Smart Stock Exchange Market: A Secure Predictive Decentralized Model

Gaurang Bansal, Vikas Hassija, Vinay Chamola, Neeraj Kumar, Mohsen Guizani

Department of Electrical and Electronics Engineering, BITS Pilani, Pilani

Department of Computer Science and Engineering, Thapar University, Patiala,

CSE Department, Qatar University, Qatar

BITS Pilani

Pilani Campus

Overview

- Introduction

- Current vs Proposed Mechanism

- Proposed Model Description

- Results

Need for using blockchain?

- The traditional stock markets are strewn with issues of centralized architectures. The network can become easy target for attackers and since the server is a single point of failure

- Intermediaries charge a significant referral fee ranging between 3 percent to 25 percent from every stakeholder.

- Traditional system are the long processing times and long settlement delays that essentially destroy the dynamic nature of the stock markets.

- There have been various instances of counterfeit products and product quality issues at different levels in the existing stock market.

Current vs Proposed Model
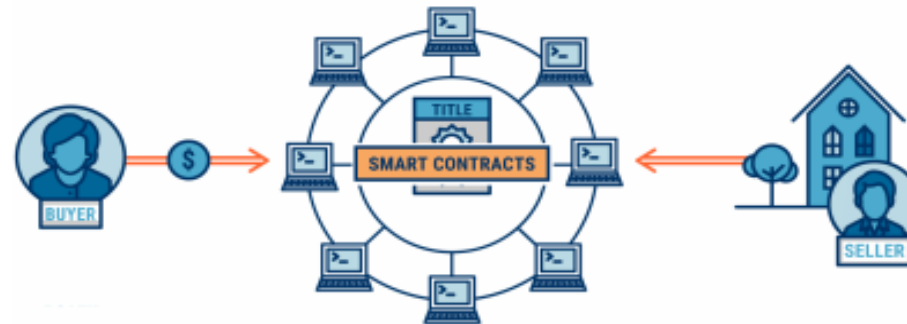
(Top) Current distributed network of supply chain.
(Bottom) Proposed network using smart contracts which act as intelligent agent

Major Contributions

- We present a **decentralized distributed predictive ledger solution** that is secure and is convergence of machine learning paradigm and blockchain mechanism.

- The machine model uses **LSTM (Long Short-Term Memory)** which incorporates time analysis data and able to predict future stocks based on recent history.

- LSTM model achieves an **accuracy of 99.71%** on New York Stock Exchange dataset.

