Decentralized Collaboration using Markov Chain Monte Carlo Algorithm

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Abstract

In this paper we analyze a platform for decentralized social and hyper-local services network using blockchain & artificial intelligence algorithms. We are building a borderless platform through democratization and decentralization of hyperlocal services. In this paper, we analyze the algorithmic foundations of this platform we refer as "*Helpium*", and its utility token HLP. The main feature of this revolutionary platform is inspired by directed acyclic graph (DAG) for helping network. The network naturally succeeds as its next evolutionary step and offers features that are required to establish hyperlocal services eco-system. Helpium is inspired by family of Markov Chain Monte Carlo (MCMC) algorithms. Helpium plans to build a grass roots community which believes in helping and supporting each other for greater good, using the revolution of blockchain and crypto-currency.

Key Words: Blockchain, Markov Chain Monte Carlo, cryptocurrency, utility tokens.

1. Introduction

Bitcoin, disrupted the broken monetary system with a decentralized crypto-currency. Blockchain technology within its core is a social platform with users, developers and miner working together. Blockchain has given birth to possibilities for world changing ideas. As expected, there are multiple challenges and roadblocks ahead. Bitcoin has introduced a zero trust eco-system with no central body.

Problem with current state of decentralized economy is that it heavily relies on crypto exchanges. Crypto exchanges charge hefty fees for every transaction. Also, exchanges are facing regulatory heat.

Another problem with crypto-currencies is the viability for micro-transactions or micro-payments because of high transaction fees. There is no clear usability for most crypto-currencies, rather than being storage of value. This is a crucial problem. For people to use crypto-currencies for their daily needs, they need to cash out to fiat currency using regulated exchanges. This process can be daunting because it involves record keeping and taxation on the gains or losses apart from the other exchange fees and issues. This process can be impractical for micro-payments or daily needs payments. That brings us to the question "How are we planning to use crypto-currencies?".

In addition, current hyper-local services market is, dominated by centralized services like Task Rabbit, Next-door, Thumbtack, Yelp, and Facebook. All these services have an inherited problem of high cost and centralized advertisement model of business, where the user privacy is at risk. Also, the current social structure has-been modeled as one to one where an individual uses a middle- man or third party to find help or services, and the cost for services is high. Sometimes, the help you want can, be easily served in much cost-effective way if you look within the community. With the current model, people are unwilling to help each other without direct gain. Current community is losing its sense of empathy and care for each other.

With Helpium we believe that every individual is a creative artist and possess unique skills. Philosophy of decentralization was based on community joining hands together to fight the monopoly and corruption of centralized model of business and banking. Decentralization has given birth to new community driven model of sharing and serving each other.

