A Credit Recommender System For Financial Institution Using Blockchain

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Abstract:

A deep learning based credit-recommender scheme public BlockChain has been discussed. To systemize the smart lending operations between the prospective borrowers (PB) and prospective lenders (PL), this is very much essential to eliminate the third party credit-rating agencies for credit-score (CS) generation. Thus the automated procedure of loan granting is secured and authorized .In the public BlockChain historical transactions, current assets, and liabilities of PB is stored as time-series sequenced data. A long-short term memory (LSTM) model generates CS based on the lending algorithms proposed which in turn generates the loan recommendations for PB to PL. to ensure the correct credibility of PB for future lending, edge-weights are updated based upon the Boolean indicators from PB and PL, which reflects the repayments and loan-defaults. This is an iteration process which improves the accuracy of edge-weight in turn, ensures the correct credibility of PB for future lending. For automatic setup of loan repayments between PB and PL Smart contracts (SC) are proposed.

Keywords: BlockChain, prospective borrowers (PB), prospective lenders (PL), credit-score (CS), lending algorithms, Smart contracts (SC).

I. INTRODUCTION

Nowadays electronic transactions sing internet or ATM for fetching cash deposits became more common. And also people are ready to do a hefty purchase in the mode of Credit which can be easily paid in monthly instalments or can be paid after a short period with the help of credit cards. Even though the individual doesn't make the payment on time disbursement of credit card

Is not a major issue for the banks. But a larger concern arises for the bank when a person approaches for a loan to check the financial capability of the customer based on the credit history and the credit score. The two terms credit history and credit score of a customer s calculated based on the credit pursued by the customer and the duly repayment of it. The financial institutions like banks and insurance agencies are using the electronic loan records for loan disbursement to PB. The sensitive information of the PB is provided by such records. Some of the information is their unique identification number, address, income-tax returns, and financial assets. These records are shared to the third

Party CRAs by the PL to for the generation of CS, collaborative and content based filters are applied on the loan records while the collaborative filters analyze the current assets and liabilities, job type (business/salaried), and age to determine risk in loan grants. The content filters 472nalyses PB's previous repayments to achieve a lending score, this process of calculating risk values and lending scores undergo multiple iterations to finalize the CS for the PB. Based on the CS calculated, the amount of loan, interest rate and the repayment period is fixed by the PL for PB.

Block chain provides peer to peer lending, and also a speedier and more secure loan process for syndicated loan structures or mortgages, a new banking and finance products and services are enabled by the Block Chain. It provides more effective processes at cheaper costs and also makes the business networks more open, inclusive, and secure .The auditing process in financial services can also be expedited. With BlockChain .It is also possible for companies to calculate credit scores using non-traditional criteria.

Block Chain also supports the system transparency in managing credit scores. A record of immutable BlockChain in financial transactions of the lenders is used to assess their creditworthiness. Personal information of an applicant is never made public using smart contracts. The fund investment companies can instantly monitor users and the purpose and identity of the data's users.
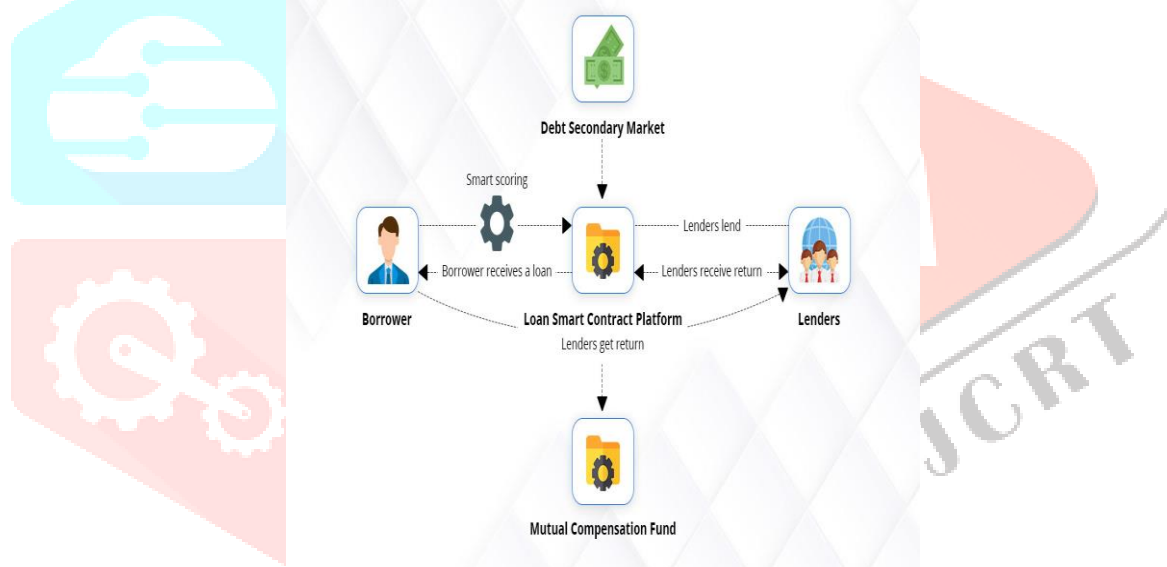Thus transparency in the process of investing in funds is increased by Block Chain.