Block Header
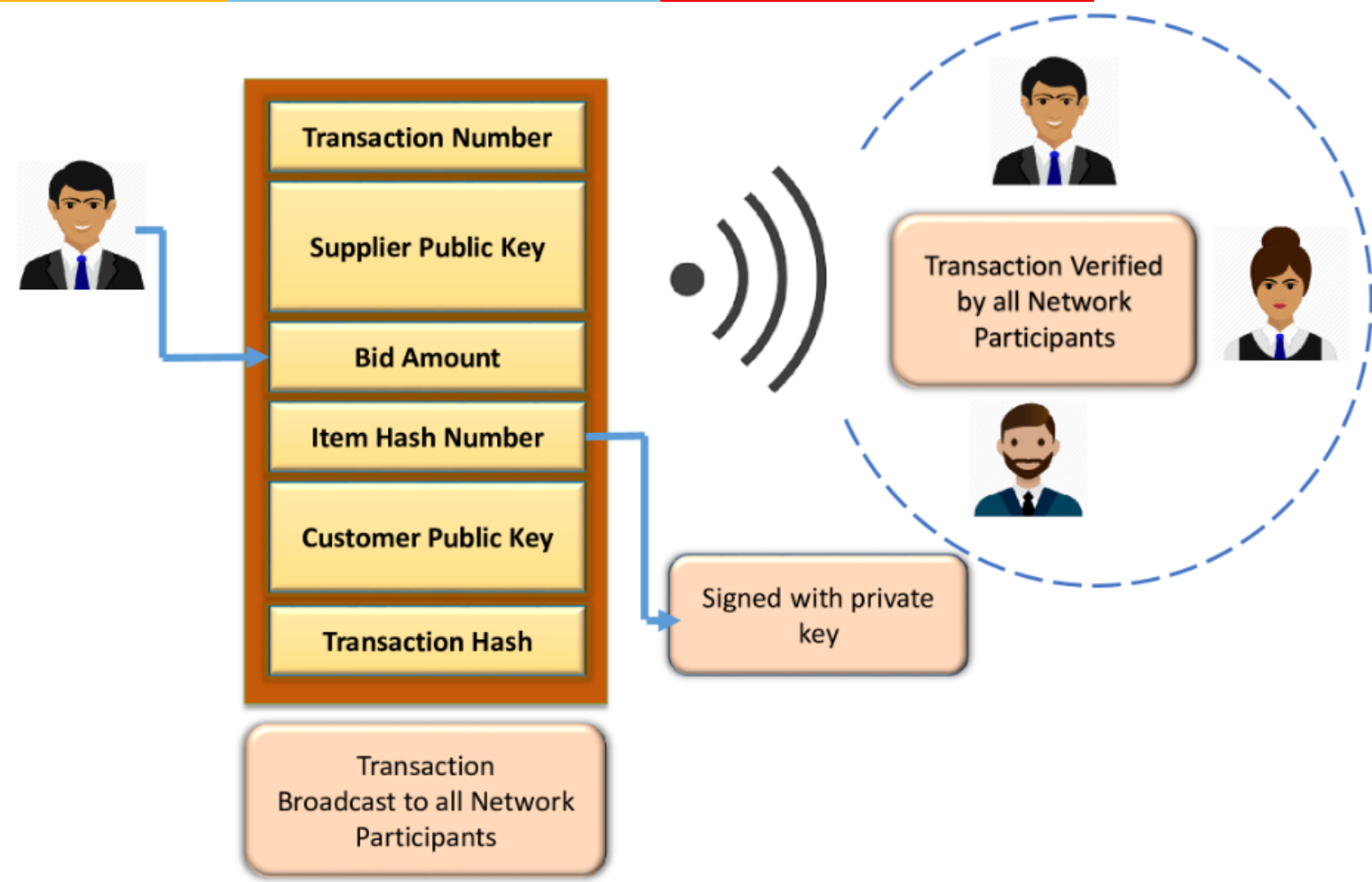
Introducing Smart Contract

- A **smart contract** is a computer protocol intended to digitally facilitate, verify, or enforce the negotiation or performance of a **contract**.

- **Smart contracts** allow the performance of credible transactions without third parties. These transactions are trackable and irreversible.

- We introduce a smart contract which acts mediator between the consumer and supplier. .

Proposed Model
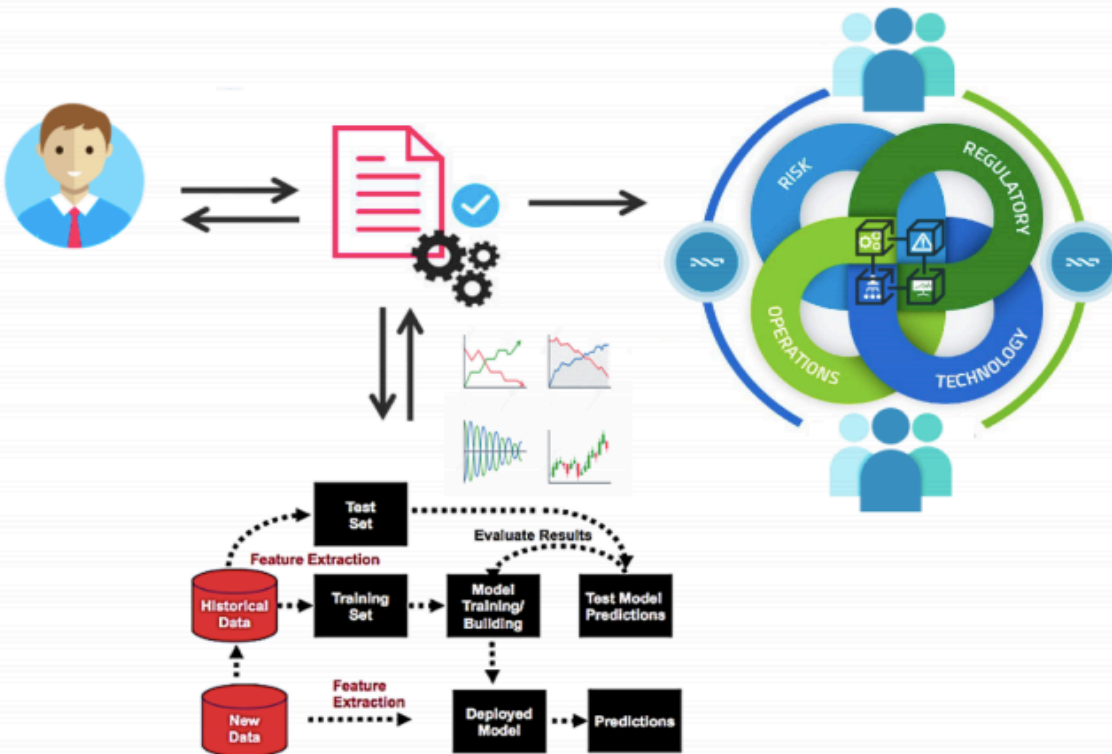
➤ User makes a transaction, it invokes the smart contract.

➤ Smart contract takes values from user and makes use of machine learning model to predict the future of stocks in which user is investing and gives its prediction to user.

➤ User can choose to continue with transaction or change.

➤ Finally the transaction is added to blockchain

- ➢ Whenever a buyer or seller wants to buy or sell his stocks, he initiates a transaction by calling smart contract.

- ➢ Smart contract accesses Intelligent agent which is separate entity from Smart contact.

- ➢ Using the distributed ledger it trains the predictive model, and makes his prediction for future.

- ➢ The future prediction are given to the agent, where he can choose to go ahead with the transactions or choose to change.

- ➢ Once the transaction is made it is validated and entered using the blockchain distributed consensus mechanism.

Results

Stock market prediction using LSTM model for Kellogs.

Left figure: train data set, train target, validation data set, validation target and test data and test target.

Right figure : actual or test target to prediction of model.

➢ We achieve an accuracy of 99.71%.

Thank You