5)) x 100 = 90,6%
agree.	4	8	32	
Doubtful	3	3	9	
disagree.	2	0	0	
Strongly disagree.	1	0	0	
Total		30	136	

Table 2.9 Results of Question three

Answer Category.	Bobot	Frequency of Answer	Total value	Percentage Value (%)
Strongly agree.	5	5	25	(117/(30x5)) x 100 = 78%
agree.	4	17	68	
Doubtful	3	8	24	
disagree.	2	0	0	

Strongly disagree.	1	0	0	
Total		30	117	

Table 2.10 Results of Question for

Answer Category.	Bobot	Frequency of Answer	Total value	Percentage Value (%)
Strongly agree.	5	2	10	(104/(30x5)) x 100 = 69,3%
agree.	4	10	40	
Doubtful	3	18	54	
disagree.	2	0	0	
Strongly disagree.	1	0	0	
total		30	104	

Table 2.11 Results of Question five

Answer Category.	Bobot	Frequency of Answer	Total value	Percentage Value (%)
Strongly agree.	5	8	40	(118/(30x5)) x 100 = 78,6%
agree.	4	12	48	
Doubtful	3	10	30	
disagree.	2	0	0	
Strongly disagree.	1	0	0	
total		30	118	

2.8 Conclusion Testing

Based on the test results, it can be concluded that:

1. Application of Altcoin Mining System Using 84.6% GPU, approached strongly agree to assist in using your Application better know how to mine using GPU (Graphics Processing Unit)
2. Application of Altcoin Mining System Using 90.6% GPU, approached strongly in agreeing to use this Application you need not bother looking for how to mine using GPU (Graphics Processing Unit)
3. Application of Altcoin Mining System Using GPU 78%, close to agree By using Application more easily connect mining tool to server pools (Coin Mining Place)
4. Application of Altcoin mining system Using GPU 69.3%, approve agree Mining application has a timer that can turn off the tool that helps you reduce the level of damage to the tool due to excessive temperature rise
5. Application of Altcoin Mining System Using GPU 78,6%, approached agree in Submission of setting information and start mine easy to understand than reading article or book.

5. Closing

3.1 Conclusions

From the research that has been done, can be drawn the conclusion as follows:

1. From the results of research that mining using the gpu will quickly heat up and must be often in the level of height control. For the process of mining done should be in love timer how many hours the mining process will be done. There should be a system that automatically turns off its mining tools safely when the heat temperature inside the mining tool reaches its maximum limit.
2. Mining is a mining activity using a specific device that processes through solving a series of mathematical problems (puzzles) based on certain difficulty levels. A person mining a coin using must use a mining device yaitu bisa menggunakan CPU, GPU atau FPGA maupun menggunakan ASIC tergantung algoritma apa yang mau kita gunakan.
1. Configuring mining tools to connect to pools (mine sites) must be in accordance with the pools settings and do not be wrong in menyettingnya because it will not get altcoin it is because the mining tool is not connected with the pools.

3.2 Suggestions

Based on the results of research and design implementation of minning rig system using graphics processing unit (graphics processing unit). It is proposed some suggestions as follows:

1. There should be more gpu used.
2. Need to be developed and reconsidered to replace the motherboard that is specific to BTC
3. Add mining results
4. Expected to develop this research data towards identification so that later can be useful for certain party or individual

Program plus menu automation to menditeksi GPU to be used.

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