coinasta®: A Peer-to-Peer Autonomous Electronic Cash System

Nohr Bjornsen
contact@coinasta.com
www.coinasta.com

A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. Satoshi Nakamoto who wrote the Bitcoin whitepaper proposed a solution to the double-spending problem using a peer-to-peer network. Similar to Nakamoto we propose the network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone. Additionally we propose an autonomous beneficiary apparatus that is built in so that the electronic system can make the decision of which beneficiaries will receive a share of all transactions. This apparatus is separated from the coinasta® block chain which has built in a secure connection to the beneficiary apparatus. The apparatus is further programmed to have a focus primarily on proof of work for rewards and beneficiary payouts. The coinasta® peer-to-peer version of electronic cash would allow a main decision engine with separate apparatus that is encrypted and connected utilizing a programmable computer that is fine tuned to making decisions related to providing the ability for the system to effectively work together to (A1) Reduce Human Poverty, (B1) Protect Animals, (C1) Protect Wildlife and (D1) Protect the Environment as well as shorten and simplify transaction times dramatically with the core peer to peer block chain. and has these beneficiary subset main functions defined as and from here on referred to as the “core mission” functions of this peer-to-peer coinasta®.

1. Introduction

Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weaknesses of the trust based model. Completely non-reversible transactions are not really possible, since financial institutions cannot avoid mediating disputes. The cost of mediation increases transaction costs, limiting the minimum practical transaction size and cutting off the possibility for small casual transactions, and there is a broader cost in the loss of ability to make non-reversible payments for non- reversible services. With the possibility of reversal, the need for trust spreads. Merchants must be wary of their customers, hassling them for more information than they would otherwise need. A certain percentage of fraud is accepted as unavoidable. These costs and payment uncertainties can be avoided in person by using physical currency, but no mechanism exists to make payments over a communications channel without a trusted party.

What is needed is the ability for a Peer to Peer block chain system that can provide trade finance, with credit capabilities implemented into its core system. What is proposed here is coinasta® that fills that need as well as providing very fast transactions due to the connections to a plurality of processing

apparatus nodes globally. Each with an exponentially growing greater processing power through a series of connectors with parallel functions where there is no single point of processing power failure. This is all due to its system ability to independently autonomously at infrequent or irregular intervals connect to programmable computer apparatus with a sustainable alternative energy technology implemented into the peer to peer validation apparatus and to the mining and people mining components of the coinasta® system and apparatus.

What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party. Transactions that are computationally impractical to reverse would protect sellers from fraud, and routine escrow mechanisms could easily be implemented to protect buyers. In this paper, we propose a solution to the double-spending problem using a peer-to-peer distributed timestamp server to generate computational proof of the chronological order of transactions. The system is secure as long as honest nodes collectively control more CPU power than any cooperating group of attacker nodes.

We define where a tried and widely tested security mechanism from Nakamoto's Bitcoin's equation, algorithm and open source peer to peer code is fully implemented. Additionally defined is a coinasta® autonomous beneficiary selection function from a percentage of all transactions and proofs of work utilizing a digital semantic agent decision engine. It is also defined where coinasta® provides a 50% split apparatus where 50% goes to the physical hardware miner and 50% goes to the "core mission" beneficiaries.

Further defined we have included where "People Miners" instantly get paid for proof of useful work, utilizing coinasta® CNA and VABit®'s which are similar to Bitcoin BTC and Satoshi. Payments for proof of work are calculated and paid from the CNA reserve or directly from an open market peer to peer exchange validated by the consensus or general agreement provided by the programmed algorithm of the embedded decision engine built into the mining and validation functions of a plurality of peer coinasta® server nodes and CNA VABit® wallets. The decision of amounts to be paid and to which beneficiaries is instantly made by the coinasta® autonomous beneficiary decision engine, utilizing policies and rules related to the "core mission" of reducing poverty, protecting animals, wildlife and the environment. Every single transaction provides a 50% reward paid to the "core mission" beneficiaries.

We also define as related to coinasta® "Proof of Work" where work is policy defined, and/or "Proof of Play" where play is policy defined as anything that promotes, initiates, ties assets to, provides universal seeding, and digital feeding and watering of the coinasta® CNA, VABit® crypto, and/or the Virtual Airport® game, and/or performs real work and/or play on the "core mission" exponential growth of an outcome for relieving poverty, protecting animals, wild life and the environment.

Further is here defined where a transaction timer that pays out beneficiaries chosen by the autonomous decision engine apparatus & mechanism is at a certain autonomously decided time factor. Implemented by an electronic computer calculated time frame engine which is instantly calculated for the best results as related to the "core mission" and valuations to aggregate and implement the most positive impact on the "core mission".

We define here in where processes in the coinasta® block chain utilize a forward thinking, forward chaining decision engine to decide what beneficiaries should be enabled by the best order of enablement for a positive outcome to the chosen "core mission" component.

Still further defined is where the decision engine uses a corpus (a collection of written texts) related to "core beneficiaries" (CB) as a rule set to be utilized by the coinasta® decision engine for making autonomous decisions related to enablement and payouts to non profit, foundations and directly to actual core mission beneficiaries.

A search indexing engine is defined utilizing aggregation of corpus and graphical text and objects that creates all established criteria for the supporting function where the coinasta® autonomous decision engine can instantly make positive and “core mission” effective decisions to seed, grow and sustain the “core mission” objectives.

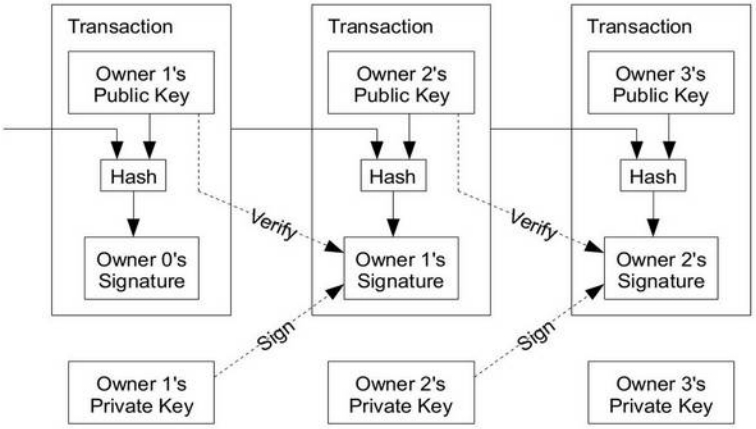
Also defined is a block chain of positive or negative results indexing and aggregation engine to harvest data related to making better decisions in the decision apparatus as related to beneficiary, coinasta®, CNA, VABit®'s and the Virtual Airport® uses.

And we also define where an asset corpus and graphical object criteria decision engine is embedded for use of the divided allocation decision engine, with a live or mechanical network valuation calculator apparatus which is used in connecting assets to the core assets coinasta®, CNA, VABit®’s and the Virtual Airport® and all other coinasta® decision engines for sustainability of the “core mission” results, apparatus, and mechanisms.

2. Transactions

Similar to Nakamoto’s Bitcoin we define an electronic coin as a chain of digital signatures. Each owner transfers the coin to the next by digitally signing a hash of the previous transaction and the public key of the next owner and adding these to the end of the coin. A payee can verify the signatures to verify the chain of ownership. The problem of course is the payee can't verify that one of the owners did not double-spend the coin. A common solution is to introduce a trusted central authority, or mint, that checks every transaction for double spending. After each transaction, the coin must be returned to the mint to issue a new coin, and only coins issued directly from the mint are trusted not to be double-spent. The problem with this solution is that the fate of the entire money system depends on the company running the mint, with every transaction having to go through them, just like a bank.

We need a way for the payee to know that the previous owners did not sign any earlier transactions. For our purposes, the earliest transaction is the one that counts, so we don't care about later attempts to double-spend. The only way to confirm the absence of a transaction is to be aware of all transactions. In the mint based model, the mint was aware of all transactions and decided which arrived first. To accomplish this without a trusted party, transactions must be publicly announced [1], and we need a system for participants to agree on a single history of the order in which they were received. The payee needs proof that at the time of each transaction, the majority of nodes agreed it was the first received.



In another embodiment of the the disclosed block chain process there is a split reward apparatus and mechanism for the purpose of creating a reserve for the benefit of people in poverty, protecting

animals, wildlife and the environment. The reserve is aggregated and increased every single time a transaction occurs during mining, proof of work payments, game play and product sales utilizing an autonomous splitting mechanism and apparatus.

The coinasta® block chain is at infrequent or irregular intervals connected to a separate synchronized Programmable Computer Controller Apparatus with, the following programmed functions in the apparatus where a series of controls in industrial production processes controlling operations and actions of a machine or device. The coinasta® block chain also comprises a series of controls for measurement or test processes controlling the status and response of a measuring or testing device. And it also comprises a series of processes for technical processing of information or data for exchange or management of information or data external to a computer.

The apparatus which is connected to the coinasta® block chain disclosed here further comprises autonomous improvements to a computer system's internal performance for increased system running speed by setting or adjusting configurations and parameters. The apparatus that works along side the coinasta® block chain comprises a process where a communication apparatus with a transmitter and a receiver includes a communication apparatus comprising a transceiver and a processor configured to cause the transceiver to perform transmitting and receiving steps. It still further comprises a communication apparatus comprising a processor configured to perform or cause the apparatus to perform transmitting and receiving steps.

The coinasta® block chain also comprises an outside control communication apparatus comprising a memory and a processor configured to enable transmitting and receiving steps to be performed by executing computer program codes stored in the memory. It also is included with a communication apparatus comprising means for transmitting and receiving which is used in a process where a block chain block reward is given for processing and discovering available blocks that are validated by a peer network in block chain mining by a miner, that is equal to a specified plurality of crypto currency coins awarded to the miner in block chain mining. This autonomously occurs after inclusion in the block chain and validation by the peers in peer nodes during consensus.

It further comprises a process where an equal amount of crypto currency coins is awarded to a specific designated crypto currency coin wallet. And still further comprising a process where the designated crypto currency coin wallet is a pool funding wallet for use in donations, as funding for specific and specified non-profit and profit organizations. The coinasta® block chain has processes still further comprising, a process programmed into the block chain in the apparatus for, dividing a specified amount of awarded crypto coins for successfully mining a block that is accepted by the crypto currency coin network of computer nodes, depositing the specified amount of awarded crypto coins for successfully mining a block that is accepted by the crypto currency coin network of computer nodes into a designated pool fund wallet, for the purpose of advertising, promotion, and nonprofit and profit fund raising as part of the presented apparatus and processes.

And coinasta® further comprises, a process utilizing a plurality of emails, electronic books, social network advertising bots, for encouraging participation in worthy online activities where, for every vote, for every submission of ideas to a contest, for every contest recommendation, for every Advertisement, for every placement in social networks, where players will receive an Air Drop of substantial FREE crypto coins, for their proof of work demonstrated. The coinasta® game tokens, and crypto further comprises the matching of the winning prizes of a contest, and still further comprising the doubling or plurality of doubling the prize, with an equal or larger amount of crypto coins awarded by the apparatus, utilizing emails, electronic books, file sharing, advertising, aggregation apparatus, for the purpose of advertising, promotion, non profit and profit fund raising as part of the presented apparatus and processes. And coinasta® further comprises a plurality of email, electronic book

processes for, raising funding through nonprofits and profit businesses, and for the publishing of all the entries in a contest or think tank event involving ideas submitted by participants in a contest, producing an after the contest book, for distribution in helping humanity, animals, and the environment, and education, that further will give credit to each individual who participated in a the contest or think tank event in the book. The coinasta® block chain external apparatus can be used for the purpose of advertising, promotion, and fund raising as part of the here defined algorithm and apparatus processes.

And the coinasta® block chain system also further comprises, a process using programmed computer processor and application for people in poverty to upload and show proof of work, through one or a plurality of the people's work of, telling stories, taking and/or sending pictures, videos, analyzing world ideas, giving their opinions on issues, creating ideas, creating solutions to problems, asking for advice, asking for help, asking for funding, submitting questions for others to answer, submitting helpful advice, for the purpose of earning crypto tokens and/or coins, and further for the purpose of exchanging crypto for useful things; and still further for the purpose of exchanging crypto coins for fiat currencies; and even still further for the purpose of advertising, promotion, and fund raising as an integral part of the presented apparatus and processes.

2A Splitting Rewards in Transactions

The coinasta® system provides the option for the splitting up of the mining block discovery rewards into a plurality of digital wallets, and also comprising the option of splitting up of mining block rewards transaction fees into a plurality of digital wallets. And still further comprising, where an electronic apparatus combined with a software timer apparatus for consolidating long hashing block chain into a shorter hashing length reducing the time frame for transactions, and further comprising a storage area on peer network nodes for storing old block chain, and further comprising reducing difficulty rate of mining related to timer consolidation events, and still further comprising where a percentage of a business where a portion of their mining block reward was contributed from the split fund goes directly to the crypto miner who received the original block reward, and further comprising a crypto currency that is created with an unknown limit for mining; and further where the open mining community does not know how many blocks can ever be mined.

The coinasta® system further comprises a game theory option of an alternative fork tied to the current trading price of coinasta® where a forked virtual crypto coin can have an infinite amount of coins mined only limited by the resources available for mining; and still further comprising where the older mined virtual crypto currency coins mined have a much higher value than the newer mined coins, and further comprising where the block chain can be used to define the dates of each created block of coins for valuation in a game or financial system for, Trading; Buying Selling; Holding; Payoffs; Bartering; Tangible Evaluations such as; Fair Value; Fair Deal; Fair Share; Fair Price; Fair Placement; and still further comprising where a choice in positioning of the first block discovered in mining of virtual block chain crypto coins can be moved by the creator / founder / organization of the coin to a different position in the block chain ledger for the purpose of, thereby strengthening the interest, and strength of the pleasure and senses of the game play.

Alternative coinasta® fork crypto currencies can have the options of changing the game play at specific intervals in time, enhancing the life span and quality of the payment system in the game play. And further have the option of changing the Value of the payments systems infrastructure; at any time, or specified dates and times; all part of the coinasta® defined alternative crypto currency apparatus and mechanism. The coinasta® alternative crypto currency fork apparatus still further comprises an FPGA, ASIC and hard coded integrated circuit for applying functions; using a Computer Object De-Encryption Encryption File Algorithm (CODEFA) block chain enhanced mechanism server for

validation and proof of ownership of crypto coins; and further comprising using a Human Key Life Internet vs a Mechanical Internet encrypted corpus, Digital Semantic Agent search engine, and encrypted object, image, video, audio files embedded file system with for validation and proof of ownership of virtual currency crypto block chain ledger coins.

2B Conserving Electricity and Water in Transactions

The coinasta® system further comprises utilizing a peer to peer node mechanism and apparatus for Mobile KWH Bank Battery Storage with block chain proof of ownership. And still further comprising; Low Energy Wall Panel Apparatus connected to Wireless Electricity transferal with block chain proof of ownership; and further comprising a Wall Paneling Construction Smart Apparatus and System comprising; a stationary electrical access wall outlet panel apparatus; a plurality of low energy multiple color lasers; a plurality of solar photo voltaic cells; a plurality of solar concentration apparatus; a plurality of graphene super capacitor apparatus; a plurality of organic battery storage units; a single or plurality of data storage devices; a plurality of USB, and USB Power Delivery energy connector apparatus; a plurality of USB communication ports; a plurality of electricity generator apparatus; a plurality of thermal electricity generating layers apparatus; a plurality of aqueous delivery apparatus; a plurality of cameras; a plurality of microphones; a plurality of speakers; a spatial point sound and light measurement controller apparatus; a wireless controller board; an LCD touchscreen display; a plurality of electricity converted to light transmitting apparatus; a plurality of light converted to electricity receiving apparatus; a plurality of graphene layered EMP protection apparatus for the purpose of reducing the use of electricity from peoples electric needs and the grid. And for the purpose of reducing the amount of fresh water taken from the ground and above ground rivers and streams used currently in the generation of electricity for the grid and off grid individual generation use.

2C Security in External Electricity and Water Generation and Fractional Transactions

The coinasta® system also has the option to utilize a single or plurality of Human not mechanical or machine Keys through the components of a single or plurality of USB processor ports for identification of authorized users; a Human Key controller board; a main CPU controller board; an energy and battery controller board; a plurality of computer processors; a plurality of 3D Solar panel with light intensity tracking apparatus; a plurality of multi layered graphene solar cell apparatus. And further comprising; an apparatus and process for executing a series of instructions on a computer system, the method comprising: registering a user and property account in a computer system; creating and attaching human identification keys to the registered users account; creating and attaching object identification keys to the registered users property account; creating and attaching bank accounts to the registered users account; creating aggregated data, and media from stored databases,or real time life events utilizing a module; creating a website search software application either from tables on the server, from aggregated data or by the entry of a search item utilizing a module for security in electronic and non electronic components.

The coinasta® system also has the option for creating a Fractional opportunity, utilizing a Fractional Request Module; providing taking a real or intangible property and dividing it into a plurality of pieces for the purpose of monetizing, creating liquidity, collaborating, sharing and making payments; providing the ability to create a divisible, divided second property from a real or intangible first property, for the purpose of creating liquidity, monetizing it, or creating greater value for the piece or pieces; providing the ability to create an assembled second property from real or intangible first property, or a plurality of first properties for the purpose of creating liquidity, monetizing it, or creating greater value for a piece or pieces; creating Publicity for created or re-purposed properties utilizing a Self Publishing Publicity module; sharing a Fractional opportunity with users in a network; creating a

Fair Value utilizing a module; that calculates the amount of money that something is worth, the price or cost of something, in a fair way to all users; creating a Fair Share opportunity utilizing a module, that calculates a portion belonging to, due to, or contributed by an individual or group; creating a Fair Deal utilizing a module, that calculates how to give (something or an amount of something) to someone, to buy and sell as a business, and additionally to reach or try to reach a state of acceptance or reconciled agreement from users in a network about real tangible or intangible object transactions; creating a Fair Price utilizing a module, that calculates the amount of money that you pay for something or that something costs, and calculates the thing that is lost, damaged, or given up in order to get or do something, and additionally calculates the amount of money needed to persuade users in a network to do something, and additionally calculates the quantity of one thing that is exchanged or demanded in barter or sale for another thing, and additionally calculates the amount of money given or set as consideration for the sale of a specified thing all in a fair way to the users in the coinasta® block chain network server apparatus and system.