Fig.1. Block Diagram

BlockChain acts like a digital ledger that is challenging to modifications. It is a distributed network of users, all the information of each and every transaction are transparent, and this enhances trust in the network to next level. Loan disbursement and repayments are recorded on BlockChain ledgers using smart contracts. From which individual credit rating will be derived from the recorded transactions and they are stored
on BlockChain, and afterwards the credit score is informed to the individual. Instead of maintaining a centralized storage, the customer data is stored as a distributed ledger as discussed earlier and it also helps in reducing cyber crimes. None of the participant can tamper with the transaction already recorded in the ledger, if any error occurs in maintaining the record it is identified and added in the error reversibility and also it is visible. Trust, security in privacy preserving and efficiency are the most required essentials in a distributed environment and the BlockChain ensures all these. The financial data is maintained with at most transparency, accuracy and it will be maintained as timely record hence improves the assessment of credit risk.

II. LITERATURE SURVEY

Sabyasachi Chakra borty, Satyabrata Aich (2019) **A BlockChain based Credit Analysis Framework for Efficient Financial Systems**.
A BlockChain based credit analysis framework is proposed in this paper which discusses about the customers from multiple financial sectors. The eligibility of the customer is also analyzed and the result is used to confirm the credit and used to calculate the credit score of the customers.

Rijwan Khan, Shadab Ansari(2020) **BlockChain based land registry system using Ethereum BlockChain.** This proposal discuss about the process of land registration which is easier for the buyers, Sellers and Government registrars in registering and transferring the ownership from the seller to the buyer. This paper explores all the possibilities of distributed environment and problems are solved by using a BlockChain based system for land ownership transfer. The implemented system is based on Ethereum BlockChain which will store all the transactions made during the process of land ownership transfer. The important events in process land registration like access of land documents and fund transfer from buyer to seller after successful verification of the land ownership transfer is triggered by smart contracts in the Block chain using the concept of smart contracts of BlockChain technology.

This system solves the problems faced by the three parties during the land registration and also removes the intermediaries. The process of land registration will be resilient and the cases of fraud in the process are decreased according to the proposed procedure. Validation is immutable and is stored in the digital ledgers. Using the system, validation of the lands is also possible as immutable transactions are being stored in the public ledger.

Aleksandar Erceg, Jovanka Damoska Sekuloska(2020) **BlockChain in the Tourism Industry—A Review of the Situation in Croatia and Macedonia.** The detection of key areas in which BlockChain technology is not implemented in the tourist industry is been analyzed in this paper. And what are the process can be handled is proposed in this paper. A case study implemented with BlockChain technology in tourism is discussed. Potential of implementing BlockChain technology in tourism industry is analyzed by the author.

Seyednima Khez , Md Moniruzzaman(2019)
BlockChain Technology in Healthcare: A Comprehensive Review and Directions for Future Research. The advantages in BlockChain technology has provided many new application opportunities, includes healthcare applications also. The survey provides a review of BlockChain based healthcare technologies and also its related applications. For the proposed inquiry, the attention is called to the open the research which matters the fast-growing field .The potential of BlockChain technology is analyzed in detail and the implemented in healthcare industry.
Mohammed Shuaib, Salwani Mohd Daud

(2020) **BlockChain-based framework for secure and reliable land registry.** The concept of smart contract is used in the proposed framework at different stages of land registry and provides an algorithm for pre agreement. This work also reviews the drawbacks in the conventional registry system. The potential benefits of implementing BlockChain technology in the system are also presented.