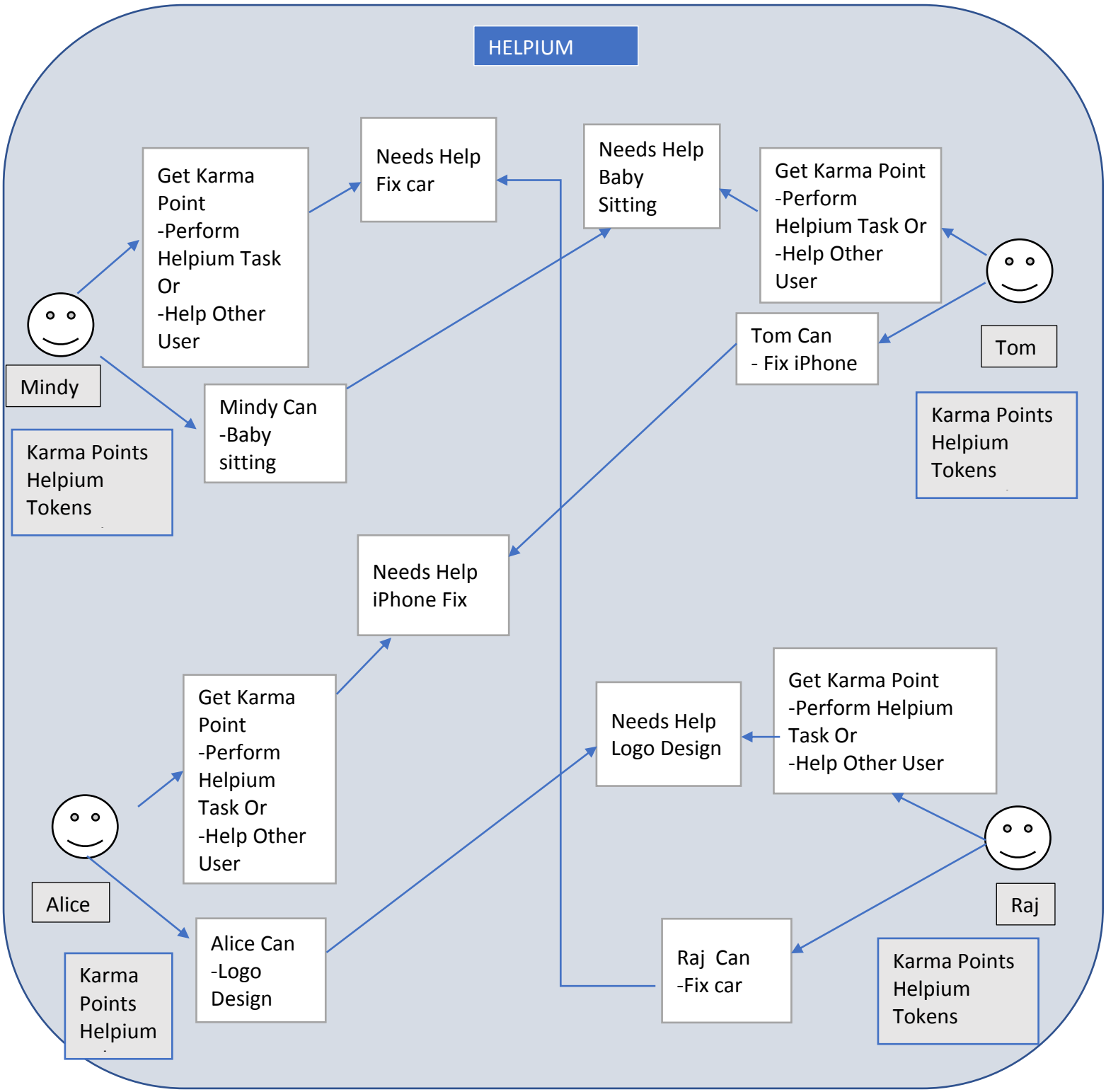
We are at the cusp of disruption in technology with Blockchains, Artificial Intelligence, Machine Learning are becoming practical use cases and implementations. Decentralized economy is the future of business. Block chains and similar technologies with crypto-currencies have significantly opened the flood gates to justifying value to creativity and hard work.

Blockchain and similar technologies demystifies the pyramid model of distribution of wealth.

Helpium is a decentralized social network that brings people together in communities to help each other mutually based on Helpium algorithms. The mode of transaction/crypto-currency between people on Helpium network.

Helpium network is, inspired by Markov chain. A Markov chain is "a stochastic model describing a sequence of possible events in which the probability of each event depends only on the state attained in the previous event." Markov Chain is a critical aspect of helping algorithm rules.

2. Helpium Platform



Helpium network will be deployed over Ethereum Main Network. Ethereum provides public chain which will deploy smart contracts and deploy Helpium Tokens and manage supply.

Helpium platform also relies on Machine Learning and Artificial intelligence to help match people and to calculate Karma points for the assignments.

3. Helping Algorithm

Helpium algorithm is designed to avoid direct weighted barter system trade. Helpium makes the network process local services and micro-tasks and micro-payments. The motivation is to grow the network activity and also process micro-tasks along with large tasks which drives user engagement and higher satisfaction rate.

For the Markov Chain to kick in action the following rules apply on Helpium helping algorithm.