The coinasta® system also has the option for creating a Fair Placement utilizing a module, that calculates putting something in a particular place, and finding an appropriate place for someone to live, work, or learn, or placing an object, advertisement, or website in a strategic location for best possible results, in a fair way to users in a network; creating a Micro Share Request utilizing a module, that calculates small shares of things, objects, real or intangible properties and makes an offer for a user in a network, for a fraction of the original item; creating a Fractional Request utilizing a module, that calculates separating components of a transaction, real or intangible property, or object through differences, determined by using modules in the system to create potential and actual deals, suggestions, motivations, or incentive to play, and potential and actual transactions; creating requests utilizing a module asking for collaborations related to the dividing of properties in a network for the benefit of the individual users in a network and/or the coinasta® system and block chain.

The coinasta® system is defined with an embedded external apparatus for connecting VABit® and CNA block chain transactions to peer to peer plurality of global server apparatus utilizing CODEFA encryption and decryption of text, images, video, stored in a block chain.

The coinasta® system also has the option for providing the ability to create a new property by transforming other properties utilizing modules; providing the ability to take an original property and transforming it into a new property utilizing a module; providing the ability to transform Fractional Objects divided pieces of real or intangible properties and original properties into a currency, or currencies utilizing a module; utilizing modules that work within software, a computer processor, or System on Chip integrated circuit, in a virtual world network, and/or non virtual network.

The coinasta® system also has the option for providing a distributed block chain to independently verify the chain of ownership of any shared piece created from real or intangible properties transformed into a fraction of the original property; providing a distributed block chain live tracking to independently verify the transactions of buying, selling, trading, bartering, with fair value or market value amounts set of any shared piece created from real or intangible properties transformed into a fraction of the original property in the network system; providing a distributed block chain recording of any activities related to changing, transforming, altering valuations, or destruction of any shared piece created from real or intangible properties transformed into a fraction of the original property in a system network; providing a shared fractional payment platform; providing a digital semantic agent for creating; color band currencies from divided pieces; a rating attached to divided pieces; the conversion of pieces into currencies at time of registration; color band requests for participation; monetary values attached to requests at the time of dividing pieces; providing a negotiation digital semantic agent for negotiations on requested newly created properties. This decrease will be exponential so every blocks will lead to a much less probability.

Whitepaper Calculations related to the Satoshi Nakamoto paper and Attack Protections

An attacker can not create an alternate chain faster than the honest chain, because the attacker cannot force the other nodes to accept invalid transactions unless he owns or hacks them. Only thing he can try is to take back the money he recently spent.

We can consider the race between the attacker and honest chain as a binomial random walk. There is only 2 possibilities at the end of this race, either the attacker wins or fails, by decreasing the gap between the honest chain and his chain.

The paper is also stating that it's analogous to the gambler's ruin problem. supposing the gambler has infinite number of trials to reach break even.

Why analogous to gambler's ruin problem?

Supposing two gamblers betting each other with a limited amount of money. One gambler has to win multiple times in a row to decrease the other gamblers money to "0". It is a similar race in attacking scenario as if the attacker writes a block, then the attacker reduces the gap between its chain and honest chain. But if the honest chain writes a block, the gap increases by +1 and putting the attacker's chain 1 block behind. This probability is expressed by given equation:

p = probability an honest node finds the next block
q = probability the attacker finds the next block
q_z = probability the attacker will ever catch up from z blocks behind

$$q_z = \begin{cases} 1 & \text{if } p \leq q \\ (q/p)^z & \text{if } p > q \end{cases}$$

Why assumed p>q?

If the majority of the nodes in the network are honest, p (possibility an honest node finds the next block) should be greater.

With the odds against the attacker, he has to make a lucky lunge early on to increase his probability to succeed. Because the more blocks the attacker is behind the honest chain, the smaller probability of success on taking the money back he recently spent. This decrease will be exponential so every blocks will lead to a much less probability.

The coinasta® algorithm takes this attacker criteria into play as each transaction is performed and fulfilled in the consensus process very similar to the original approach of Satoshi Nakamoto. But adds additional safeguards into the transactional process. This intelligent system speeds up the processing times, and shortens the delays in completing transactions utilizing a pre processing data flow mechanism.

Still further here below we see where, Satoshi explained the scenario of the attacker on taking the money he recently spent:

We now consider how long the recipient of a new transaction needs to wait before being sufficiently certain the sender can't change the transaction. We assume the sender is an attacker who wants to make the recipient believe he paid him for a while, then switch it to pay back to himself after some time has passed. The receiver will be alerted when that happens, but the sender hopes it will be too late.

The receiver generates a new key pair and gives the public key to the sender shortly before signing. This prevents the sender from preparing a chain of blocks ahead of time by working on it continuously until he is lucky enough to get far enough ahead, then executing the transaction at that moment. Once the transaction is sent, the dishonest sender starts working in secret on a parallel chain containing an alternate version of his transaction.

The recipient waits until the transaction has been added to a block and z blocks have been linked after it. He doesn't know the exact amount of progress the attacker has made, but assuming the honest blocks took the average expected time per block, the attacker's potential progress will be a Poisson distribution with expected value:

$$\lambda = z\frac{q}{p}$$

λ = poisson density
z = number of blocks

This equation at the above is a discrete probability distribution (poisson distribution). It gives the attacker's probability by counting the number of successes (finding block) in a series of intervals measured in time. To use this model, we must assume:

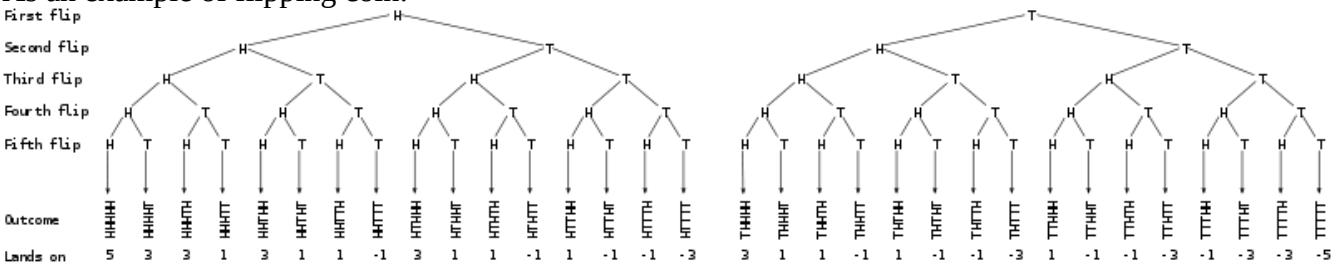
1. The number of successes during each time interval is independent of any other interval.(like flipping a coin)

2. The probability that a single success will occur during a very short time interval is proportional to the duration of the time interval.

3. The probability of more than one success in such a short time interval is negligible.
Reference for poisson explanation: https://arxiv.org/pdf/1701.03977.pdf

When using poisson distribution, the occurrence of one event doesn't affect the probability that a second event will occur. Events occur independently. The rate at which events occur is constant. It can't be high or low in some intervals. (as you have 50% chance when flipping a coin)

As an example of flipping coin:



All possible random walk outcomes after 5 flips of a fair coin

The actual probability distribution is a binomial distribution, and the number of trials are sufficiently bigger than the number of successes one is asking for.

Wikipedia contributors. "Random walk." Wikipedia, The Free Encyclopedia. Wikipedia,
The Free Encyclopedia, 4 Jan. 2022. Web. 3 Feb. 2022.

To get the probability the attacker could still catch up now, we multiply the Poisson density for each amount of progress he could have made by the probability he could catch up from that point:

$$\sum_{k=0}^{\infty} \frac{\lambda^k e^{-\lambda}}{k!} \cdot \begin{cases} (q/p)^{(z-k)} & \text{if } k \le z \\ 1 & \text{if } k > z \end{cases}$$

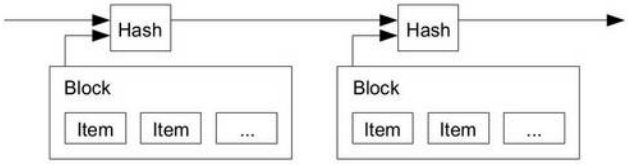
Rearranging to avoid summing the infinite tail of the distribution...

$$1 - \sum_{k=0}^{z} \frac{\lambda^k e^{-\lambda}}{k!} \left(1 - (q/p)^{(z-k)}\right)$$

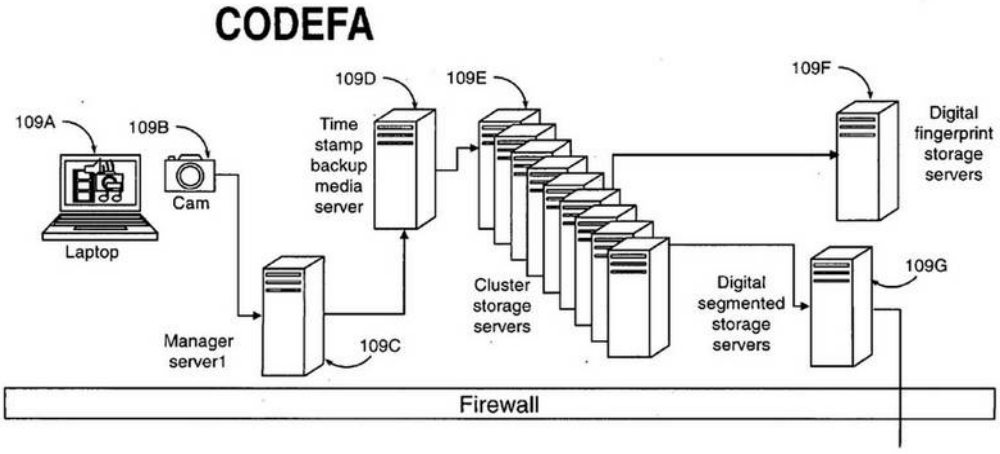
k = number of blocks for the attackers progress.

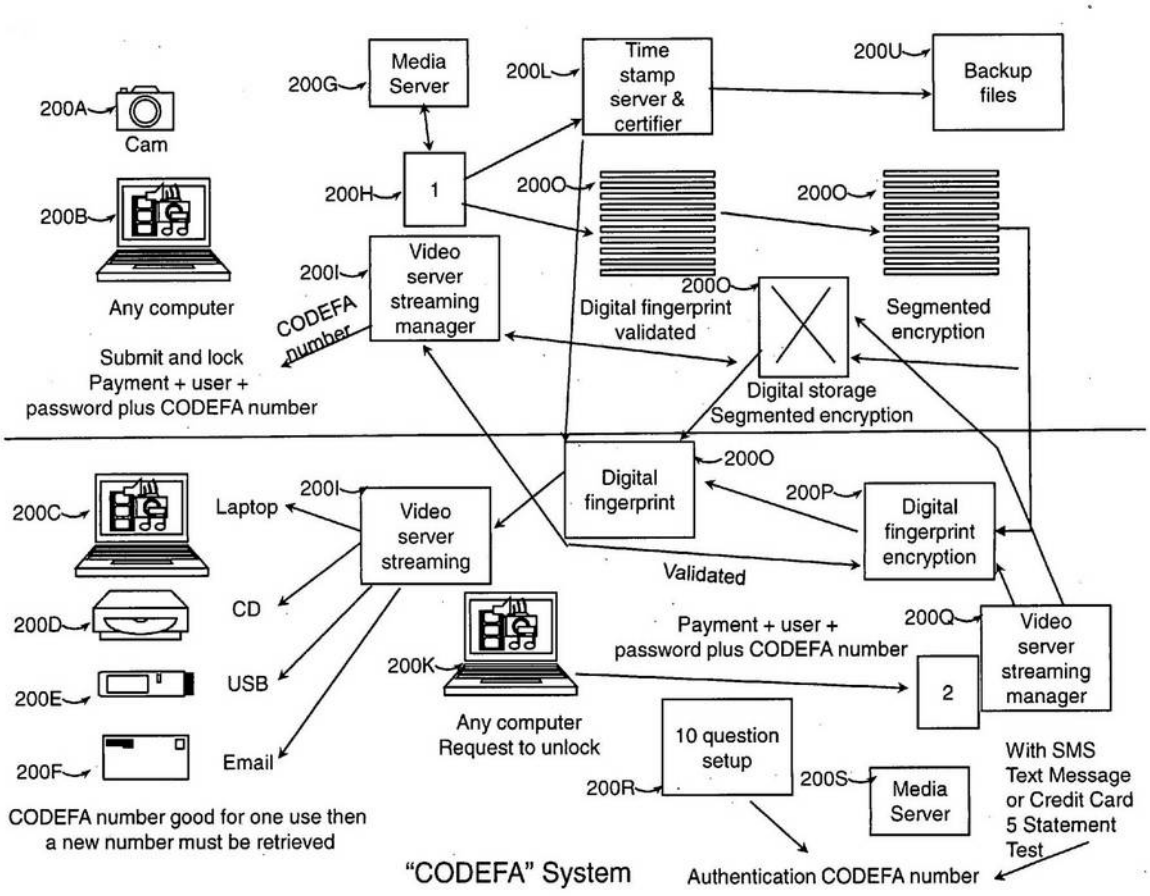
3. Timestamp Server

Similar to Nakamoto's Bitcoin the solution we propose begins with a timestamp server as implemented by Bitcoin and previously described in CODEFA time stamp server prior definitions. A timestamp server works by taking a hash of a block of items to be timestamped and widely publishing the hash, such as in a newspaper or Usenet post [2-5]. The timestamp proves that the data must have existed at the time, obviously, in order to get into the hash. Each timestamp includes the previous timestamp in its hash, forming a chain, with each additional timestamp reinforcing the ones before it.



The coinasta® system also has the option for a coinasta® object registry like in the CODEFA system where an object is defined as something material that may be perceived by the senses, or a thing that you can see and touch and that is not alive. We define a registry is a place for registering, a book for official records, a ledger or block chain as the place where such records are kept. So in the presented coinasta® system external apparatus we include the object registry apparatus functions with sensors, storage and human key security attachment to a process of steps to aggregate object information, and store images, measurements, and other sensing data, in folders, and databases for reference at a later place and time with date and time stamp aligned with the coinasta® transaction time stamp through the coinasta® time stamp server aligned with CODEFA system processes established.

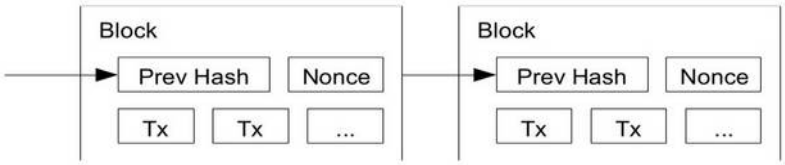




4. Proof-of-Work

Similar to Nakamoto's Bitcoin we define the use of the ability to implement a distributed timestamp server on a peer-to-peer basis, we will need to use a proof- of-work system similar to Adam Back's Hash cash [6], rather than newspaper or Usenet posts. The proof-of-work involves scanning for a value that when hashed, such as with SHA-256, the hash begins with a number of zero bits. The average work required is exponential in the number of zero bits required and can be verified by executing a single hash. For our timestamp network, we implement the proof-of-work by incrementing a nonce in the block until a value is found that gives the block's hash the required zero bits. Once the CPU effort has been expended to make it satisfy the proof-of-work, the block cannot be changed without redoing the work. As later blocks are chained after it, the work to change the block would include redoing all the blocks after it. The proof-of-work also solves the problem of determining representation in majority decision making. If the majority were based on one-IP-address-one-vote, it could be subverted by anyone able to allocate many IPs. Proof-of-work is essentially one-CPU-one-vote. The majority decision is represented by the longest chain, which has the greatest proof-of-work effort contributed in it. If a majority of CPU power is controlled by honest nodes, the honest chain will grow the fastest and outpace any competing chains. To modify a past block, an attacker would have to redo the proof-of-work of the block and all blocks after it and then catch up with and surpass the work of the honest nodes. We will show later that the probability of a slower attacker catching up diminishes exponentially as subsequent blocks are added. To compensate for increasing hardware speed and varying interest in running nodes over time, the proof-of-work difficulty is determined by a moving average targeting an average number of blocks per hour. If they're generated too fast, the difficulty increases. This system

can also be implemented as an option utilizing the CODEFA apparatus and mechanism in the coinasta® external block chain server node apparatus.



We further define where the continuously aggregating and indexing in the coinasta® search mechanism and apparatus where valuation of “Proof of Play” is calculated and stored as a function with the ability to implement a distributed timestamp server on a peer-to-peer basis, with changing values module. Valuation calculations are made autonomously to decide how valuable a proof-of -work is, and is used as well as an autonomous proof- of-play apparatus valuation calculation component in the coinasta® system.

5. Network

The steps to run the network are as follows:

1) New transactions are broadcast to all nodes.

2) Each node collects new transactions into a block.

3) Each node works on finding a difficult proof-of-work for its block.

4) When a node finds a proof-of-work, it broadcasts the block to all nodes.

5) Nodes accept the block only if all transactions in it are valid and not already spent.

6) Nodes express their acceptance of the block by working on creating the next block in the chain, using the hash of the accepted block as the previous hash.

7) Valuation is calculated continuously for the value of a proof-of-work and proof-of-play

Nodes always consider the longest chain to be the correct one and will keep working on extending it. If two nodes broadcast different versions of the next block simultaneously, some nodes may receive one or the other first. In that case, they work on the first one they received, but save the other branch in case it becomes longer. The tie will be broken when the next proof- of-work is found and one branch becomes longer; the nodes that were working on the other branch will then switch to the longer one.

