Implementing A Church–Turing–Deutsch Principle Machine on a Blockchain.

Abstract:

Genetic algorithms are the basic elements of a brand new computer world. Technology has exponentially evolved in recent years

But not in software terms, hardware. Genetic engineering

This gap in areas such as Algorithms (GAs)

Big data mining, predictions for protein folding, finance, etc.

We present in this document the opportunity to use a

Medium like a "Unlimited Single Taped Turing."

Blockchain for the storage of a genetic algorithm

Offer complete turing.

Introduction:

(genatic Algorithm)The goal of such an

initiative would be no other than reach what we now describe

as “Artificial Intelligence”.

Prerequisite:

1. Genetic Algorithm
    - Chaotic Genetic Algorithm
    - Swarm Intelligence
2. Cellular Automaton
    - 110 Rule
3. ChurchTuring thesis
4. Universal Computing Device
5. Blockchain
    - SHA-256
6. Bitcoin
7. Proof Of work
8. Consensus
9. Decider
10. Two Stack Push Down Automaton

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Paper : In this paper we present that it is theoretically possible for a Turing-Complete algorithm, like a Cellular Automaton based on rule 110, to be implemented on an Unbounded Single Taped Turing Medium such as a Blockchain.

1.What does computable means?

- Computable means any mathematically operation can pe perform by computer is known as computable

Turing machine:

Turing machines are theoretical computers defined by Alan Turing in his highly influential paper titled On Computable Numbers, with an application to the Entscheidungsproblem, published 1936. Turing machines are abstract mathematical constructs that help us describe in a rigorous fashion what we mean by computation.

Alnozo Church:Lamda calculus:

Lambda calculus (also written as λ-calculus) is a formal system in mathematical logic for expressing computation based on
function abstraction and application using variable binding and substitution. It is a universal model of computation that can be used to simulate any Turing machine. It was introduced by the mathematician Alonzo Church in the 1930s at the age of 27 as part of his research into the foundations of mathematics.

Church–Turing–Deutsch principle. The principle states that a **Universal Computing Device** can simulate every physical process

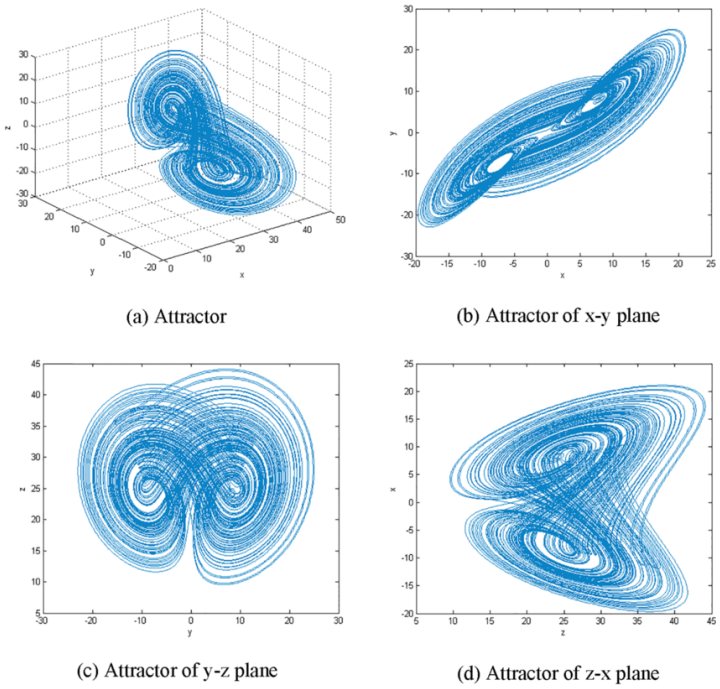
Blockchain: **Blockchain** is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system.
A **blockchain** is essentially a digital ledger of transactions that is duplicated

and distributed across the entire network of computer systems on the **blockchain**

consensus algorithm is a mechanism that allows users or machines to coordinate in a distributed setting. It needs to ensure that all agents in the system can agree on a single source of truth, even if some agents fail. In other words, the system must be fault-tolerant

Genetic Algorithm (GA) is a search-based optimization technique based on the principles of **Genetics and Natural Selection**. It is frequently used to find optimal or near-optimal solutions to difficult problems which otherwise would take a lifetime to solve. It is frequently used to solve optimization problems, in research, and in machine learning

Chaos: *When the present determines the future, but the approximate present does not approximately determine the future.*