1. In order for a user to get help, the user needs to perform a task and gain at least one Karma point. This task can be system generated or user can pick a task from the pool of other user generated tasks. A user not only gains Karma points for performing the task, but they do gain HLP Tokens for the same.
2. Helpium auto generated tasks will have a predefined Karma point and HLP Tokens assigned.
3. User generated Tasks, will have user set, HLP Tokens and Karma points are calculated by the Helpium platform-using cutting edge AI and Machine Learning.
4. A user can accumulate as many Karma points and HLP tokens.
5. A user can use the HLP tokens to pay for tasks that he/she needs to be completed.

Karma Points and HLP Tokens can be earned by performing tasks. These tasks can be of following type:

1. ***Helpium Platform Auto Generated Tasks:*** *These are tasks generated for quick completion. For example invite a friend and others. These tasks will use Machine Learning and Artificial intelligence to assign Karma points and HLP Tokens. The user will gain 1 Karma points per task.*
2. ***Helpium User Tasks:*** *These are User created tasks. A user who needs help adds details to these task for example HLP Tokens to perform this task and Karma points (which are suggested by Helpium platform). A smart contract is created which details the description of the task and HLP tokens associated with this task. A user can perform this task and gain Helpium tokens and Karma points. These Helpium tokens will be transferred from another Users wallet to the Performing user's wallet through, once the task is marked as successfully complete. Karma points will give additional incentives for Users to help each other for complicated tasks or smaller tasks.*
3. ***Reputation System:*** *Karma Points also help in building reputation for the user. The more Karma points a user had garnered the higher reputation a user will gain throughout the system. This is critical for building the trust and reputation on the platform.*
4. ***Exchange of Helpium (HLP) tokens:*** *it can be bought from the platform or an exchange using fiat currency. This can be useful if a user who needs HLP tokens to get his/her task done.*
5. ***User Onboarding:*** *A user needs to post his capabilities and qualities on Helpium platform. This is useful for a user to approach a Helpium user for a help, which he/she can provide. Helpium expects the users to keep the current helping capabilities up to date.*

4. Helpium (HLP) Utility Token

Helpium tokens will be ERC-20 compatible tokens. Total of 1 billion Helpium tokens will be generated on platforms. And rest of new Helpium tokens will be created from fiat currency buy option from Helpium network platform. Helpium network will maintain 50% of the current token supply. Rest of the 40% will be available in the early token sale.

Helpium Tokens can, either be bought on the platform, Or Helpium network by purchasing through USD or during the initial coin offering or through exchanges.

Helpium initial coin offering will be distributed based on value. These Helpium coins will be changed to Helpium tokens when the platform is launched and can be used inside the platform.

Helpium tokens will, automatically be assigned to users who join the platforms initially.

Helpium tokens will build an analogous economy. Individuals who own Helpium tokens, will be able to utilize Helpium tokens for multiple purposes inside the Helpium network. For long-term storage, we highly recommend storing your tokens in an ERC20-enabled wallet to which you control your private key.

Helpium tokens will be assigned to users in Helpium Wallets.

Helpium tokens can also be bought from crypto currency exchanges or convert to Helpium tokens from other crypto currencies.

5. Task Smart Contracts

When a task or help is created, Helpium platform immediately creates a smart contract for that task with Helpium tokens associated with that task.

These Helpium tokens are locked until someone successfully completes a task or unless you withdraw your task from Helpium network.

Once a task is complete. A user can approve the task and Helpium platform will sign the transaction using users private key to be sent to the Performers wallet.

When a task is created by a user, a user needs to assign Helpium tokens (HLP) to perform that particular task. A smart contract will be created based on task details and Helpium tokens associated with the task.

Once a particular user performs the task. The user will provide access to the Helpium tokens and transfer the Helpium tokens to the performing user.

The details on the smart contract and implementation will be presented further in stages.

6. Helpium Web and Mobile Platforms

Helpium will be launched in an intuitive and interactive platform like Mobile and Web for seamless user interaction. Helpium will be user first approach of execution.

Helpium is completely redefining and decentralizing the micro services segment of the business and this requires very easy to use products.

7. Helpium Wallet

Initially Helpium tokens will be ERC-20 tokens based on Ethereum. Any wallet which supports ERC-20 tokens can hold Helpium tokens.

Support for in-built wallet on Mobile and Web will be incorporated on Beta stage of the product.