New transaction broadcasts do not necessarily need to reach all nodes. As long as they reach many nodes, they will get into a block before long. Block broadcasts are also tolerant of dropped messages. If a node does not receive a block, it will request it when it receives the next block and realizes it missed one. The same process works in the coinasta® system transaction with valuation calculated for proof of work and proof of play. The system has the ability to implement a periodic change of the proof of work/play reward autonomously from mining, people mining and play in a game.

6. Incentive

Similar to Nakamoto’s Bitcoin we define where by convention, the first transaction in a block is a special transaction that starts a new coin owned by the creator of the block. This adds an incentive for nodes to support the network, and provides a way to initially distribute coins into circulation, since there is no central authority to issue them. The steady addition of a constant of amount of new coins is

analogous to gold miners expending resources to add gold to circulation. In our case, it is CPU time and electricity that is expended. The incentive can also be funded with transaction fees. If the output value of a transaction is less than its input value, the difference is a transaction fee that is added to the incentive value of the block containing the transaction. Once a predetermined number of coins have entered circulation, the incentive can transition entirely to transaction fees and be completely inflation free. The incentive may help encourage nodes to stay honest. If a greedy attacker is able to assemble more CPU power than all the honest nodes, he would have to choose between using it to defraud people by stealing back his payments, or using it to generate new coins. He ought to find it more profitable to play by the rules, such rules that favor him with more new coins than everyone else combined, than to undermine the system and the validity of his own wealth.

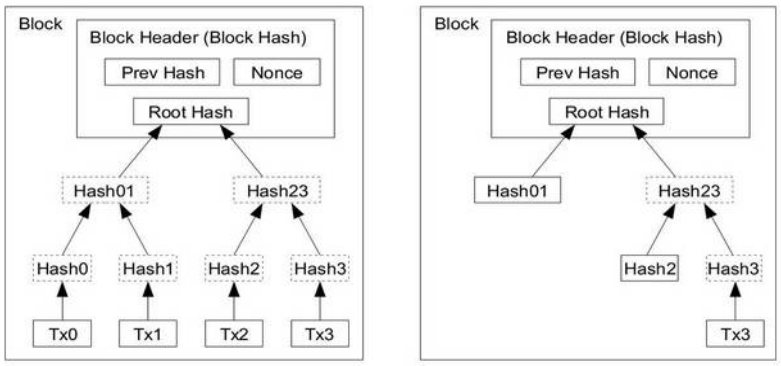
Another aspect to this modified Bitcoin block chain is where the apparatus block chain has autonomous formula for splitting virtual currency mining payoff rewards with nonprofit, profit and poverty individuals through donations. The Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit, For Profit and Poverty Individuals Through Donations has an Apparatus for Splitting Environment through Autonomous Donations to effective Beneficiaries Foundations, Products and Services.

In another aspect we show the same processes splitting the main block reward earned by miners into separate useful wallets for the purpose of creating funding sources for goodwill and to fund businesses and nonprofits. We also define where teachers receive crypto coin currency that is useful in their wallets. We define where we see where poverty individuals or any individuals in the world receive crypto virtual Currency coins in their wallets for proof of work in taking pictures and submitting them to the system. We also define where we see people in poverty, people with mobile phones, or the general population being able to earn additional crypto currency coins from the fund wallet for making videos and uploading them to the system as proof of work.

We also show where the coinasta® Apparatus is used for Splitting Virtual Currency Mining Payoff Rewards with Non Profit and Poverty Individuals Through Donations. We further define the process in the apparatus related to a programmed ASIC chip with registration to banking in transactions.

7. Reclaiming Disk Space

Similar to Nakamoto’s Bitcoin we define where once the latest transaction in a coin is buried under enough blocks, the spent transactions before it can be discarded to save disk space. To facilitate this without breaking the block's hash, transactions are hashed in a Merkle Tree [7][2][5], with only the root included in the block's hash. Old blocks can then be compacted by stubbing off branches of the tree. The interior hashes do not need to be stored.



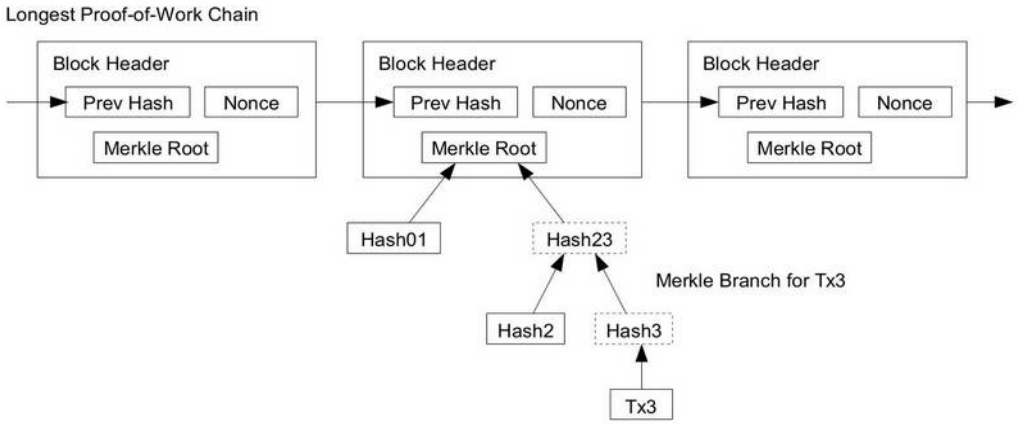
Transactions Hashed in a Merkle Tree

After Pruning Tx0-2 from the Block

A block header with no transactions would be about 80 bytes. If we suppose blocks are generated every 10 minutes, 80 bytes * 6 * 24 * 365 = 4.2MB per year. With computer systems typically selling with 2GB of RAM as of 2008, and Moore's Law predicting current growth of 1.2GB per year, storage should not be a problem even if the block headers must be kept in memory.

8. Simplified Payment Verification

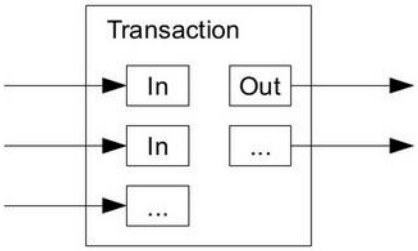
Similar to Nakamoto’s Bitcoin we define we provide where it is possible to verify payments without running a full network node. A user only needs to keep a copy of the block headers of the longest proof-of-work chain, which he can get by querying network nodes until he's convinced he has the longest chain, and obtain the Merkle branch linking the transaction to the block it's timestamped in. He can't check the transaction for himself, but by linking it to a place in the chain, he can see that a network node has accepted it, and blocks added after it further confirm the network has accepted it.



As such, the verification is reliable as long as honest nodes control the network, but is more vulnerable if the network is overpowered by an attacker. While network nodes can verify transactions for themselves, the simplified method can be fooled by an attacker's fabricated transactions for as long as the attacker can continue to overpower the network. One strategy to protect against this would be to accept alerts from network nodes when they detect an invalid block, prompting the user's software to download the full block and alerted transactions to confirm the inconsistency. Businesses that receive frequent payments will probably still want to run their own nodes for more independent security and quicker verification.

9. Combining and Splitting Value

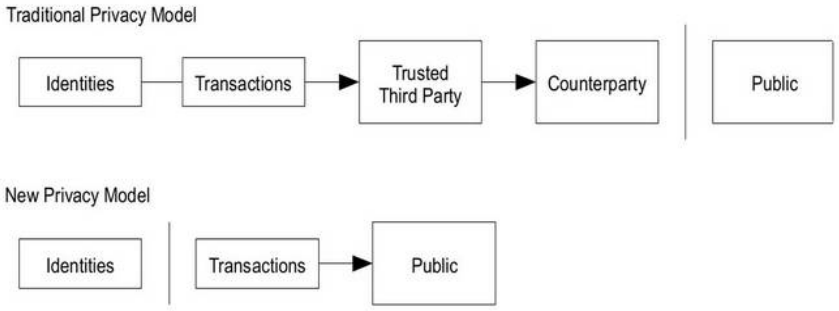
Similar to Nakamoto’s Bitcoin we define where although it would be possible to handle coins individually, it would be unwieldy to make a separate transaction for every cent in a transfer. To allow value to be split and combined, transactions contain multiple inputs and outputs. Normally there will be either a single input from a larger previous transaction or multiple inputs combining smaller amounts, and at most two outputs: one for the payment, and one returning the change, if any, back to the sender.



It should be noted that fan-out, where a transaction depends on several transactions, and those transactions depend on many more, is not a problem here. There is never the need to extract a complete standalone copy of a transaction's history.

10. Privacy

Similar to Nakamoto’s Bitcoin we define where the traditional banking model achieves a level of privacy by limiting access to information to the parties involved and the trusted third party. The necessity to announce all transactions publicly precludes this method, but privacy can still be maintained by breaking the flow of information in another place: by keeping public keys anonymous. The public can see that someone is sending an amount to someone else, but without information linking the transaction to anyone. This is similar to the level of information released by stock exchanges, where the time and size of individual trades, the "tape", is made public, but without telling who the parties were.



As an additional firewall, a new key pair should be used for each transaction to keep them from being linked to a common owner. Some linking is still unavoidable with multi-input transactions, which necessarily reveal that their inputs were owned by the same owner. The risk is that if the owner of a key is revealed, linking could reveal other transactions that belonged to the same owner.

11. Calculations

Similar to Nakamoto’s Bitcoin we define we consider the scenario of an attacker trying to generate an alternate chain faster than the honest chain. Even if this is accomplished, it does not throw the system open to arbitrary changes, such as creating value out of thin air or taking money that never belonged to the attacker. Nodes are not going to accept an invalid transaction as payment, and honest nodes will never accept a block containing them. An attacker can only try to change one of his own transactions to take back money he recently spent. The race between the honest chain and an attacker chain can be characterized as a Binomial Random Walk. The success event is the honest chain being extended by one block, increasing its lead by +1, and the failure event is the attacker's chain being extended by one block, reducing the gap by -1. The probability of an attacker catching up from a given deficit is analogous to a Gambler's Ruin problem. Suppose a gambler with unlimited credit starts at a deficit and plays potentially an infinite number of trials to try to reach break even. We can calculate the probability he ever reaches break even, or that an attacker ever catches up with the honest chain, as follows [8]:

p = probability an honest node finds the next block
q = probability the attacker finds the next block
q_z = probability the attacker will ever catch up from z blocks behind

$$q_z = \begin{cases} 1 & \text{if } p \le q \\ (q/p)^z & \text{if } p > q \end{cases}$$

$$\lambda = z\frac{q}{p}$$

To get the probability the attacker could still catch up now, we multiply the Poisson density for each amount of progress he could have made by the probability he could catch up from that point:

$$\sum_{k=0}^{\infty} \frac{\lambda^k e^{-\lambda}}{k!} \cdot \begin{cases} (q/p)^{(z-k)} & \text{if } k \le z \\ 1 & \text{if } k > z \end{cases}$$

Rearranging to avoid summing the infinite tail of the distribution...

$$1 - \sum_{k=0}^{z} \frac{\lambda^k e^{-\lambda}}{k!} \left(1 - (q/p)^{(z-k)}\right)$$

Converting to C code...

```
#include <math.h>
double AttackerSuccessProbability(double q, int z)
{
    double p = 1.0 - q;
    double lambda = z * (q / p);
    double sum = 1.0;
    int i, k;
    for (k = 0; k <= z; k++)
    {
        double poisson = exp(-lambda);
        for (i = 1; i <= k; i++)
            poisson *= lambda / i;
        sum -= poisson * (1 - pow(q / p, z - k));
    }
    return sum;
}
```

Given our assumption that $p > q$, the probability drops exponentially as the number of blocks the attacker has to catch up with increases. With the odds against him, if he doesn't make a lucky lunge forward early on, his chances become vanishingly small as he falls further behind. We now consider how long the recipient of a new transaction needs to wait before being sufficiently certain the sender can't change the transaction. We assume the sender is an attacker who wants to make the recipient believe he paid him for a while, then switch it to pay back to himself after some time has passed. The receiver will be alerted when that happens, but the sender hopes it will be too late. The receiver generates a new key pair and gives the public key to the sender shortly before signing. This prevents the sender from preparing a chain of blocks ahead of time by working on it continuously until he is lucky enough to get far enough ahead, then executing the transaction at that moment. Once the transaction is sent, the dishonest sender starts working in secret on a parallel chain containing an alternate version of his transaction. The recipient waits until the transaction has been added to a block

and *z* blocks have been linked after it. He doesn't know the exact amount of progress the attacker has made, but assuming the honest blocks took the average expected time per block, the attacker's potential progress will be a Poisson distribution with expected value:

Running some results, we can see the probability drop off exponentially with z.

Running some results, we can see the probability drop off exponentially with z.

```
q=0.1
z=0     P=1.0000000
z=1     P=0.2045873
z=2     P=0.0509779
z=3     P=0.0131722
z=4     P=0.0034552
z=5     P=0.0009137
z=6     P=0.0002428
z=7     P=0.0000647
z=8     P=0.0000173
z=9     P=0.0000046
z=10    P=0.0000012

q=0.3
z=0     P=1.0000000
z=5     P=0.1773523
z=10    P=0.0416605
z=15    P=0.0101008
z=20    P=0.0024804
z=25    P=0.0006132
z=30    P=0.0001522
z=35    P=0.0000379
z=40    P=0.0000095
z=45    P=0.0000024
z=50    P=0.0000006
```

Solving for P less than 0.1%...

```
P < 0.001
q=0.10   z=5
q=0.15   z=8
q=0.20   z=11
q=0.25   z=15
q=0.30   z=24
q=0.35   z=41
q=0.40   z=89
q=0.45   z=340
```

12. Decision Engine

We have proposed a system for electronic transactions without relying on trust. We started with the usual framework of coins made from digital signatures, which provides strong control of ownership, but is incomplete without a way to prevent double-spending. To solve this, we proposed a peer-to-peer network using proof-of-work to record a public history of transactions that quickly becomes computationally impractical for an attacker to change if honest nodes control a majority of CPU power. The network is robust in its unstructured simplicity. Nodes work all at once with little coordination. They do not need to be identified, since messages are not routed to any particular place and only need to be delivered on a best effort basis. Nodes can leave and rejoin the network at will, accepting the proof-of-work chain as proof of what happened while they were gone. They vote with

their CPU power, expressing their acceptance of valid blocks by working on extending them and rejecting invalid blocks by refusing to work on them. Any needed rules and incentives can be enforced with this consensus mechanism. In the end we need an Autonomous Decision Engine to choose the “core mission” Beneficiaries with Core Policies and Rules related to the optimal positive affects of Beneficiary Fund Allocation that support the “core mission” of Reducing Poverty, Protecting Animals, Wildlife and the Environment Exponentially through a Self Seeding algorithm.

We have determined that 70 percent of poverty non profits working through a certain accepted method to reduce poverty we analyzed globally have reduced non capable results, so we use the Poisson approximation to the binomial distribution to determine the probability that 5 of 400 non profits using a certain accepted method to reduce poverty globally will have reduced non capable results.

Solution. Substituting x = 5, λ = nθ = 400 · 0.7 = 280 into the
formula for Poisson distribution, we get

$$p(5; 280) = \frac{(280^5 e^{-280})}{5!} = 3.582234215863007068 92e - 112.$$

And this is defining how we reduce the beneficiaries and begin to determine fairly how we arrive at a definitive list of potential non profits to be awarded beneficiary funding from utilizing the “core mission” model and equation in distribution.

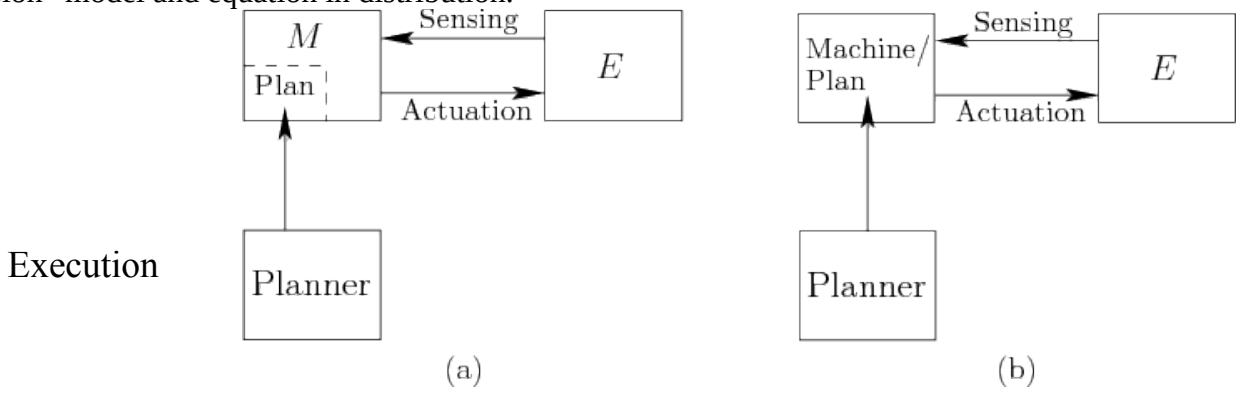


Figure 1.18: (a) A planner produces a plan that may be executed by the machine. The planner may either be a machine itself or even a human. (b) Alternatively, the planner may design the entire machine.

A plan is usually executed by a machine. A human could alternatively execute it; however, the case of machine execution is the primary focus of this book. There are two general types of machine execution. The first is depicted in Figure 1.18a, in which the planner produces a plan, which is encoded in some way and given as input to the machine. In this case, the machine is considered programmable and can accept possible plans from a planner before execution. It will generally be assumed that once the plan is given, the machine becomes autonomous and can no longer interact with the planner.

Reference: LaValle , Steven M. “Planning Algorithms” Copyright 2006 Cambridge University Press, 842 pages

I. The coinasta non profit and/or profit beneficiary action or process of replacing a beneficiary utilizing digital semantic agent problem.