(a) Attractor

(b) Attractor of x-y plane

(c) Attractor of y-z plane

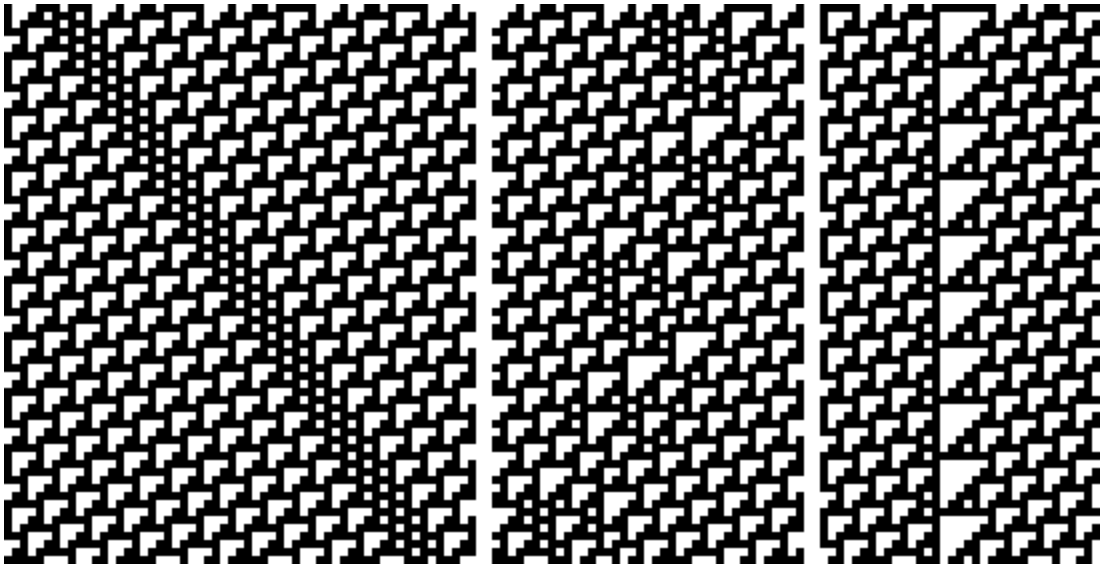
(d) Attractor of z-x plane

The most important observation within the Natural Evolutionary procedure through out the years, seems to be the randomization factor. Random mutations led to new genetic characteristics and Natural Selection decided if the characteristic will remain dominant to the next generations. Whenever the randomization exceeded a certain level, the subject would die out and could not survive. The mutations had to be minimal and the iteration process naturally selectable. On a philosophical perspective side note, one could say that whoever designed the Universe, has carefully designed a Randomization Engine as a prerequisite to its existence

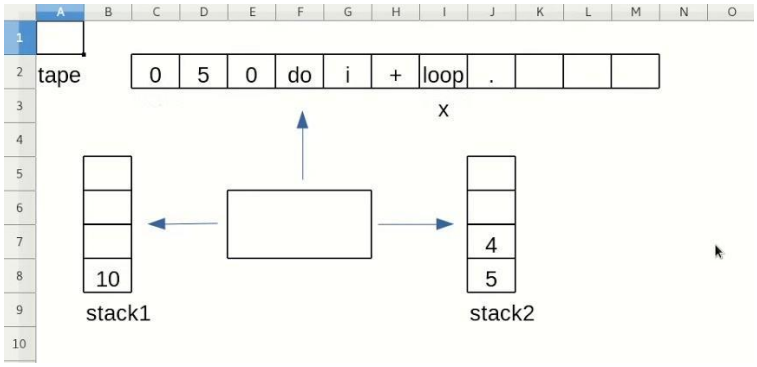
Bitcoin's scripting system forms the basis for a special class of Turing Machines called a decider (Sipser, 1996) or alternatively a total Turing machine (Kozen, 1997). This is a class of Turing Machine that halts for every input.

Cellular Automaton :

- Gird of cells
- Cell is state (each cell has a nieghborhood)
- State of cell is (time)=(niegborhood states (Time-1))



Two Stack Push Down Automaton :Like turing machine
Power is equal to truing machine



Cuda:

CUDA is a parallel computing platform and programming model developed by Nvidia for general computing on its own GPUs (graphics processing units). **CUDA** enables developers to speed up compute-intensive applications by harnessing the power of GPUs for the parallelizable part of the computation

Advantage: The advantage of implementing such an entity on a blockchain is primarily that it provides a theoretical representation of an Unbounded Single Taped Turing Medium. Secondly, that such a medium can be designed to provide fast iteration mechanism through recorded Tx. Some existing blockchains have the ability of materialize up to thousands Tx per second

Disadvantage : The disadvantage is that the GA fitness procedure should be done externally (**External Oracles**) and Application Specific Integrated Circuits (ASICs) are mandatory for the task

Opportunities and Future Uses.

Bitcoin's creation in

2009 was a revolutionary idea in the financial world. It is

considered as the digital cash of the new age. Secure, non

centralized, can provide the world with “honest”, non

inflatable money

Machine on a Blockchain, in turn, could open a whole new world of apps from computer aided governance to extinction level events predictions to better humanity.Emerging technologies such as the Human-Machine interface may give such an organisation, which was previously difficult to obtain, comprehensive information in many fields of science.

The evolution level of the algorithm will exponentially exceed unparalleled standards by employing the large amount of information acquired by smart contracts, daily transactions, weather conditions or literature stored on a Blockchain using deep machine learning techniques

Conclusion :

In this paper we showed that it was possible theoretically for an unbounded single-type turing medium such as a blockchain to be used with a Turing-Complete algorithm, as a cellular Automatic device based on rule 110,

The implementation could be accomplished by writing a Genetic Algorithm that would evolve using a naturally random generated mutational system as closely as possible.

The process of iteration is based on a Blockchain transaction method, and when the optimum fitness level is right each entity will keep its own. As Swarm Intelligence to become a Church, we have proved that the basic algorithm should be Turing complete. –Turing-German theory

Can this chaos not be reversed into the Universe once more?

Can that not be done?