Rasa Kanapickiene , Renatas Spicas (2019)
Credit Risk Assessment Model for Small and Micro-Enterprises: The Case of Lithuania. This research, analyses the trade credit in a seller (supplier) perspective. Trade credit provides the supplier to increase sales and profits but risks arises when the customer does not pay, and risk increases at the time of supplier's insolvency. If the suppliers firm is a small or micro-enterprise (SmiE), it is usually there is an issue of human and technical resources. Therefore, to deal such risks, the supplier firm needs a high accuracy but simple and highly interpretable trade credit risk assessment model .this proposal creates a statistical enterprise trade credit risk assessment (ETCRA) model for small and micro enterprises.

PawełPławiak , Moloud Abdar (2020)**: DGHNL: A new deep genetic hierarchical network of learners for prediction of credit scoring.** A novel methodology is introduced in this paper and it is Deep Genetic Hierarchical Network of Learners (DGHNL) supervised learning, deep learning, and layered learning, optimization of learner's parameters approaches used along with the cross-validation (CV) training- testing method.

Natan Morar, Chris Baber, Faye McCabe (2020)**: Drilling Into Dashboards: Responding to Computer Recommendation**
The fraud pattern is analyzed with proposal in this paper. The efficiency is explored based on the responds o the people for the computer recommendations. The output shows that participants adapt the decision making to the confidence of the automated support.

Ke Ren, Avinash Malik(2019) **Recommendation Engine for Lower Interest Borrowing on Peer to Peer Lending (P2PL) Platform.** This work discuss about the determining the interest rate for the lenders based on the bidding loans in P2PL platforms. With these two mechanisms the borrowers get different interest rates for different credit worthiness. Hence a recommendation system built in this paper recommends the new borrower, the type of loan they can apply for. And also the borrower can get low interest rates and have a high chance of getting funded.

Vikas Hassija , Gaurang Bansal(2020) **Secure Lending: BlockChain and Prospect Theory-Based Decentralized Credit Scoring Model.** How a block chain provides the support to decentralized credit scoring in reducing and evaluating the amount of dependence of paperwork. Lending money is subjective to every lender a optimal investment strategy for different risk vs. return scenarios is proposed in this paper.

III. PROPOSED SYSTEM ARCHITECTURE

The loan disbursement cycle is high in the proposed system. There is a direct communication between the perspective borrowers and the perspective lenders that they can know about each other's details clearly. An approach of semantic analysis is implemented to read the borrowers review. The percentage PL will decide to lend the loan to the borrower based on the reviews. The details of the perspective lenders lending and the borrower's payment as smart contracts in the BlockChain.

The advantages of this approach are
- ✓ Every perspective borrower has a possibility to get a loan from lender.
- ✓ Perspective lenders and perspective borrowers had to know each other's identity.

Algorithm
- ❖ Sentiment analysis
  Modules Titles
- ❖ PB and PL Registration
  - ❖ Loan Request by PB
  - ❖ Sentiment Analysis
  - ❖ Payment Tracking

PB and PL Registration
Perspective lender and perspective borrower will register their personal information as well as income details. And also they will upload government issued documents for registration process.

Loan Request by PB
Perspective borrower login the registered perspective lenders details will shown as list. Borrower can choose the lender and he can check the lenders personal details and government Id proofs. Then he can send the request to the lenders. One PB should send request to one PL only.

Sentiment Analysis

The requester borrower's details will be list down in lenders side. Lender can check borrower's personal info id proofs. Once he checked with the basic steps he will move on to sentiment analysis. Lender can check the positive reviews percentage, negative reviews percentage by using sentiment analysis.