We define a stochastic infinite-horizon problem solved utilizing an autonomous digital semantic agent. To make a decision of when to replace your non profit and/or profit beneficiary during transactions. Here's how coinasta non profit and/or profit beneficiaries digital semantic agent works in its algorithm. Beneficiaries get funded; they start to accomplish their mission; and then they produce positive results for a while, or negative results. In the coinasta decision engine algorithm, that sequence of events is considered and referred to as one funding cycle. In the coinasta digital semantic agent framework, the algorithm assumes that a non profit and/or profit beneficiary can be used up to n_1 funding cycles and its productivity can be one of n_2 classes. Each coinasta non profit and/or profit beneficiary choice belongs to a productivity class x yields $q_x y(s)$ usable currency or other valued assets of positive results during the s^{th} cycle so that all non profit and/or profit beneficiaries follow the same pattern of analysis for their calculated yields, but the level of their yields varies depending on the non profit and/or profit beneficiaries. The coinasta digital semantic agent does not know the productivity class of a non profit and/or profit beneficiary until after its first funding cycle is aggregated by the digital semantic agent.

There are two state variables in this case,

- the funding cycle of the non profit and/or profit beneficiary:

  s=funding cycle number of non profit and/or profit beneficiary $\in S_1=\{1,2,\ldots,n_1\}$

- the quality of the non profit and/or profit beneficiary:

  x=non profit and/or profit beneficiary quality $\in X=\{1,2,\ldots,n_2\}$

The choice variable is:

z=0 (keep non profit and/or profit beneficiary), or z=1 (replace)

The state equation for the funding cycle number is simple,

$$s_{t+1} = \begin{cases} s_t + 1 & \text{if } z_t = 0 \\ 1 & \text{if } z_t = 1 \end{cases}$$

The stochastic state equation for the quality variable is

$$x_{t+1} = \begin{cases} x_t & \text{if } z_t = 0 \quad \text{with probability} 1 \\ x_i & \text{if } z_t = 1 \quad \text{with probability } w_i \end{cases}$$

where w_i is the probability of getting a non profit and/or profit beneficiary of class i.

The benefit function is

$$\pi(z,x,s) = \begin{cases} pq_x y(s) & z = 0 \\ pq_x y(s) - c & z = 1 \end{cases}$$

where c is the cost of replacing a non profit and/or profit beneficiary. Note that you pay the cost of replacing the non profit and/or profit beneficiary after funding. (The sequence of activities, i.e. you pay after funding, is important and substantive in discrete-time problems, while in continuous-time specifications they tend to go away because everything can indeed be simultaneous and/or instantaneous. The order of events is a modeling choice.)

A formal statement of the non profit and/or profit beneficiary replacement problem, therefore, is:

$$\max_{z_t=0,1} \sum_{t=0}^{\infty} \frac{\pi(z_t, x_t s_t)}{(1+r)^t} \text{ s.t.}$$

$$x_{t+1} = \begin{cases} x_t & \text{if } z_t = 0 \quad \text{with probability 1} \\ x_i & \text{if } z_t = 1 \quad \text{with probability } w_i \end{cases}$$

$$s_{t+1} = \begin{cases} s_t + 1 & \text{if } z_t = 0 \\ 1 & \text{if } z_t = 1 \end{cases}$$

The Bellman's equation for this problem becomes

$$V(s_t, x_t) = \max_{z=0,1} \begin{cases} pq_x y(s_t) + \beta V(s+1, x_t); & \text{if } z_t = 0 \\ pq_x y(s_t) - c + \beta \sum_{i=1}^{n_2} w_i V(1, x_i); & \text{if } z = 1 \end{cases}$$

In this case the state space will be a two dimensional array of $n_1 \cdot n_2$ points. This can be solved using two loops in the state space, a loop over x inside a loop over s.

Again, we can look at this process using pseudocode.

Set $V^{RHS}(x,s)=0$ for every state $x \in X$, $s \in S$.

For iteration 1,2,…, max iter

Stage Loop

for every quality state $x_t \in X$

State 1 Loop

for every funding cycle age $s_t \in S$

State 2 Loop

for $z_t=0$

$$V^0 = pq_x y(s_t) + \beta V^{RHS}(s+1, x_t)$$

for $z_t=1$

$$EV^{t+1} = 0$$

for $i=1,\ldots, n_2$, $EV^{t+1} = EV^{t+1} + w_i V^{RHS}(1, x_i)$

$$V^1 = pq_x y(s_t) - c + \beta EV^{t1}$$

Control Loop

If $V^1 > V^0$ then

$z_t^* = 1$

$V^{LHS}(x,s) = V^1$

If $V^0 > V^1$ then

$z_t^* = 0$

$V^{LHS}(x,s) = V^0$

Identify best choice

control loop can be achieved without a loop statement because there are only two options.

[end of control loop. Bellman's eqn is solved]

next funding cycle age

next quality state

[end of state loops]

Check for convergence

Find $diff = \max_{x,s} \left| V^{LHS}(s,x) - V^{RHS}(s,x) \right|$

if *diff*<convergence criterion,

exit loop,

else

$V^{RHS} = V^{LHS}$

Convergence and update section

continue [end of stage loop]

II. Optimal coinasta Digital Semantic Agent decisions used in a dynamic context

Once the DSA has solved a dynamic programming problem, the DSA obtains an optimal policy function and a value function. The policy function, $z^*(x,t)$ in a finite horizon model and $z^*(x)$ in an infinite horizon model, tells the DSA the decisions, contingent on any particular state variable that coinasta might face. In principle this is quite useful in providing the DSA advice or simply analyzing optimal choices for the DSA to take to get higher trades and funding.

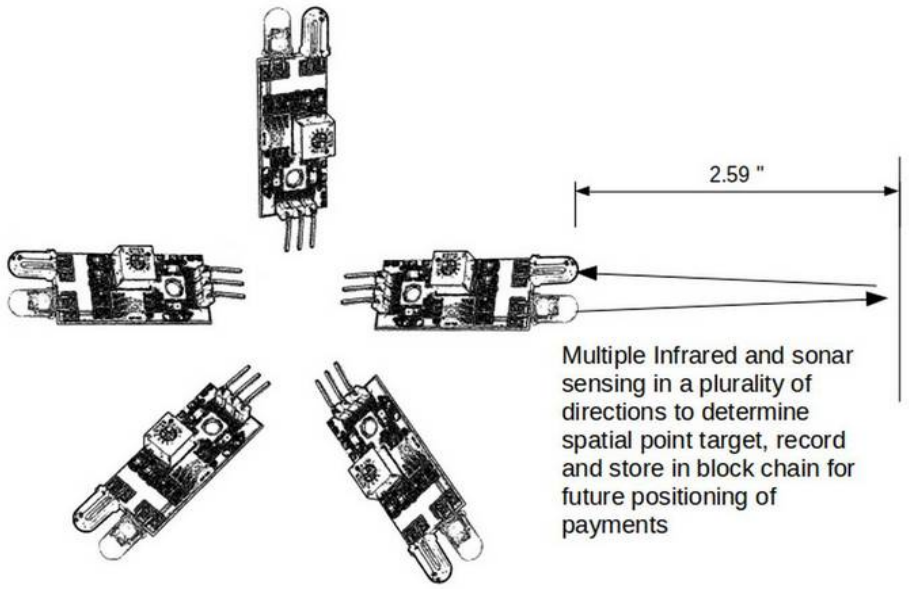
Consider the non profit and/or profit beneficiary replacement problem. After you have solved the problem, you have a clear rule for replacing non profit and/or profit beneficiaries. Conventional wisdom may be that you should replace a non profit and/or profit beneficiary after a certain number of funding cycles, but if the non profit and/or profit beneficiary is particularly productive, should you wait a little longer? Should you retire the non profit and/or profit beneficiary earlier if it is at the low end of the productivity distribution? Assuming your problem specification is correct, your solution to the problem above can serve as the basis for strong advice or better management of your digital semantic agent's criteria tracking database of non profit and/or profit beneficiaries.

Additionally the solution can be used to predict the outcomes in the market. For example, if the price of replacing a non profit and/or profit beneficiary goes up, what can we expect will happen to the supply of funding in the short run and, over the longer term, what will happen to the supply of funding and the market-clearing price? These questions can only be answered by understanding how the underlying dynamic optimization problem that coinasta® digital semantic agents are either implicitly or explicitly solving.

Still further we are interested in studying how economic decisions play out in the future, so the use of a simulation model will definitely be useful to the DSA. Simulation models often use an open loop decision process – i.e. they assume that decisions are set in stone prior to the start of the problem. In reality of course, optimal decisions are closed loop, meaning that decision makers respond to new information about the states in which they find themselves. Using a Dynamic Programming Decision Engine solution in your simulation work (i.e., incorporating $z^*(x_t)$ into our model) will realistically incorporate the fact that DSA decision makers react to changing conditions before making decisions.

For example, suppose that you are studying a policy to promote the use of bio fuels. This will change the dynamic incentives of individuals throughout the economy – from producers of corn to producers of oil and coal. One cannot simply assume that they will react to new policies in the same way that they have reacted to price changes in the past – the structure of the dynamic choice problem has been changed. computational power, we are increasingly able to add dynamic realism to policy analysis that these economists have promoted.

Spatial Point Target Method and Apparatus



The coinasta® Decision Engine utilizes apparatus to record, and store Spatial Point Targeting coordinates for the ability to send and receive payments to and/or from a specific Spatial Point for added security and gaming entertainment. The engine is defined to allow a point to be defined, and any programmable computer, mobile phone, tablet pc or dongle wallet can be utilized to search for that spatial point through GPS, and fine tuned utilizing the engine built into a mobile phone wallet. The system uses Multiple infrared and sonar sensing in a plurality of directions to target distances that are recorded of a specific spatial point target which is stored inside a transaction in the block chain of the wallet and/or the apparatus server block chain and/or in the Virtual Airport block chain for future positioning of payment “Spatial Places”. The Virtual Airport embeds these “Spatial Places” into its block chain of places in the game for buying, selling, trading, and auctioning transactions.

Criteria for a decision engine that electronically makes decisions involving coinasta®

We define where value as in valuation is, the act of saying how much something is worth. A valuation can be useful when trying to determine the fair value, fair share, or fair impact of an action, asset, or system. Further we define valuation as an analytical process of determining the current (or projected) worth of actions taken from decision making in a decision engine.

Questions for coinasta® Decision Engine equations...

How much coinasta® needs to be transacted to reduce poverty 2%?

What percentage increase in a person’s wealth who makes $1.90 a day would make their life better and sustainable?

We define as an example of the decision engine functions where a group of players in the Virtual Airport® keep records of the number of successful favorable transactions using coinasta® for game products the group of players scores per game during a time frame session:

No. of successful favorable transactions	Frequency
0	8
1	10
2	12
3	3
4	5
5	2

Find the mean number of successful favorable transactions per game.

Solution. The table above will be used, with a third column added.

No. of successful favorable transactions	Frequency	No. of successful favorable transactions X Frequency
0	8	0 X 8 = 0
1	10	1 X 10 = 10
2	12	2 X 12 = 24
3	3	3 X 3 = 9
4	5	4 X 5 = 20
5	2	5 X 2 =10
Totals	40 (total games)	73 (total successful favorable transactions)

$$\textbf{Mean} = \overline{x} = \frac{73}{40} = 1.825$$

The Virtual Airport® has public places where players interact and play the game. The coinasta® crypto is abundantly used in its core mission capacity throughout the Virtual Airport® game.

The average number of players on any one day at the Virtual Airport® in a certain place there is known to be 12. What is the probability that on a given day fewer than nine players will arrive at this certain place?

Solution. Let X be the number of players arriving on a given day.

Then, using Poisson distribution with λ = 12, we get

$$P(X < 9) = \sum_{x=0}^{8} p(x;12) = \sum_{x=0}^{8} \frac{12^x e^{-12}}{x!}$$

$$= e^{-12}(\frac{12^0}{0!} + \frac{12^1}{1!} + \frac{12^2}{2!} + \frac{12^3}{3!} + \frac{12^4}{4!} + \frac{12^5}{5!} + \frac{12^6}{6!} + \frac{12^7}{7!} + \frac{12^8}{8!})$$

= 0.1550

How does a person (poverty line) live on $1.90 per day?

The international poverty line, which is currently $1.90 a day, is the threshold that determines
whether someone is living in poverty.

The line is based on the value of goods needed to sustain one adult.

This metric, however, does not take into account access to *sanitation, water, and electricity* and
what effect that has on their quality of life.

The World Bank sets the international poverty line at periodic intervals as the cost of living for basic food, clothing, and shelter around the world changes. In the 2008 update, the poverty line was set at $1.25 per day. In 2015, the threshold was updated to $1.90 per pay, which is where it currently stands.

International Poverty Line vs. Federal Poverty Level (FPL)
The federal poverty level (FPL), also known as the poverty threshold or guidelines, in the U.S. is an annual income level based on the number of members in the household. For a single-person household, the 2020 poverty level is $12,760 a year—or just under $35 a day. For each additional household member, the level increases by $4,480. These guidelines are for all states and the District of Columbia except Alaska and Hawaii, as it's more expensive to live in those states. In the U.S., the poverty levels are used to determine eligibility for certain federal programs, such as Medicaid and the Supplemental Nutrition Assistance Program (SNAP). [i]

HTTPS://WWW.INVESTOPEDIA.COM ERMS/I/INTERNATIONAL-POVERTY-LINE.ASP

The term "absolute poverty" is also sometimes used as a synonym for extreme poverty. Absolute poverty is the absence of enough resources to secure basic life necessities.

Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population). Based on World Bank data ranging from 1998 to 2018.[14] To assist in measuring this, the World Bank has a daily per capita international poverty line (IPL), a global absolute minimum, of $1.90 a day as of October 2015.[15]

The new IPL replaces the $1.25 per day figure, which used 2005 data.[16] In 2008, the World Bank

came out with a figure (revised largely due to inflation) of $1.25 a day at 2005 purchasing-power parity (PPP).[17] The new figure of $1.90 is based on ICP purchasing power parity (PPP) calculations and represents the international equivalent of what $1.90 could buy in the US in 2011. Most scholars agree that it better reflects today's reality, particularly new price levels in developing countries.[18] The common IPL has in the past been roughly $1 a day.[19]

These figures are artificially low according to Peter Edward of Newcastle University. He believes the real number as of 2015 was $7.40 per day.[ii]

Using a single monetary poverty threshold is problematic when applied worldwide, due to the difficulty of comparing prices between countries.[citation needed] Prices of the same goods vary dramatically from country to country; while this is typically corrected for by using purchasing power parity (PPP) exchange rates, the basket of goods used to determine such rates is usually unrepresentative of the poor, most of whose expenditure is on basic foodstuffs rather than the relatively luxurious items (washing machines, air travel, healthcare) often included in PPP baskets. The economist Robert C. Allen has attempted to solve this by using standardized baskets of goods typical of those bought by the poor across countries and historical time, for example including a fixed calorific quantity of the cheapest local grain (such as corn, rice, or oats).[21]

David Gordon's paper, "Indicators of Poverty and Hunger", for the United Nations, further defines absolute poverty as the absence of any two of the following eight basic needs:[iii]

Food: Body mass index must be above 16.
Safe drinking water: Water must not come solely from rivers and ponds, and must be available nearby (fewer than 15 minutes' walk each way).
Sanitation facilities: Toilets or latrines must be accessible in or near the home.
Health: Treatment must be received for serious illnesses and pregnancy.
Shelter: Homes must have fewer than four people living in each room. Floors must not be made of soil, mud, or clay.
Education: Everyone must attend school or otherwise learn to read.
Information: Everyone must have access to newspapers, radios, televisions, computers, or telephones at home.
Access to services: This item is undefined by Gordon, but normally is used to indicate the complete panoply of education, health, legal, social, and financial (credit) services.[iv]

--Wikipedia contributors. "Poverty threshold." *Wikipedia, The Free Encyclopedia*. Wikipedia, The Free Encyclopedia, 26 Feb. 2021. Web. 3 Mar. 2021.

So for our calculations related to the coinasta® core mission affect on reduction of poverty, protecting animals, wildlife and the environment, we have increased the real number of the international poverty line to $19.99 per day. Of course we are taking into consideration of Peter Edward of Newcastle University who felt in 2015 that the World Bank figures are artificially low. He believes the real number as of 2015 was $7.40 per day.[v] So we are using in our calculations a $19.99 per day number to insure that beneficiaries will have a useful positive impact in the defined decision engine apparatus presented here.

So… 84 percent of world population subsists on under $19.99 per day[vi] So we take the current population of 7,849,604,651 billion people[vii] and calculate how many people live in poverty currently that can benefit from the coinasta® core mission. So we utilize 6,593,667,906.84 as the real number of people that are currently living in poverty on the earth for the purpose of our calculations.

So the problem is:

How do you get $19.99 a day to every single person in poverty in a sustainable and consistent way?

Vote with your wallet… Reward for proof of work equation is defined in this way:

1. Every thing people do when they buy things needs to have a new valuation model clarified by having the reactions to the purchase of things broken down into first principal prices. Cost of actions need to be analyzed for the real valuations of our commerce actions.

We buy can of Tuna for $2.00 USD We eat it.
(coinasta® core mission = *Reducing Poverty, Protecting Animals. Wildlife, and the Environment*)

Manufacturing Cost, Transport Cost, Packaging Cost, Harm Cost, Animal, Wild Life, Environment Harm, Human Health Cost, Industry Contamination Cost, Virus, Bacteria, Water Contamination Cost, Electricity Cost, Fresh Water Cost, Carbon Footprint Cost.

