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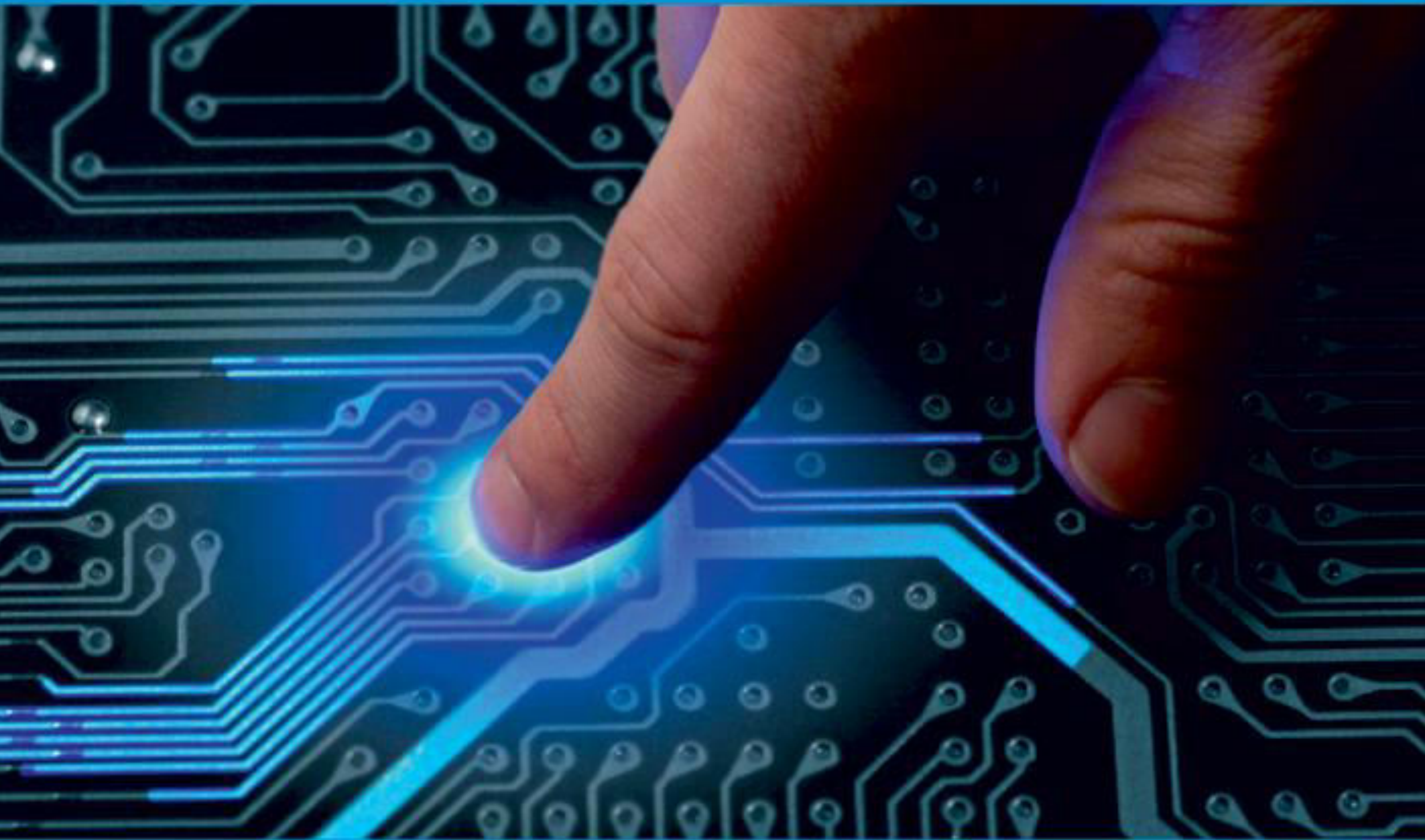

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Personal Finance Ecosystem with Peer to Peer Lending and Borrowing

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ABSTRACT: The project consists of a personal finance ecosystem allowing the users to access the account insights and learn about their finance anytime anywhere according to their convenience. After signing up with us, users can perform P2P lending and borrowing, intra-bank transactions, access account statement and transaction history, budget planning. Users can also learn about finance through various courses and blog posts. They can also utilize investment advisor and chat- bot. The main feature of the project is the unique P2P lending and borrowing system which allows users to make maximum profit by lending and borrowing money. Users can choose to lend money from their accounts on a rate higher than simple interest. The borrowers will have to verify their documents and prove eligibility for a loan, after which they will be benefited with a loan at interest lesser than that of conventional banks.