Payment Tracking

The borrower's monthly payment will be stored in block-chain. So that lenders can know about the date of payment and whether it is late payment or on time payment
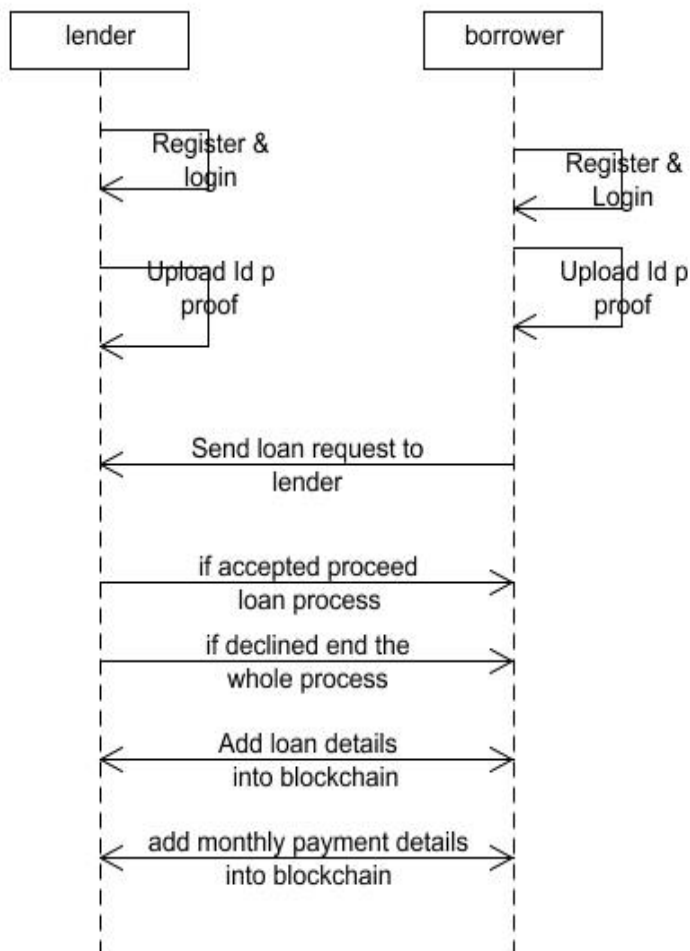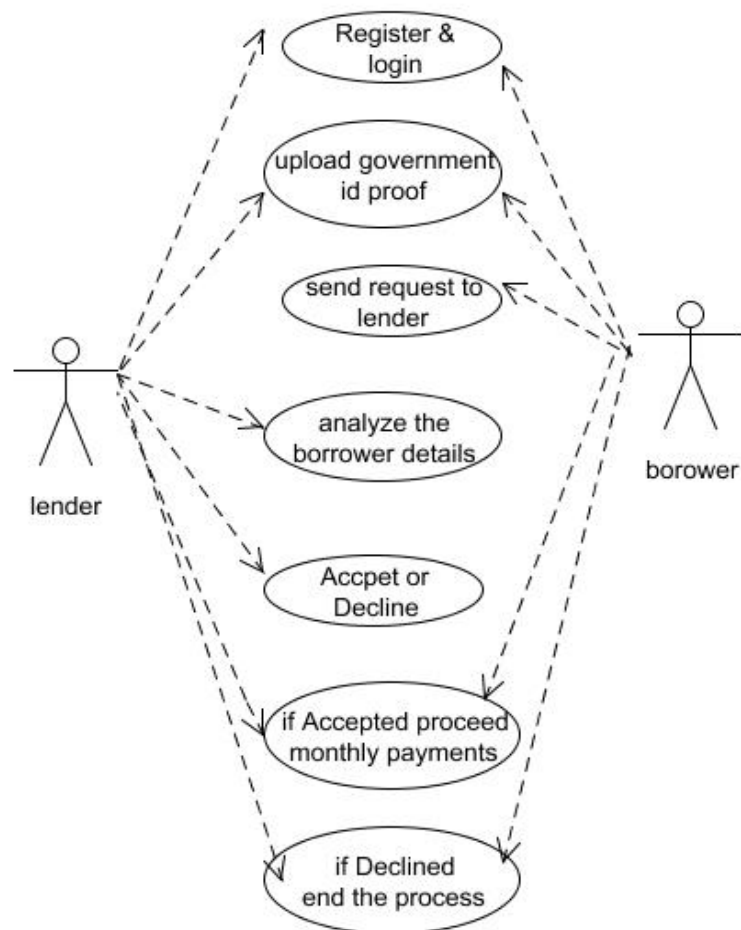

Fig.2. Sequential Diagram

Fig.3. User-case Diagram

IV. CONCLUSION

Gaps are created in the traditional lending models in the lending process because of their inability of effectively assess the credit. It is a tedious process also which consumes a lot of time in documentation and evaluation. BlockChain technology is implemented by the new age lending firms .A technology based credit evaluation approach is implied for checking the eligibility of the application to disbursement and repayment .The entire loan procedure can be done through online. The customers can access credit solutions directly from their smart phones and thus paper paperwork, physical branch visits or intermediaries are avoided.

V. ACKNOWLEDGMENT

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