A) **Cost to the coinasta® core mission of using a can (Mining metal from ground cost = MC)**
B) **Cost to the coinasta® core mission of using a can (Gas, Oil, transport of can to market =TC)**
C) **Cost to the coinasta® core mission of using a can (Printing on can inks, and fuel) = PC**
D) **Cost to the coinasta® core mission of using a can (Animal, Wild Life and Environment Damage) = AWLEC**
E) **Cost to the coinasta® core mission of using a can (Human Health Damage) = HHC**
F) **Cost to the coinasta® core mission of using a can (Antibiotics, Chemicals, Mercury Damage) = ICC**
G) **Cost to the coinasta® core mission of using a can (Virus, Bacteria, Water Contamination Damage) = VBWC**
H) **Cost to the coinasta® core mission of using a can (Electricity Cost) = EC**
I) **Cost to the coinasta® core mission of using a can (Fresh Water Cost) = FWC**
J) **Cost to the coinasta® core mission of using a can (Carbon Footprint Cost) =CFC**
K) **Cost to the coinasta® core mission of using tuna (Food Product Cost) =FPC**

FPC = 0.16
MC = 0.13 **Comparison of eating almond butter with seaweed vs tuna fish**

7 A
8 B
9 A
10 B
11 A
12 B
13 A
91
FPC = 0.16
MC = 0.13

References:

Asian Development Bank, 2007, Purchasing power parities and real expenditures, Manila, December.

Chen, Shaohua, and Martin Ravallion, 2007, ―Absolute poverty measures for the developing world, 1981–2004,‖ Proceedings of the National Academy of Sciences, 104:43, 16757–62.

Chen, Shaohua, and Martin Ravallion, 2008, ―The developing world is poorer than we thought, but no less successful in the fight against poverty,‖ Policy Research Working Paper 4703, World Bank, August.

Deaton, Angus, 2005, ―Measuring poverty in a growing world (or measuring growth in a poor world,‖ Review of Economics and Statistics, 87: 1, 1–19.

Deaton, Angus, and John Muellbauer, 1980, Economics and Consumer Behavior, New York. Cambridge University Press.

Deaton, Angus, and Alan Heston, 2008, ―Understanding PPPs and PPP-based national accounts,‖ NBER Working Paper No. 14499, November.

Deaton, Angus and Sam Schulhofer-Wohl, 2009, ―International comparisons of well-being,‖ in preparation.

90

Dikhanov, Yuri, 2005, "Trends in Global Income Distribution: 1970-2000, and Scenarios for 2015", UNDP

We Propose a Non Profit Decision Engine in Separate Plurality of Connected Blockchain:

1. Who is the beneficiary
2. What is the maximum impact of giving to a beneficiary
3. What is the valuation of the beneficiary receiving funds

(V) Valuation Decision Engine Ranking Criteria:

1. Human Impact Positive + (1-100)
2. Human Impact Negative – (1-100)
3. Animal Impact Positive + (1-100)
4. Animal Impact Negative – (1-100)
5. Wild Life Impact Positive + (1-100)
6. Wild Life Impact Negative – (1-100)
7. Environment Impact Positive + (1-100)
8. Environment Impact Negative – (1-100)

+ 400 is the Highest Positive Valuation Impact
- 400 is the Lowest Negative Valuation Impact

(B) Who is Beneficiary Decision Engine Ranking Criteria:

1. Human Impact Positive + (1-100)
2. Human Impact Negative – (1-100)
3. Animal Impact Positive + (1-100)
4. Animal Impact Negative – (1-100)
5. Wild Life Impact Positive + (1-100)
6. Wild Life Impact Negative – (1-100)
7. Environment Impact Positive + (1-100)
8. Environment Impact Negative – (1-100)

+ 400 is the Highest Positive Valuation Impact
- 400 is the Lowest Negative Valuation Impact

Policies with Rules as related to “core mission” Beneficiary Decision Engine

Corpus Database “core mission” Functions

Utilize Web Scraping to Aggregate the Core Function Data we use scraping of the internet, deep web and dark web to aggregate complete corpus database of information about potential beneficiaries and the work they have accomplished along with success rate quantitative analysis by the decision engine artificial intelligent indexing Digital Semantic Agent.

A. Scrape, using Digital Semantic Agent (DSA) and Index organization’s website.

B. The DSA Scrapes by Conducting an in depth news search to make decisions on any recent events or findings that affect the potential beneficiary organization.

C. The DSA Scrapes Search Engines for interviews, speeches by the Non Profit organization’s leader, or designated spokes people.

D. The DSA Scrapes information on the organization's strengths and weaknesses.

E. The DSA Scrapes and Indexes through Previously Checked third-party non profit evaluators for non profit annual reports and financial documents, analyze and create rating index autonomously.

F. Autonomous use of the DSA to Scrape and Index Published materials such as mission statement, brochures, newsletters, and annual reports, Newspaper, magazine, journal and online articles about the Non Profit organization, also aggregate Bios or resumes of executive director and other organization leaders, with Specific project proposal, IRS status certifying that the organization is eligible to receive tax-deductible charitable contributions.

.

G. The DSA Scrapes the Internet, Deep Web, and Dark Web for published nonprofit red flags related to beneficiary aggregated

You may, in your research, come across something that you consider to be a "red flag”—something that will make you think long and hard about contributing to the organization. Read on for help in dealing with red flags that may arise.

H. The DSA uses Criteria for Web Scraping data for decision making related to non profit and/or profit beneficiary dynamic programming, and autonomous delivery and receipt of funding selections utilizing the coinasta® Digital Semantic Agent Decision Engine mechanism and apparatus.

Examples of question / answer criteria for decision making by the engine:

Does the organization's mission align with your personal philanthropic goals?

Is the organization well-positioned to carry out the proposed project?

Can Non Profit work well within coinasta® "core mission"?

What is the organization's mission and strategy?

Does the organization's strategy support your vision for creating change?

How has the organization defined the problem it is trying to solve?

Has the organization matched its goals to its approach to achieving them?

How effective are the organization's programs?

What evidence of its outcomes does the organization have?

Does the organization have support from external experts in the field?

Does the organization have a clear definition of success?

What metrics does the organization track to know if it is succeeding?

How does the organization use the data it collects to learn and make decisions?

Does the executive director have a vision for the organization?

Does he or she have a personal track record of success?

Is the leadership team able to effectively guide the organization?

Can it maintain focus, make tough decisions, and inspire staff?

Is the board effective, engaged, and aligned with the leadership team?

Is there a succession plan in place for key people, such as the executive director?

How strong is the potential grantee's financial management?

Does the financial management team have the requisite experience and judgment?

Does the organization have systems in place to evaluate its financial progress?

Does the organization have a solid strategy to raise revenue?

What percentage of costs is covered by reliable funding sources?

How concentrated are revenue sources?

What are the 5 economic values?

What Are 'Economic Values'? There are nine common Economic Values that people consider when evaluating a potential purchase: efficiency, speed, reliability, ease of use, flexibility, status, aesthetic appeal, emotion, and cost.

Efficacy — how well does it work?
Speed — how quickly does it work?
Reliability — can I depend on it to do what I want?
Ease of Use — how much effort does it require?
Flexibility — how many things does it do?
Status — how does this affect the way others perceive me?
Aesthetic Appeal — how attractive or otherwise aesthetically pleasing is it?
Emotion — how does it make me feel?
Cost — how much do I have to give up to get this?

Why is economic valuation important?

The rationale for the economic valuation of natural resources is that they somehow impact on the utility (or well-being) of individuals, and that these individuals can identify a satisfactory trade-off between quantities of money and the environmental goods and bads they want.

What does economic value mean?

Economic value can be described as a measure of the benefit from a good or service to an economic agent. It is typically measured in units of currency. Another interpretation is that economic value represents the maximum amount of money an agent is willing and able to pay for a good or service

What plans, if any, does the organization have in place to become financially sustainable (if it is not already)?

Does the organization have enough cash on hand to weather an unexpected storm?

How effectively can the leadership team work together to translate priorities into initiatives?

Does the organization have a clear and effective decision-making process?

Is the organization able to attract and retain talented people?

Do staff receive the training and opportunities they need to do their jobs well?

Does the organization have the technology systems and human resources needed to operate effectively

Do staff appear committed to the organization and to improvement, where necessary?

Red Flag Aggregation Decision Engine Web Scraping Criteria:

Not all red flags carry equal weight by the coinasta® Digital Semantic Agent (DSA). For example, in many cases you'll find that nonprofits lack vital systems and supports due to a lack of resources. That's a red flag, but one you may be able to live with; you might be able to provide the resources needed to fix the problem. Other red flags might prove to be more troubling, for example, if they shed light on fundamental gaps or issues, such as an ineffective program or an executive director's flawed approach. In those cases, more resources may only exacerbate the problem. More important than these red flags, in other words, is the context from which they arise. Try to figure out whether the challenges you identify are surmountable with the support you plan to provide. Are the leadership team and board willing to tackle (or even acknowledge) these weaknesses? If the weakness lies in capacity, consider your own willingness to fund some or all of the non-program expenses that capacity building would require. The DSA attempts to stay open minded: DSA Approaches the process with questions. The DSA Doesn't leap to judgment when challenges come to light. Engaging in conversation in the spirit of inquiry will reveal the story behind the weaknesses, how they have emerged, and how you might help address them with your support.

Strategy and results: Red flags

Here are some examples of issues that should trigger further inquiry as DSA does the research.

The organization cannot demonstrate a track record of success because it is not tracking data.
The organization seems to "go it alone" and can't describe how its efforts fit alongside the work of other organizations in this space.
From the data presented, the organization does not appear to be successful.
Various members of the organization and board present fundamentally different versions of the mission.
The organization does not appear to have a process for learning from its experience.

Leadership: Red flags

Here are some examples of issues that should trigger DSA further inquiry as DSA does research.

The executive director doesn't seem fully committed to the organization.
The executive director does not seem to have a solid grasp of the financial aspects of the organization.
The organization lacks any management "bench strength" beyond the leader, and lacks a succession plan for the leader or any other key staff.
Board members are not donating to and fundraising for the organization; board participation is low.

Financials: Red flags

Here are some examples of issues that should trigger DSA further inquiry as DSA does research.

The organization doesn't have audited financial statements.
The organization has a growing deficit from year to year.
Budgeted income and expenses are not based on solid assumptions.
Accounting and finance functions all lie with one person.

Reference:

Criteria for 1/27/2021 How to Research a Nonprofit—Light-Touch Approach | Bridgespan

https://www.bridgespan.org/insights/library/philanthropy/nonprofit-due-diligence-donor-decision-tool/how-to-research-a-nonprofit-lig… 7/8

Improving Indirect Cost Recovery

Understanding Non profit Business Models

PAY WHAT IT TAKES researching nonprofits
COVID-19 (Coronavirus) Resources for Nonprofits
STRATEGY DEVELOPMENT
researching nonprofits
The board is not involved in financial review or audit.
Revenue sources change drastically from year to year.
Organization and operations: Red flags
Here are some examples of issues that should trigger further inquiry as you do your research.
Staff morale seems low (for example, turnover of non-leadership staff is higher than leadership had planned for).
Organization's leaders are not able to pinpoint where they would like to contribute next to (for example, in people, systems, or specific sites or programs).
The resource needs identified by staff are vastly different from person to person.
The process for making decisions is unclear.
After completing this phase, ask: What have you learned? Can you make a decision? If not, what more do you need to know?

Factors:

Online and Offline search / learning
Connected and Unconnected search / learning
Centralized and De Centralized search / learning
Biased and Unbiased search / learning
Positive and Negative Beneficiary Valuation search / learning

We use these processes:

Markov decision processes, MDP for short, is a framework that allows modeling of problems including non-deterministic environments. Originally, MDP were designed to express problems with a finite number of states and actions. However, most real-life problem are continuous, therefore other models have been proposed which use continuous states and actions, CSA-MDP for short

Policy: A deterministic policy $\pi : S 7\rightarrow A$ denotes which action $a \in A$ will be taken for any state $s \in S$. Thereafter, if it is not stated otherwise, by policy, we implicitly refer to deterministic policy.

Value function: A value function $V \pi : S 7\rightarrow R$ denotes the value for each state $s \in S$ according to the policy π. This value function is the xed point of Equation (3), denoted $V \pi (s)$.

Q-Value: A Q-value $Q\pi : S \times A \; 7\rightarrow \; R$ denotes the expected reward when starting by applying action $a \in A$ in state $s \in S$ and then applying policy π. The value is the xed point of Equation (4), denoted $Q\pi$ (s, a).

Optimality: A policy π is considered as optimal if and only if it follows Equation (5). Optimal policies are denoted $\pi * . \forall s \in S, \forall a \in A, V \pi * (s) \geq Q \pi * (s, a)$ (5) The value of a state is denoted

2.2.1 Batch-mode algorithm The batch learning algorithm FPF, is mainly based on the Fitted Q Iteration algorithm, Fitted Policy Forest

2.2 Fitted Policy Forest When there is no black-box model available for a learning problem, it is not possible to solve it “oine” (One is Never Enough). Thus, it is mandatory to obtain samples by interacting with the system. We present here the Fitted Policy Forest algorithm, which can perform batch-mode learning or semi-online learning. This algorithm is mainly based on the use of regression forests to approximate both, the Q-value and the policy. While it can handle continuous action spaces, it cannot deal with heterogeneous action spaces. We start by describing the algorithm for batch-mode learning, then we show how we can use a simple exploration scheme to transform it into a semi online learning algorithm. Experimental results on classical learning problems 56 Ludovic Hofer 2. Computing efficient policies are presented for both batch mode learning and semi-online learning. Finally, we discuss the applicability of FPF to our targeted problems.

Computational cost As mentioned previously, a quick access to the optimal action for a given state is crucial for real-time applications. We present the average time spent to retrieve actions for different methods in Figure 2.8 and the average time spent for learning the policies in 2.9.

Cheap and costly blackbox functions A key aspect of blackbox optimization is the cost of sampling the blackbox. While this cost might not always be represented as a numerical value, it is commonly accepted to separate blackbox in two different categories: cheap and costly. Cheap blackbox can be called several thousands or even millions of time while costly function are usually called at most a few hundred times. Since this thesis focuses on oine learning, we generally consider cheap blackbox functions based on models trained on data acquired on the robot. However, if optimization of the function had to be performed online, then the Decision-making algorithms for autonomous robots 77 2.4. Policy Mutation Learner blackbox function would be considered as costly because learning on the robot includes risk of damaging the robot and requires human supervision. **Bayesian optimization** Bayesian optimization is a state-of-the-art method for global optimization. Its main principle is to use the samples acquired by interacting with the blackbox function to establish a predictive model for the function based on Gaussian processes.

In neural networking or heuristic algorithms (computer terms generally used to describe 'learning' computers or 'AI simulations'), a black box is used to describe the constantly changing section of the program environment which cannot easily be tested by the programmers. This is also called a white box in the context that the program code can be seen, but the code is so complex that it is functionally equivalent to a black box. In physics, a black box is a system whose internal structure is unknown, or need not be considered for a particular purpose. In cryptography to capture the notion of knowledge obtained by an algorithm through the execution of a cryptographic protocol such as a zero-knowledge proof protocol. If the output of an algorithm when interacting with the protocol matches that of a simulator given some inputs, it only needs to know the inputs.

Reference: Wikipedia contributors. "Black box." Wikipedia, The Free Encyclopedia. Wikipedia, The Free Encyclopedia, 5 Nov. 2021. Web. 8 Jan. 2022.

Fig. 1 Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit and Poverty Individuals Through Donations

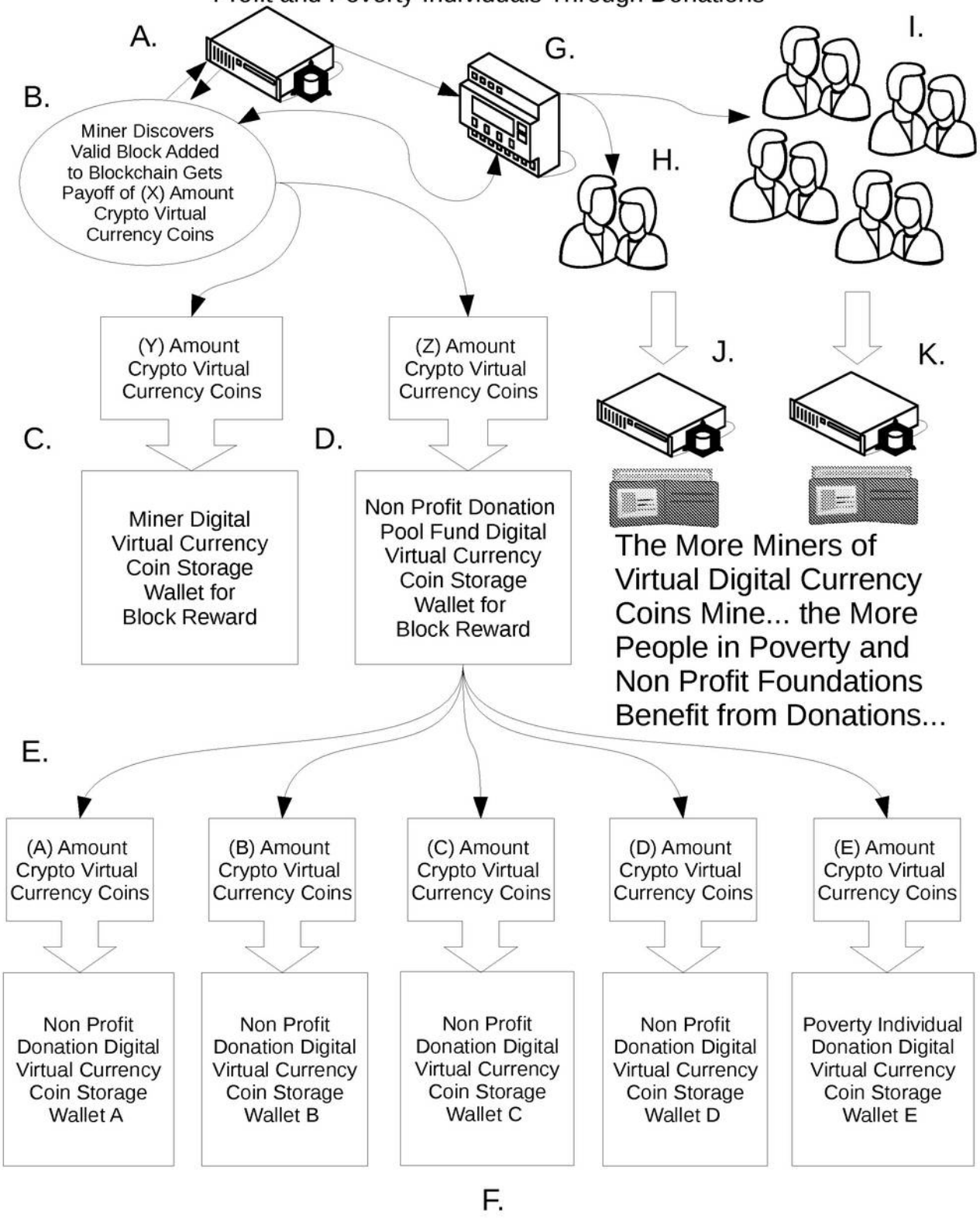


Fig. 2 Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit, For Profit and Poverty Individuals Through Donations