KEYWORDS: P2P Lending, Finance, Loan, Ecosystem, funding

I. INTRODUCTION

There are many Financial Technology models, one of which Peer-to-peer (P2P) lending has been growing rapidly over the previous years. P2P lending enables individuals to obtain loans directly from other individuals, cutting out the financial institution as the middleman. Many powerful individuals as well as organisations have been adamant about removing over- powerful financial institutions from absolute power over the currency of any nation. Hence P2P is also the main idea behind the meteoric growth of cryptocurrencies all over the world. In our project, we have implemented the main idea of P2P lending through a transaction based financial website, that allows its users to lend and borrow money from each other directly, without the interference of any middleman or a governing body which usually get major cuts out of the transactions, otherwise.

Financial literacy can be learned in the same way as any other language. To be proficient, one must use and apply their knowledge.Certain phrases and concepts must be remembered, and practice, like any other task, aids in the development of financial awareness. A solid grasp of one's financial condition, regardless of age, career, or income level, helps one be responsible with how they use and manage the money they make. Personal finance plays an important role in achieving financial independence. Every phase of our lives requires us to plan for and handle money. We would be enslaved if we didn't plan ahead, not understanding how to pay off loans and credit cards while also paying our payments. Paycheck to paycheck living is a very difficult way of life. Even if we have a job that pays for our everyday needs, protracted medical bills or any other unforeseen circumstance can cause financial disaster. As a result, having suitable personal finance management abilities might assist us in effectively managing our money. It also promises a prosperous financial future.

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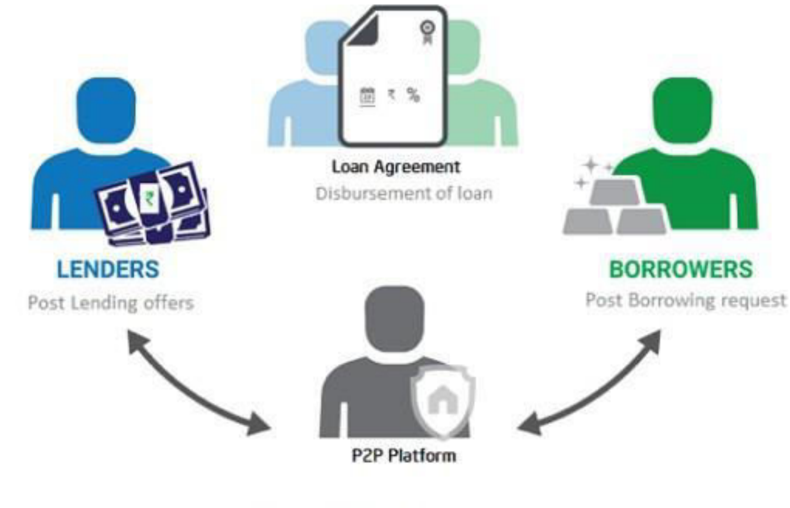

How P2P Lending Works?

II. PROBLEM DEFINITION

We are offering a complete personal finance website, where user can learn, understand, analyze and invest his money. Our idea can improve lending and borrowing of money, thus helping the overall economy. We offer loans on a P2P basis, making sure that the need for money in critical situations is fulfilled for needy people. Our application includes, features like investment advisor, virtual assistant for help, and news and blogs for learning and understanding of financial concepts. The P2P lending helps borrowers get the loans at a better speed and rate during their time of need whereas it helps lenders to earn better from their money at a lower risk.