8. Weights of Tasks

Weight of a task correlates to factors like time, difficulty, demand and cost of a particular service. Important challenge for Helpium, is to give preference towards micro-tasks or tasks with smaller value, these tasks can be of a smaller weight. However, they do carry Karma points. Helpium algorithm with precondition of Karma points before seeking a help/service helps address this issue.

Helpium will use artificial intelligence and machine learning algorithm to suggest expected weight of Helpium token points of a task.

The weight of a task will be determined by how much Helpium tokens a user is willing to spend to get his task or help successfully met.

Certain tasks will have Helpium tokens help calculate Helpium weights. The higher the weight of a task, the better reputation will be built.

9. Expiration Time for Tasks

We do not want stale and incorrect tasks to flood the eco-system. That's the reason tasks will have an expiry time. A shorter expiry date can be set by the user during creation of a task.

10. Cancelling Tasks

Tasks can be cancelled at any time. All the Helpium tokens associated with the task will be refunded to user's wallet except the execution cost of smart contract which is consumed by Ethereum smart contract will not be refunded.

11. Reputation System

Karma points define the reputation of a user. If a user performs the task as per satisfaction he or she is awarded 100% of the Karma points per task. These per task Karma points are tracked to generate a reputation stat for a user.

The better reputation a user has, the higher visibility the user gets in terms of gaining new tasks.

12. Transaction fees

Helpium platform will be running over Ethereum nodes. Ethereum smart contracts require gas which costs Ethereum. Helpium platform will not charge any additional transaction fees. Helpium does not charge or profit from any transaction in the eco-system, which in return drives the cost down.

13. Eco-system

Helpium platform plans to boost crypto-currency eco-system by providing a venue where crypto-currencies are useful in performing real life needs and use cases. Currently, users either need to convert the crypto-currency into fiat and pay respective gains and then use the fiat for fulfilling their needs.

Helpium platform plans to eliminate that need.

14. Helpium Decentralized Governance

Helpium platform operates as a non-profit organization. Helpium platform will be initially be governed by set of tasks assigned for building the eco-system. The eco-system needs following ingredients:

- Strong network of users.
- People willing to help each other especially for micro tasks.
- People willing to build a reputation system.
- People getting their tasks done for cheaper price.
- The task performer able to use Helpium tokens for other tasks that he needs to be completed.

15. Helpium Supply and Demand Cycle

Helpium tokens (HLP) will have a limited supply of 1 billion. Helpium supply will be maintained by Helpium network and platform core team. Helpium tokens can be brought from Helpium platform directly or through crypto-exchanges. Initially exchanges support Helpium token "HLP", it can be bought directly from Helpium platform.

Helpium is a deflationary currency; Only 1 billion Helpium tokens will ever be created. Out of which 50% of the tokens will be reserved for long term sustainability of the platform.

- 20% total will be used for Helpium ecosystem
- 10% total will be used for initial seed investors.
- 20% total will be retained by the founding team.

Rest 50% of HLP tokens will be released by Helpium network gradually.

16. One More Thing …

Future for Helpium is extremely promising. Helpium can be the first decentralized blockchain application which serves the broader community. Helpium can also be the first decentralized application in the world to bridge utility tokens with actual ground and tangible tasks.

Potential and reach of Helpium is beyond imagination. The next potential segment that Helpium can easily dominate is the marketplaces and classifieds. People would post and buy things through Helpium network, without fiat conversion. And the most revolutionary concept of Helpium, would be that the Helpium tokens then can be useful for performing other tasks within the eco-system.

Helpium will be the next revolutionary parallel economy of the world.

17. Conclusion

Helpium is a promising initiative to change the world one-step at a time. Helpium is also one of the first decentralized application to reach the grass roots audience. Helpium is one of the most groundbreaking ideas, which believes in decentralization of talent, A person who is talented needs to have justified value no matter where the person comes from. Helpium breaks the division of borders, countries, currencies, color, race, nationality, gender etc. And helps people explore their own talent. With Helpium the norm of social empathy and social collaboration is brought to light. Which brings the society close together to help each other for a greater good.

18. Acknowledgements

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