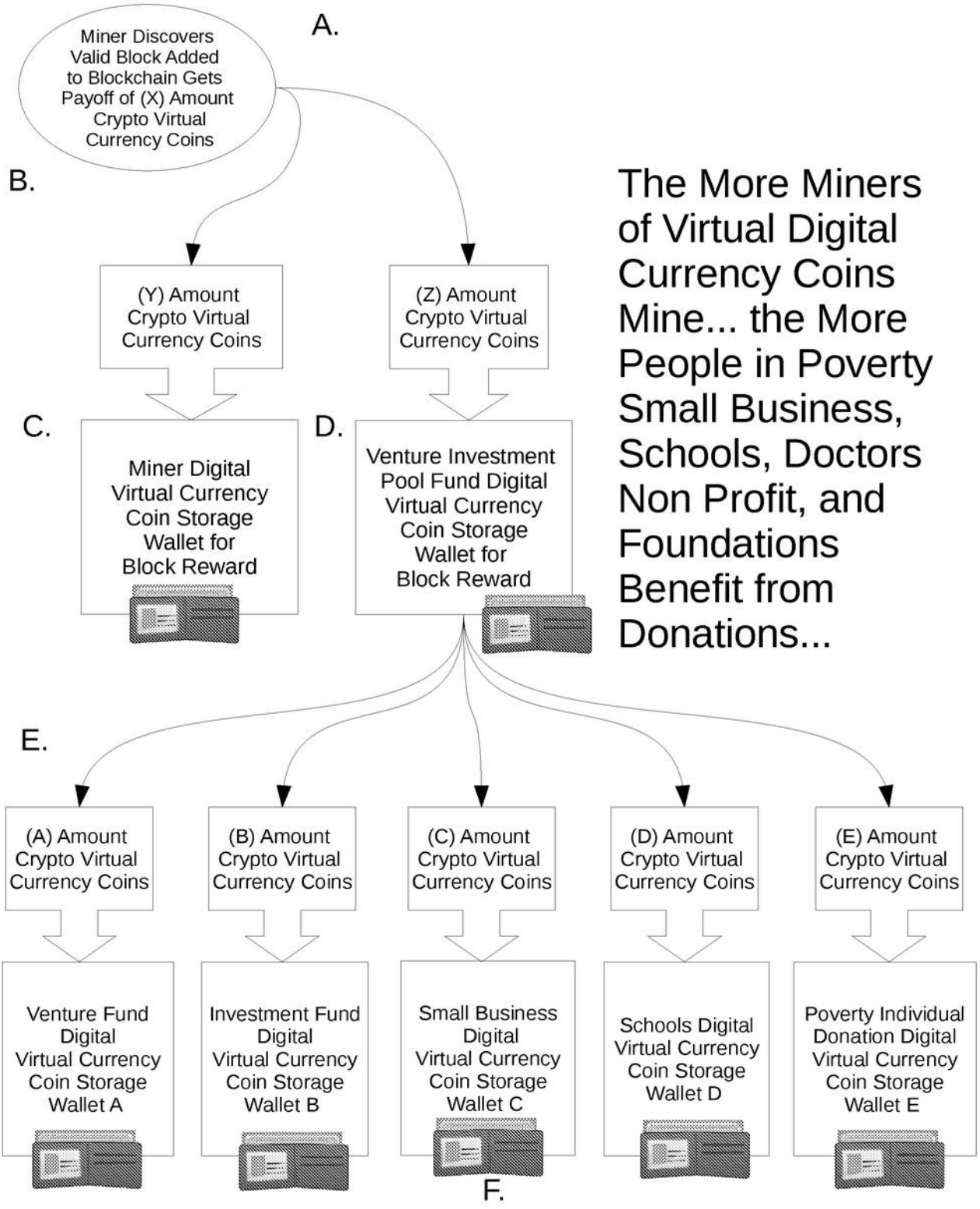


Fig. 3 Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit and Poverty Individuals Through Donations

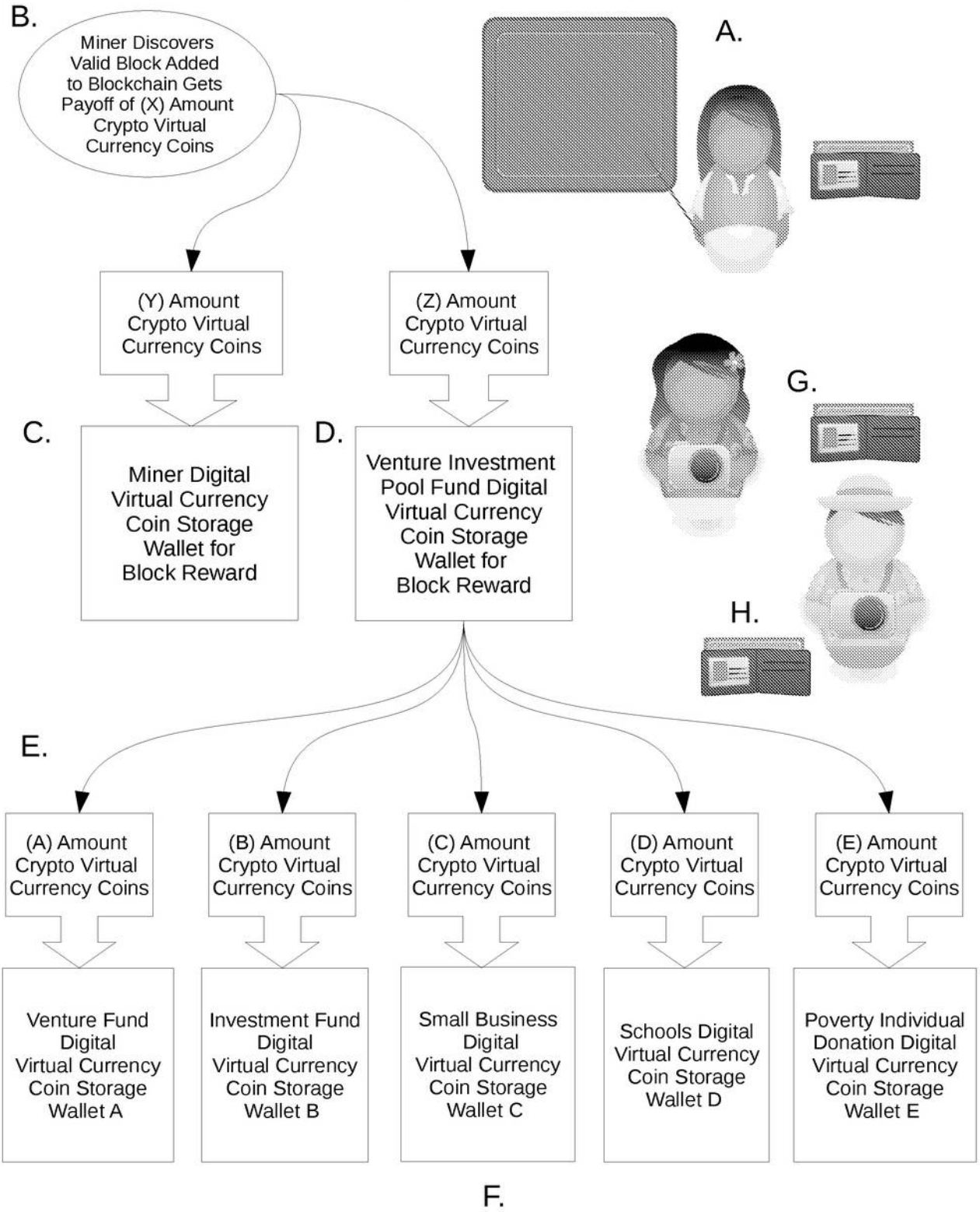


Fig. 4 Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit and Poverty Individuals Through Donations

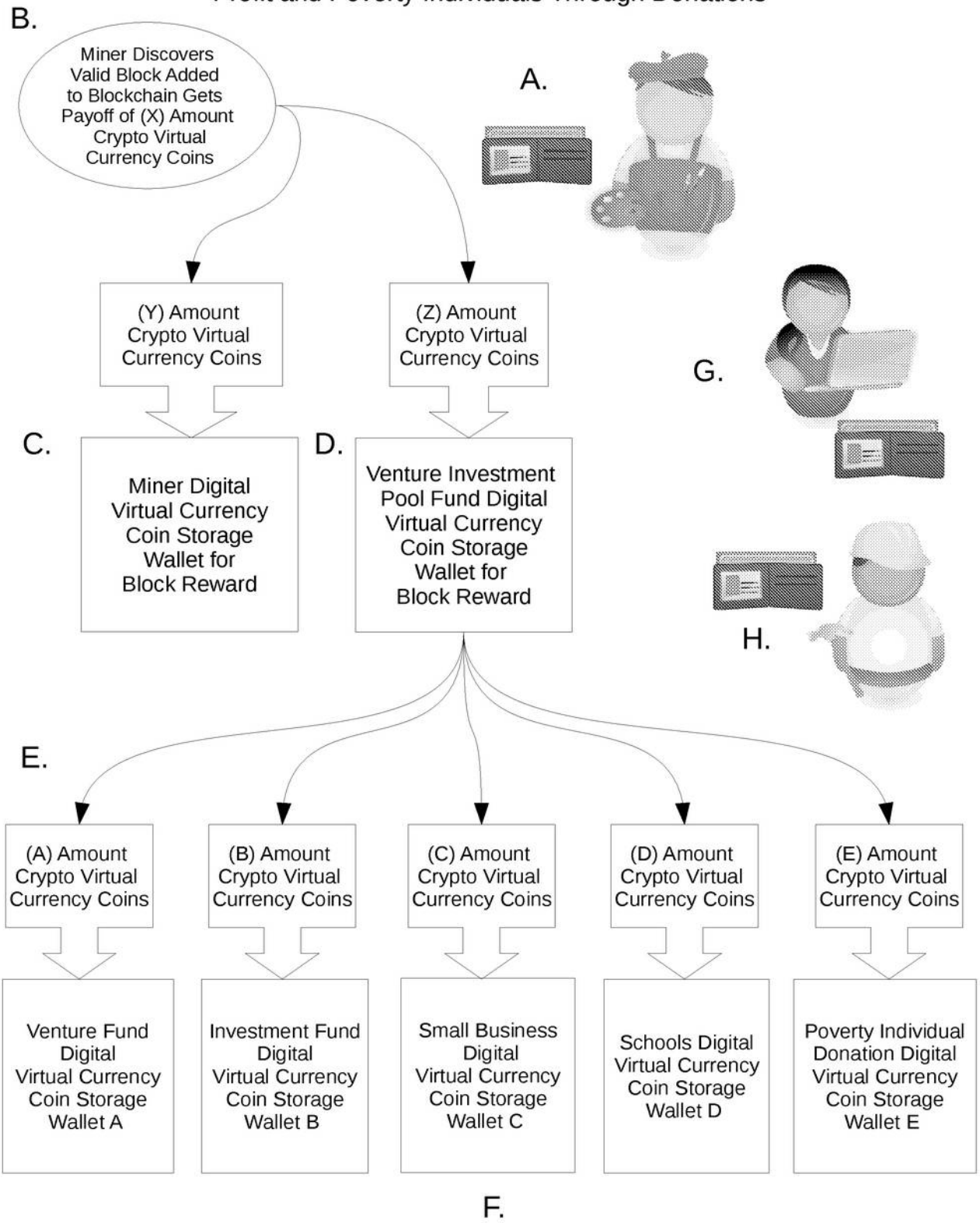


Fig. 5 Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit and Poverty Individuals Through Donations

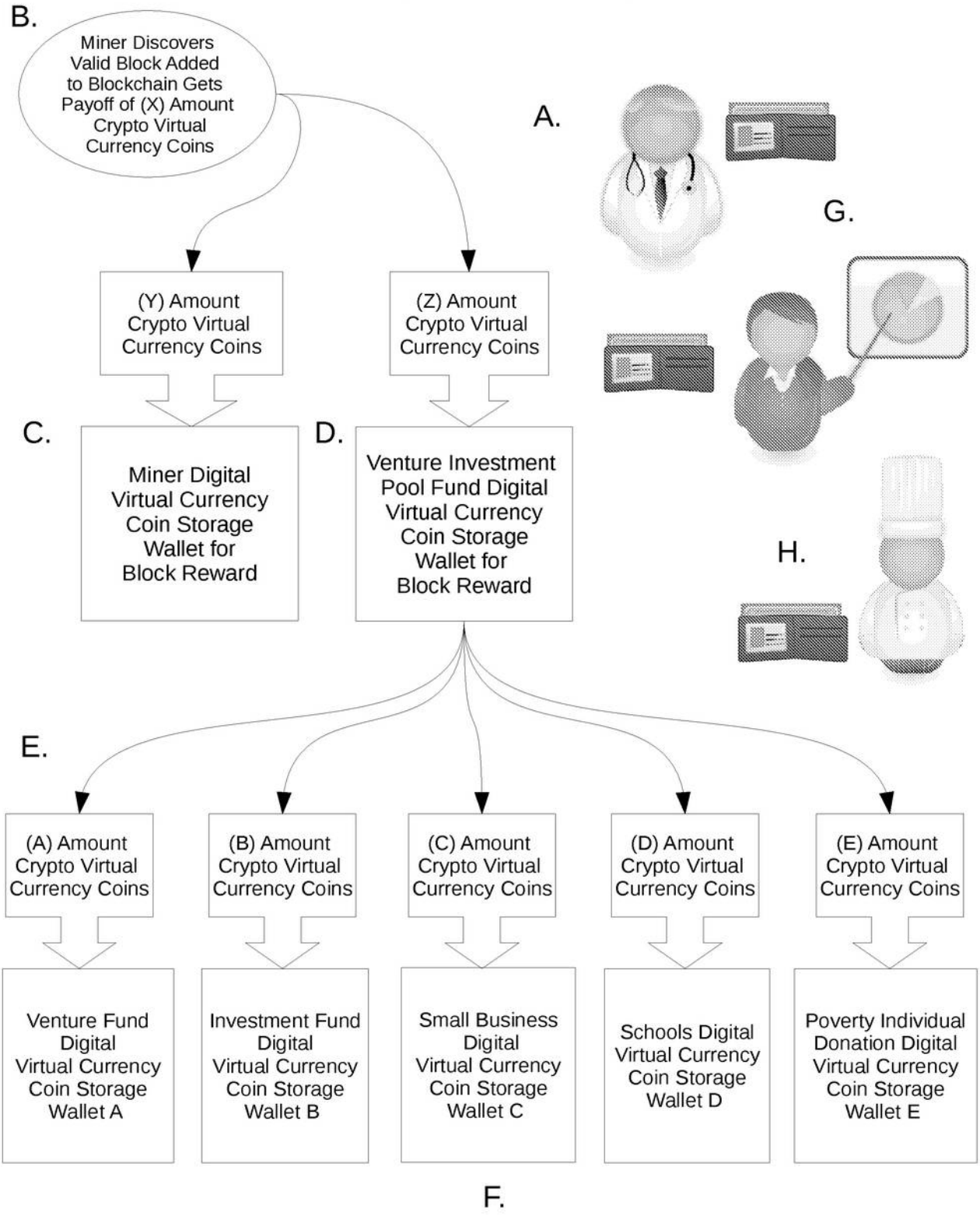
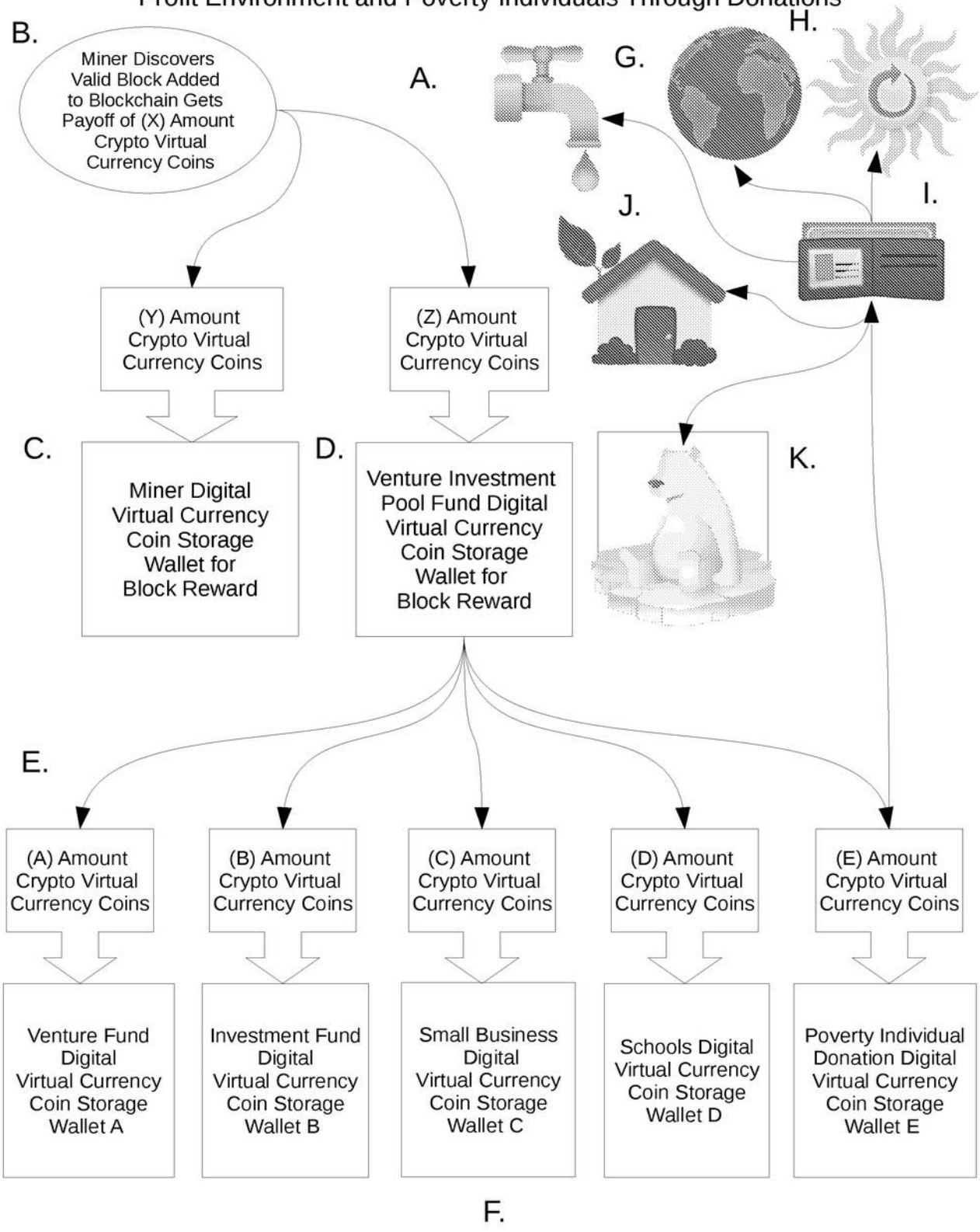