III. EXPLANATION

After a user logs-in, some data is taken from the user. Using this data a user is divided into 7 different categories from A to G, with A being the safest person to lend in the decreasing order. To allocate this category different criteria including job, home ownership, age, income, employment length and some other features are taken into account. After considering all this data, a category from A to G is assigned to the user using an algorithm. The interest is decided on the basis of this category. A lender can decide the way he wants to lend, whether in the moderately risky loans with higher returns or the loans with lower risks and comparatively moderate returns. Depending upon this selection, the allocation algorithm selects the borrowers for a particular lender in such a way that the returns can be maximized while keeping the risk as low as possible. The borrower on the other hand gets the loan at a rate lower than the banks since the middleman is cut. This helps the borrowers to get a better loan deal at a faster speed.

	charged_off_rate	interest_rate	loan_grade
0	0.059693	0.073353	A
1	0.119069	0.110216	B
2	0.167180	0.135536	C
3	0.212207	0.157234	D
4	0.253674	0.177173	E
5	0.306452	0.197530	F
6	0.317610	0.213953	G

From the above figure, we can see that, the charged off rate, i.e. the loan default rate is directly proportional to the loan grade. And since the rate risk goes on increasing, to compensate the risk, the interest rate also goes on increasing from loan grade A to G.

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According to the algorithm, the money of a particular lender is lent to different users to diversify the risk against default. This also helps to maximize the gains while minimizing the losses. This diversification helps in achieving net positive results even in the worst-case scenario. After this, another algorithm is run to allocate price sums to different loans in such a way that, the risk for the lenders is minimized.

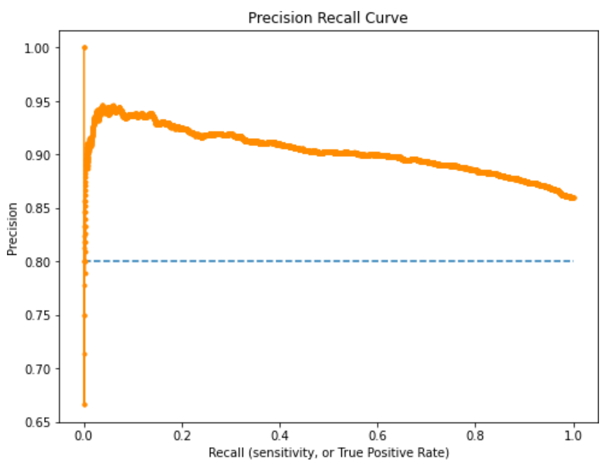
IV. RESULTS AND CONCLUSION

The model after running estimates the average returns. The model divides each investors' money into different parts according to the predefined criteria to diversify the loans and thus decreasing the risks associated with the investment. The model for P2P lending designed by us gives an average return of 9.86% when the lender is investing conservatively. In the worst case scenario of this model, the lender still earns a positive return of 3.67%, comparable to a savings account. The precision for these returns is quite high at 0.938 or 93.80%, making the results reliable. The low false positive rate also reinforces the high quality and accuracy of the outputs from the algorithm.

```
Confusion matrix:
 [[1230   70]
 [6920 1060]]
The True Positive Rate (Recall/Sensiti
vity)is tpr = tp/(tp+fn):  0.132832080
20050125
The False Positive Rate (1-specificati
on)is fpr = fp/(fp+tn):  0.05384615384
615385
The Precision (tp/(tp+fp)) is:  0.9380
530973451328


The investment return with this model
is:  9.86%
The investment return with this model
for the worse case is:  3.67%
```

In the figure given below, the precision-recall curve for the predictions according to our model, is drawn. This curve shows the trade-off between the precision and recall. Precision shows how much data points of the predicted are actually correct. whereas recall measures whether or not all the correct data points are predicted or not. This precision recall curve is important because we don't want 100% recall at a poor precision rate. The precision-recall curve for our model shows the precision of around .88 or 88% for the perfect recall, i.e. recalling all the correct data points. This shows that our model is largely accurate in it's predictions.



To conclude, The peer to peer (P2P) lending allows both the parties viz. lenders and borrowers to maximize their benefits, along with protecting the principal invested. The lenders can get better returns with limited risks and borrowers can access the funds quickly with moderately low interest rates during their time of needs. With the average returns of 9.86%, our P2P lending system offers a great way of investing the money securely for the lenders and quick, better-rated, on time loans for borrowers. This makes the peer to peer lending and borrowing system a definite prospect for the coming times.

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