Fig. 6 Apparatus for Splitting Virtual Currency Mining Payoff Rewards with Non Profit Environment and Poverty Individuals Through Donations



Reference Used in coinasta® Algorithm:
A Programmable Computer Controller Apparatus with, the following programmed functions in the apparatus; a series of controls in industrial production processes controlling operations and actions of a machine or device; which also comprises a series of controls in measurement or test processes controlling the status and response of a measuring or testing device; and also comprises a series of technical processing of information or data for exchange or management of information or data external to a computer; and further comprises improvements to a computer system's internal performance for increased system running speed by setting or adjusting configurations and parameters; that comprises a process where; and comprises a communication apparatus comprising a transmitter and a receiver; and further comprises a communication apparatus comprising a transceiver and a processor configured to cause the transceiver to perform transmitting and receiving steps; and still further comprises a communication apparatus comprising a processor configured to perform or cause the apparatus to perform transmitting and receiving steps;

and also comprises a communication apparatus comprising a memory and a processor configured to enable transmitting and receiving steps to be performed by executing computer program codes stored in the memory; with a communication apparatus comprising means for transmitting and receiving is used for; the process where a block chain block reward is given for processing and discovering available blocks that are validated by a peer network in block chain mining by a miner; that is equal to a specified plurality of crypto currency coins awarded to the miner in block chain mining; after inclusion in the block chain and validation by the peers; and further comprising a process where an equal amount of crypto currency coins is awarded to a specific designated crypto currency coin wallet; and still further comprising a process where the designated crypto currency coin wallet is a pool funding wallet for use in donations, as funding for specific and specified non-profit and profit organizations; and further comprising; a process programmed into the block chain in the apparatus for dividing a specified amount of awarded crypto coins for successfully mining a block that is accepted by the crypto currency coin network of computer nodes; depositing the specified amount of awarded crypto coins for successfully mining a block that is accepted by the crypto currency coin network of computer nodes into a designated pool fund wallet;

for the purpose of advertising, promotion, and nonprofit and profit fund raising as part of the presented apparatus and processes. and further comprising; a process utilizing a plurality of emails, electronic books, social network advertising bots; for encouraging participation in worthy online activities where; for every vote; for every submission of ideas to a contest; for every contest recommendation; for every Advertisement; for every placement in social networks; where players will receive an airdrop which is defined in this case as where an airdrop is a distribution of a cryptocurrency token or coin, usually for free, to numerous crypto wallet addresses, of substantial defined in this case as of considerable importance, size, or worth, free defined as no charge for crypto coins sent as a gift; for their proof of work demonstrated; and further comprising the matching of the winning prizes of a contest; and still further comprising the doubling or plurality of doubling the prize, with an equal or larger amount of crypto coins awarded by the apparatus; utilizing emails; electronic books; file sharing; advertising; aggregation apparatus; for the purpose of advertising, promotion, non profit and profit fund raising as part of the presented apparatus and processes; and further comprising; a plurality of email, electronic book processes for; raising funding through nonprofits and profit businesses;

for the publishing of all the entries in a contest or think tank event involving ideas submitted by participants in a contest; producing an after the contest book, for distribution in helping humanity, animals, and the environment, and education; that further will give credit to each individual who participated in a the contest or think tank event in the book; for the purpose of advertising, promotion,

and fund raising as part of the presented apparatus and processes; and further comprising; a process using programmed computer processor and application for people in poverty to upload and show proof of work; through a single or plurality of electronic computer devices; a single or plurality of mobile phone devices; through the people's work of; telling stories; taking and sending pictures and videos; analyzing world ideas; giving their opinions on issues; creating ideas; creating solutions to problems; asking for advice; asking for help; asking for funding; submitting questions for others to answer; submitting helpful advice; for the purpose of earning crypto coins; and further for the purpose of exchanging crypto coins for useful things here defined as food, water, shelter, clothing, housing, energy, and chosen assets; and still further for the purpose of exchanging crypto coins for fiat currencies; and even still further for the purpose of advertising, promotion, and fund raising as an integral part of the presented apparatus and processes;

and further comprising; providing the option for the splitting up of the mining block discovery rewards into a plurality of digital wallets; and also comprising the option of splitting up of mining block rewards transaction fees into a plurality of digital wallets; and further comprising; an electronic apparatus combined with a software timer apparatus for consolidating long hashing block chain into a shorter hashing length; and further comprising a storage area on peer network nodes for storing old block chain; and further comprising reducing difficulty rate of mining related to timer consolidation events; and still further comprising where a percentage of a business where a portion of their mining block reward was contributed to from the split fund goes directly to the crypto miner who received the original block reward; and further comprising; comprising a crypto currency that is created with an unknown limit for mining; and further where the open mining community does not know how many blocks can ever be mined; and further comprising where a virtual crypto coin can have an infinite amount of coins mined only limited by the resources available for mining;

and still further comprising where the older mined virtual crypto currency coins mined have a substantially much higher value similar to artist proofs in limited edition print collecting than the newer mined coins; and further comprising where the block chain can be used to define the dates of each created block of coins for valuation in a game or financial system for; Trading; Buying Selling; Holding; Payoffs; Bartering; Tangible Evaluations here defined as; Fair Value; Fair Deal; Fair Share; Fair Price; Fair Placement; and still further comprising where a choice in positioning of the first block discovered in mining of virtual block chain crypto coins can be moved by the creator / founder / organization of the coin to a different position in the block chain ledger for the purpose of; Strengthening the game play; Changing the game play at specific intervals in time; Enhancing the life span and quality of the payment system in game play; Changing the Value of the payments systems infrastructure; at any time, or specified dates and times;

all part of the presented apparatus and invention; and further comprising an FPGA, ASIC and hard coded integrated circuit for applying functions; using a Computer Object De-Encryption Encryption File Algorithm (CODEFA) mechanism server for validation and proof of ownership of crypto coins; and further comprising using a human key or here defined as a digitally proven and verified live human representation of a specific individual person for validation and proof of ownership of Virtual Currency crypto block chain ledger coins; and further comprising; Mobile KWH Bank Battery Storage with block chain proof of ownership; and further comprising; Low Energy Wall Panel Apparatus connected to Wireless Electricity transferal with block chain proof of ownership; and further comprising a Wall Paneling Construction Smart Apparatus and System comprising; a stationary electrical access wall outlet panel apparatus; a plurality of low energy multiple color lasers; a plurality of solar photo voltaic cells; a plurality of solar concentration apparatus; a plurality of graphene super capacitor apparatus;

a plurality of organic battery storage units; a single or plurality of data storage devices; a plurality of USB, and USB Power Delivery energy connector apparatus; a plurality of USB communication ports; a plurality of electricity generator apparatus; a plurality of thermal electricity generating layers apparatus; a plurality of aqueous delivery apparatus; a plurality of cameras; a plurality of microphones; a plurality of speakers; a spatial point sound and light measurement controller apparatus; a wireless controller board; an LCD touchscreen display; a plurality of electricity converted to light transmitting apparatus; a plurality of light converted to electricity receiving apparatus; a plurality of graphene layered EMP protection apparatus; a human key or here defined as a digitally proven and verified live human representation of a specific individual person USB processor port for identification of authorized users; a human key or here defined as a digitally proven and verified live human representation of a specific individual person controller board; a main CPU controller board;

an energy and battery controller board; a plurality of computer processors; a plurality of 3D Solar panel with light intensity tracking apparatus; a plurality of multi layered graphene solar cell apparatus; and further comprising; An apparatus and process for executing a series of instructions on a computer system, the method comprising: registering a user and property account in a computer system; creating and attaching human identification keys or here defined as a digitally proven and verified live human representation of a specific individual person to the registered users account; creating and attaching object identification keys to the registered users property account; creating and attaching bank accounts to the registered users account; creating aggregated data, and media from stored databases,or real time life events utilizing a module; creating a website search software application either from tables on the server, from aggregated data or by the entry of a search item utilizing a module;

creating a Fractional opportunity, utilizing a Fractional Request Module; providing taking a real or intangible property and dividing it into a plurality of pieces for the purpose of monetizing, creating liquidity, collaborating, sharing and making payments; providing the ability to create a divisible, divided second property from a real or intangible first property, for the purpose of creating liquidity, monetizing it, or creating greater value for the piece or pieces; providing the ability to create an assembled second property from real or intangible first property, or a plurality of first properties for the purpose of creating liquidity, monetizing it, or creating greater value for a piece or pieces; creating Publicity for created or re-purposed properties utilizing a Self Publishing Publicity module; sharing a Fractional opportunity with users in a network; creating a Fair Value utilizing a module; that calculates the amount of money that something is worth, the price or cost of something, in a fair way to all users; creating a Fair Share opportunity utilizing a module, that calculates a portion belonging to, due to, or contributed by an individual or group;

creating a Fair Deal utilizing a module, that calculates how to give (something or an amount of something) to someone, to buy and sell as a business, and additionally to reach or try to reach a state of acceptance or reconciled agreement from users in a network about real tangible or intangible object transactions; creating a Fair Price utilizing a module, that calculates the amount of money that you pay for something or that something costs, and calculates the thing that is lost, damaged, or given up in order to get or do something, and additionally calculates the amount of money needed to persuade users in a network to do something, and additionally calculates the quantity of one thing that is exchanged or demanded in barter or sale for another thing, and additionally calculates the amount of money given or set as consideration for the sale of a specified thing all in a fair way to the users in the network; creating a Fair Placement utilizing a module, that calculates putting something in a particular place, and finding an appropriate place for someone to live, work, or learn, or placing an object, advertisement, or website in a strategic location for best possible results, in a fair way to users in a network;

creating a Micro Share Request utilizing a module, that calculates small shares of things, objects, real or intangible properties and makes an offer for a user in a network, for a fraction of the original item; creating a Fractional Request utilizing a module, that calculates separating components of a transaction, real or intangible property, or object through differences, determined by using modules in the system to create potential and actual deals, suggestions, motivations, or incentive to play, and potential and actual transactions; creating requests utilizing a module asking for collaborations related to the dividing of properties in a network for the benefit of the individual users in a network; providing the ability to create a new property by transforming other properties utilizing modules; providing the ability to take an original property and transforming it into a new property utilizing a module;

providing the ability to transform Fractional Objects divided pieces of real or intangible properties and original properties into a currency, or currencies utilizing a module; utilizing modules that work within software, a computer processor, or System on Chip integrated circuit, in a virtual world network, and/or non virtual network; and further comprising; providing a distributed block chain to independently verify the chain of ownership of any shared piece created from real or intangible properties transformed into a fraction of the original property; providing a distributed block chain live tracking to independently verify the transactions of buying, selling, trading, bartering, with fair value or market value amounts set of any shared piece created from real or intangible properties transformed into a fraction of the original property in the network system;

providing a distributed block chain recording of any activities related to changing, transforming, altering valuations, or destruction of any shared piece created from real or intangible properties transformed into a fraction of the original property in a system network; providing a shared fractional payment platform; providing a digital semantic agent for creating; color band currencies from divided pieces; a rating attached to divided pieces; the conversion of pieces into currencies at time of registration; color band requests for participation; monetary values attached to requests at the time of dividing pieces; providing a negotiation digital semantic agent for negotiations on requested newly created properties.

13. Conclusion

We have proposed a system for electronic transactions without relying on trust. We started with the usual framework of coins made from digital signatures, which provides strong control of ownership, but is incomplete without a way to prevent double-spending. To solve this, we proposed a peer-to-peer network using proof-of-work to record a public history of transactions that quickly becomes computationally impractical for an attacker to change if honest nodes control a majority of CPU power. The network is robust in its unstructured simplicity. Nodes work all at once with little coordination. They do not need to be identified, since messages are not routed to any particular place and only need to be delivered on a best effort basis. Nodes can leave and rejoin the network at will, accepting the proof-of-work chain as proof of what happened while they were gone. They vote with their CPU power, expressing their acceptance of valid blocks by working on extending them and rejecting invalid blocks by refusing to work on them. Any needed rules and incentives can be enforced with this consensus mechanism.

We have proposed an autonomous blockchain network connected to a machine learning engine for contributions to a real human supporting beneficiary decision engine related to security, tracking, and certification of the mined, transacted, contributed, crypto virtual currency, that can be used to solve the grand challenges of mankind. A crypto graphic, blockchain, peer to peer self managing, fair valuation, consensus system and algorithm for the purpose of generating funding resources, to generate positive, healthy, and fair solutions for reducing poverty, protecting animals, wildlife and the environment.

References:

Atkeson, Christopher G., Moorey, Andrew W., Schaalz, Stefan, Moore, Andrew W and Schaal, Stefan, 1997. Locally Weighted Learning. Artificial Intelligence, 11:1173. doi:10.1023/A:1006559212014.

A. Back, "Hashcash - a denial of service counter-measure," http://www.hashcash.org/papers/hashcash.pdf, 2002.

A. Denny Ellerman, Paul L. Joskow, and David Harrison Jr., Emissions Trading in the U.S.: Experience, Lessons, and Considerations for Greenhouse Gases, Pew Center on Global Climate Change, 2003.

Albert Gore and Scott Adams, Businesslike Government: Lessons Learned from America's Best Companies, Washington, D.C.: National Performance Review, 1997;

Antonoglou, Ioannis, Panneershelvam, Veda, Lanctot, Marc, Dieleman, Sander, Grewe, Dominik, Nham, John, Kalchbrenner, Nal, Sutskever, Ilya, Lillicrap, Timothy, Leach, Madeleine, Kavukcuoglu, Koray, Graepel, Thore and Hassabis, Demis, 2016. Mastering the game of Go with deep neural networks and tree search. Nature, 529(7587):484489.doi:10.1038/nature16961.

Beatriz Armendáriz de Aghion and Jonathan Morduch, The Economics of Microfinance, Cambridge, Mass.: The MIT Press, 2005:21.

Behnke, Sven,2006. Online trajectory generation for omnidirectional biped walking. Proceedings - IEEE InternationalConference on Robotics and Automation, 2006(May):15971603. doi:10.1109/ROBOT.2006.1641935.

Benbrahim, H, Doleac, J S, Franklin, J A and Selfridge, O G, 1992. Real-time learning: a ball on a beam. International Joint Conference on Neural Networks, 1992. IJCNN, 1:98103.doi:10.1109/IJCNN.1992.287219.

Bernstein, Andrey and Shimkin, Nahum, 2010. Adaptive-resolution reinforcement learning with polynomial exploration in deterministic domains. Machine Learning, 81(1999):359397.doi:10.1007/s10994-010-5186-7.

Bertsekas, Dimitri P., 2013. Lambda-Policy Iteration: A Review and a New Implementation. In Reinforcement Learning and Approximate Dynamic Programming for Feedback Control,pages 379409. ISBN 9781118104200. doi:10.1002/9781118453988.ch17.

Bitcoin: A Peer-to-Peer Electronic Cash System Satoshi Nakamoto satoshin@gmx.com www.bitcoin.org https://bitcoin.org/bitcoin.pdf.

Borchani, Hanen, Varando, Gherardo, Bielza, Concha and Larrañaga, Pedro, 2015. A survey on multi-output regression. Wiley Interdisciplinary Reviews:Data Mining and Knowledge Discovery, 5(5):216233. doi:10.1002/ widm.1157.

Breiman, L, Friedman, J H, Olshen, R A and Stone, C J, 1984. Classication and Regression Trees, volume 19. ISBN 0412048418. doi:

Breiman, Leo, 1996. Bagging predictors. Machine Learning,24(2):123140. doi:10.1007/BF00058655.

Brochu, Eric, Cora, Vlad M and December, Freitas, 2010. A Tutorial on Bayesian Optimization of Expensive Cost Functions, with Application to Active User Modeling and Hierarchical Reinforcement Learning.

Charles Wolf Jr., Markets or Government: Choosing Between Imperfect Alternatives, 2nd ed., Cambridge, Mass.: MIT Press, 1993.

Charting Impact resources for GuideStar profiles Evaluation and Measurement of Outcomes | National Council of Nonprofits.

Christine Letts, William P. Ryan, and Allen Grossman, High Performance Nonprofit Organizations: Managing Upstream for Greater Impact, New York: Wiley, 1999.

Clayton M. Christensen et al., “Disruptive Innovation for Social Change,” Harvard Business Review, 84, no. 12, 2006: 96.

Cynthia Massarsky, “Coming of Age: Social Enterprise Reaches Its Tipping Point,”

D. Bayer, S. Haber, W.S. Stornetta, "Improving the efficiency and reliability of digital time-stamping,"

Data Playbook (Shusterman Foundation)

David Vogel, The Market for Virtue: The Potential and Limits of Corporate Social Responsibility, Washington, D.C.: Brookings Institution Press, 2005: 28.

De Boer, Pieter Tjerk, Kroese, Dirk P., Mannor, Shie and Rubinstein, Reuven Y., 2005. A tutorial on the cross-entropy method. Annals of Operations Research, 134(1):1967.doi:10.1007/s10479-005-5724-z.

Deisenroth, Marc P and Rasmussen, Carl Edward, 2011. PILCO: A Model- Based and Data-Ecient Approach to Policy Search. Icml, pages 465472.

Eric Nee and Martin Eakes, “15 Minutes: Interview with Martin Eakes,” Stanford Social Innovation Review<, 5, no. 3, 2008.

Ernst, Damien, Geurts, Pierre and Wehenkel, Louis, 2005. Tree-Based Batch Mode Reinforcement Learning. Journal of Machine Learning Research, 6(1):503556.

Evaluating advocacy (National Council of Nonprofits)

Everett M. Rogers, Diffusion of Innovations, 5th ed., New York: Free Press, 2003. For an example of the successful diffusion of an ineffective innovation.

For a more detailed discussion, see Public Goods and Market Failures: A Critical Examination, edited by Tyler Cowen, New Brunswick, N.J.: Transaction Publishers, 1992.

Getting started with data driven decision making (workbook from NTEN)

Geurts, Pierre, Ernst, Damien and Wehenkel, Louis, 2006. Extremely randomized trees. Machine Learning, 63(1):342. doi:10.1007/

Gittins, Jc, Gittins, Jc, Jones, Dm and Jones, Dm, 1979. A dynamic allocation index for the discounted multiarmed bandit problem. Biometrika, 66(3):561565. doi:10.2307/2335176.

Grameen Bank's financial statements reveal Yunus's salary in 2006 to be
H. Massias, X.S. Avila, and J.-J. Quis S. Haber, W.S. Stornetta, "How to time-stamp a digital document," In Journal of Cryptology, vol 3, no 2, pages 99-111, 1991.

Hansen, Nikolaus and Ostermeier, Andreas, 2001. Completely Derandomized Self-Adaptation in Evolution Strategies. Evolutionary Computation, 9(2):159195. doi:10.1162/106365601750190398.

Hansen, Nikolaus, Müller, Sibylle D and Koumoutsakos, Petros, 2003. Reducing the time complexity of the derandomized evolution strategy with covariance matrix adaptation (CMA-ES). Evolutionary computation, 11(1):118. doi:10.1162/106365603321828970.

Heidrich-Meisner, Verena and Igel, Christian, 2009. Uncertainty handling CMA-ES for reinforcement learning. Proceedings ofthe 11th Annual conference on Genetic and evolutionary computation - GECCO '09, page 1211. doi:10.1145/1569901.1570064.

Hofer, Ludovic and Gimbert, Hugo, 2016. Online Reinforcement Learning for Real-Time Exploration in Continuous State and Action Markov Decision Processes.In PlanRob2016,Proceedings ofthe 4th Workshop on Planning and Robotics at ICAPS2016. AAAI.

Hofer, Ludovic and Rouxel, Quentin, 2017. An Operational Method Toward Ecient Walk Control Policies for Humanoid Robots. In ICAPS 2017.

Hoffman, Matthew, Brochu, Eric and Freitas, Nando De, 2011. Portfolio Allocation for Bayesian Optimization. Conference on Uncertainty in Articial Intelligence, pages 327336.

How do we build the capacity of nonprofits to evaluate, learn, and improve? (GEO)

How to Research a Nonprofit—Light-Touch Approach | Bridgespan
https://www.bridgespan.org/insights/library/philanthropy/nonprofit-due-diligence-donor-decision-tool/how-to-research-a-nonprofit-lig… 6/8 1/27/2021

https://www.councilofnonprofits.org ools-resources/evaluation-and-measurement-of-outcomes 2/2

Ijspeert, Auke Jan, Nakanishi, Jun, Hoffmann, Heiko, Pastor, Peter and Schaal, Stefan, 2013. Dynamical movement primitives: learning attractor models for motor behaviors.Neural computation, 25(2):32873. doi: 10.1162/NECO_a_00393.

J. Gregory Dees and Beth Battle Anderson, “Framing a Theory of Social Entrepreneurship: Building on Two Schools of Thought and Practice,” in Research on Social Entrepreneurship: Understanding and Contributing to an Emerging Field: ARNOVA’s Occasional Paper Series, edited by Rachel Mosher-Williams, Washington, D.C.: Association for Research on Nonprofit and Voluntary Organizations, 2006: 39-66.

J. Gregory Dees, “The Meaning of ‘Social Entrepreneurship,’” Center for the Advancement of Social Entrepreneurship, 2001.

J.T. Hage, “Organizational Innovation and Organizational Change,” Annual Review of Sociology, 25, 1999; and Patricia H. Thornton, “The Sociology of Entrepreneurship,” Annual Review of Sociology, 25, 1999).

James C. Collins, Good to Great and the Social Sectors: A Monograph to Accompany Good to Great, 1st ed., Boulder, Colorado.

Jim Collins, 2005; Mark Harrison Moore, Creating Public Value: Strategic Management in Government, Cambridge, Mass.: Harvard University Press, 1995;

John Elkington and Pamela Hartigan, The Power of Unreasonable People: How Social Entrepreneurs Create Markets That Change the World, Boston: Harvard Business School Press, 2008.

John McMillan, Reinventing the Bazaar: A Natural History of Markets, New York: W.W. Norton & Company, 2002;

Joshua Humphreys et al., 2005 Report on Socially Responsible Investing Trends in the United States, Washington, D.C.: Social Investment Forum, 2006.

Kirkpatrick, S., Gelatt, C. D. and Vecchi, M. P., 1983. Optimization by Simulated Annealing. Science, 220(4598):671680.doi:10.1126/science.220. 4598.671.

Kober, Jens and Peters, Jan, 2012. Reinforcement Learning in Robotics: A Survey. In Marco Wiering and Martijn van Otterlo, editors, Reinforcement Learning: State-of-the-Art, pages 579610. Springer Berlin Heidelberg.

Kober, Jens, Kober, Jens and Peters, Jan, 2009. Policy search for motor primitives in robotics. NIPS 2008, pages 849-856.

Koenig, Sven and Simmons, Reid G., 1996. The eect of representation and knowledge on goal-directed exploration with reinforcement-learning algorithms. Machine Learning, 22(1-3):227250.doi:10.1007/BF00114729.

Kohavi, Ron, 1995. A Study of Cross-Validation and Bootstrap for Accuracy Estimation and Model Selection.In Appears in the International Joint Conference on Articial Intelligence (IJCAI), pages 17. ISBN 1-55860-363-8. doi:10.1067/mod.2000.109031.

LaValle , Steven M. “Planning Algorithms” Copyright 2006 Cambridge University Press, 842 pages

Lemon, Stephenie C, Roy, Jason, Clark, Melissa A, Friedmann, Peter D and Rakowski, William, 2003. Classication and Regression Tree Analysis in Public Health: Methodological Review and Comparison With Logistic Regression.The Society of Behavioral Medicine, 26(3):172181. doi:Doi10. 1207/S15324796abm2603_02.

Li, Lihong, Littman, Michael L. and Mansley, Christopher R., 2009. Online exploration in least-s on Autonomous Agents and Multiagent Systems, pages 733739.

Logic Model Development Guide (W.K. Kellogg Foundation)
Loh, Wei-Yin, 2011. Classication and regression trees. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, 1(1):1423. doi: 10.1002/widm.8.

Mark Harrison Moore, Creating Public Value: Strategic Management in Government, Cambridge, Mass.: Harvard University Press, 1995;

McCallum, A K, 1996. Reinforcement learning with selective perception and hidden state.PhD thesis.

McGeer, T., 1990. Passive Dynamic Walking. The International Journal of Robotics Research, 9(2):6282.doi:10.1177/027836499000900206. Decision-making algorithms for autonomous robots 121.

Measuring Outcomes (US Dept. of Health and Human Services, Compassion Capital Fund)

Mechanism, n.,” The Oxford English Dictionary OED Online, Oxford University Press, 2008. Paul Light makes exactly this point in his plea to broaden the definition of social entrepreneurship in his fall 2006 Stanford Social Innovation Review article, but this stretches the fundamental meaning of entrepreneurship. Hence we still see innovation as a better tool for analyzing social innovations.

Meuleau, Nicolas, Benazera, Emmanuel, Brafman, Ronen I., Hansen, Eric A. and Mausam, 2009. A Heuristic Search Approach to Planning. J. Artif. Int. Res., 34:2759.

Nemec, Bojan, Zorko, Matej and Zlajpah, Leon, 2010. Learning of a ball-in-a-cup playing robot. In 19th International Workshop on Robotics in Alpe-Adria-Danube Region, RAAD 2010 - Proceedings, pages 297301. ISBN 9781424468867d.oi:10.1109/RAAD.2010.5524570.

Ng, Andrew Y and Jordan, Michael, 2000. PEGASUS: A Policy Search Method for Large MDPs and POMDPs. Conference on Uncertainty in Articial Intelligence, 94720:406415.doi:10.1.1.81.1085.

Ng, Andrew Y, Kim, H Jin, Jordan, Michael I and Sastry, Shankar, 2004. Inverted autonomous helicopter ight via reinforcement learning. In International Symposium on ExperimentalRobotics.

Notions of social objectives, public value, and public good and externalities can be found in J. Gregory Dees, Social Enterprise: Private Initiatives for the Common Good, Boston: Harvard Business School, 1994;

Nouri, Ali and Littman, Michael L., 2009. Multi-resolution Exploration in Continuous Spaces. Advances in Neural Information Processing Systems, pages 12091216.

Outcomes matter (Nonprofit Finance Fund and Federal Reserve Bank of San Francisco)

Paul Light, “Searching for Social Entrepreneurs: Who They Might Be, Where They Might Be Found, What They Do,”

Pazis, Jason and Lagoudakis, Michail G, 2009. Binary action search for learning continuous-action control policies. Proceedings ofthe 26th International Conference on Machine Learning (ICML), pages 793800. doi: http://doi.acm.org/10.1145/1553374.1553476.

Peters, Jan and Schaal, Stefan, 2006. Policy Gradient Methods for Robotics. In 2006 IEEE/RSJ International Conference on Intelligent Robots and Systems,pages 22192225. ISBN 1-4244-0258-1. doi:10.1109/IROS. 2006.282564.

R.C. Merkle, "Protocols for public key cryptosystems," In Proc. 1980 Symposium on Security and Privacy, IEEE Computer Society, pages 122-133, April 1980.

Rasmussen, Carl Edward and Deisenroth, Marc Peter, 2008. Probabilistic Inference for Fast Learning in Control.Learning, (July).

Rasmussen, Carl Edward, 2006. Gaussian processesfor machine learning. International journal of neural systems,14(2):69106. doi:10.1142/S0129065704001899.

Read about organizational self-assessments and the self-assessment process for a nonprofit board. (National Council of Nonprofits).

Research on Social Entrepreneurship: Understanding and Contributing to an Emerging Field: ARNOVA’s Occasional Paper Series, edited by Rachel Mosher- Williams, Washington, D.C.: Association for Research on Nonprofit and Voluntary Organizations, 2006.

Research on Social Entrepreneurship: Understanding and Contributing to an Emerging Field: ARNOVA’s Occasional Paper Series, edited by Rachel Mosher-Williams, Washington, D.C.: Association for Research on Nonprofit and Voluntary Organizations, 2006: 13-37.

Rosabeth M. Kanter, The Change Masters: Innovation and Entrepreneurship in the American Corporation, New York: Simon & Schuster, 1983: 20;

Rouxel, Quentin, Passault, Gregoire,Hofer, Ludovic, N'Guyen, Steve and Ly, Olivier, 2016. Learning the odometry on a small humanoid robot. In Danica Kragic, Antonio Bicchi and Alessandro De Luca,

editors, 2016 {IEEE} International Conference on Robotics and Automation, {ICRA} 2016, Stockholm, Sweden, May 16-21, 2016, pages 18101816. IEEIES.BN 978-1-4673-8026-3d.oi:10.1109/ICRA.2016.7487326. 122 Ludovic Hofer.

Roy, Nicholas and Thrun, Sebastian, 1999. Online self-calibration for mobile robots. In Robotics and {Automation}, 1999. {Proceedings}. 1999 {IEEE} {International} {Conference} on, volume 3, pages 22922297. IEEE.

Rubinstein, Reuven Y, 1999. The Cross-Entropy Method for Combinatorial and Continuous Optimization. Methodology and Computing in Applied Probability, 1(2):127190. doi:10.1007/s11009-008-9101-7. s10994-006-6226-1.

Sanner, Scott, Delgado, Karina Valdivia and de Barros, Leliane Nunes, 2012. Symbolic Dynamic Programming for Discrete and Continuous State MDPs. In Proceedings of the 26th Conference on Articial Intelligence, volume 2. ISBN 978-0-9749039-7-2.

Santamaria, J. C., Sutton, R. S. and Ram, A., 1997. Experiments with Reinforcement Learning in Problems with Continuous State and Action Spaces. Adaptive Behavior, 6(2):163217. doi:10.1177/105971239700600201.

Sarah A. Soule, “The Diffusion of an Unsuccessful Innovation: The Case of the Shantytown Protest Tactic,” The Annals of the American Academy of Political and Social Science, 566, November 1999.

Scherrer, Bruno, 2013. Performance bounds forλ policy iteration and application to the game of tetris. Journal of Machine Learning Research, 14(1):11811227.

Se S. Haber, W.S. Stornetta, "Secure names for bit-strings," In Proceedings of the 4th ACM Conference on Computer and Communications Security, pages 28-35, April 1997.

Silver, David, Huang, Aja, Maddison, Chris J., Guez, Arthur, Sifre, Laurent, van den Driessche, George, Schrittwieser, Julian,

Skoll Foundation, “Background on Social Entrepreneurship,” Schwab Foundation for Social Entrepreneurship,

State of Evaluation: Evaluation Capacity and Practice in the Nonprofit Sector (Innovation Network)

T.M. Amabile, “A Model of Creativity and Innovation in Organizations,” in Research in Organizational Behavior, edited by Barry M. Staw and L.L. Cummings, Greenwich, Conn.: JAI Press, 1988.

The Sources of Innovation; and John E. Ettlie, William P. Bridges, and Robert D. O’Keefe, “Organization Strategy and Structural Differences for Radical Versus Incremental Innovation,” Management Science, 30, no. 6, 1984.

The State of Evaluation in Colorado's Nonprofit Sector (The Colorado Trust, CO Nonprofits, Community Resource Center)

Tip sheets and other free evaluation resources (Point K Learning Center - Innovation Network)

W. Dai, "b-money," http://www.weidai.com/bmoney.txt, 1998.

W. Feller, "An introduction to probability theory and its applications," 1957.

Wang, H O, Tanaka, K and Griffin, M F, 1996. An approach to fuzzy control of nonlinear systems:Stability and design issues.Ieee Transactions on Fuzzy Systems, 4(1):1423.doi:10.1109/91.481841.

Weinstein, Ari and Littman, ML, 2013. Open-Loop Planning in Large-Scale Stochastic Domains. In 27th AAAI Conference on Articial Intelligence, volume 1, pages 14361442.ISBN 9781577356158.

What Is a Social Entrepreneur?" Ashoka, "What Is a Social Entrepreneur?" and

William B. Gartner, "'Who Is an Entrepreneur?' Is the Wrong Question,"American Journal of Small Business, 12, no. 4, 1988; and Jane Wei-Skillern et al., Entrepreneurship in the Social Sector, Thousand Oaks, Calif.: Sage, 2007.

William Drayton, "Everyone a Changemaker: Social Entrepreneurship's Ultimate Goal," Innovations, 1, no. 1, 2006.

William J. Abernathy and James M. Utterback, "Patterns of Industrial Innovation," Technology Review, 80, no. 7, 1978; and Eric von Hippel, The Sources of Innovation, New York: Oxford University Press, 1988.

Williams, Ronald and Baird, Leemon C., 1994. Tight Performance Bounds on Greedy Policies Based on Imperfect Value Functions Proceedings of the Eighth Yale Workshop on Adaptive and Learning Systems, pages 108113. Decision-making algorithms for autonomous robots.

i https://www.investopedia.com erms/i/international-poverty-line.asp

ii Hickel, Jason (1 November 2015). "Could you live on $1.90 a day? That's the international poverty line". *The Guardian*. ISSN 0261-3077. Retrieved 10 January2017.

iii "Indicators of Poverty and Hunger" (PDF). Retrieved 14 February 2008.

ivWikipedia contributors. "Poverty threshold." *Wikipedia, The Free Encyclopedia*. Wikipedia, The Free Encyclopedia, 26 Feb. 2021. Web. 3 Mar. 2021.

v Hickel, Jason (1 November 2015). "Could you live on $1.90 a day? That's the international poverty line". *The Guardian*. ISSN 0261-3077. Retrieved 10 January2017.

vi https://www.wsws.org/en/articles/2015/07/11/poor-j11.html

vii https://www.worldometers.info/world-population/