Personalized Credit Score

Sujeet Kumar, Shubham Verma, Shreyanshi, Shriyanka B V
Department of Computer Science and Engineering
SJB Institute of technology
Bangalore
India

(sujeetkumar6870@gmail.com, shubh1997v@outlook.com, shreyanshi750@gmail.com, shriyanaidu1995@gmail.com)

***Abstract*—Credit score is calculated based on data shared by banks reflecting timely payment of an individual's loans and credit cards dues. People who have no access to formal channels of credit are financially excluded due to low/nil credit score. According to the World Bank, less than 1 in 10 people in low and middle income countries around the world are on file in public credit registries. Alternative payment data of contractual agreements (such as utility bills, cheque bounces, insurance premiums, rentals etc.) are not taken into consideration in the traditional credit score calculations to measure and profile financial discipline.**

People who have a credit score and have credit relationships with banks have a skewed picture of their financial discipline since alternate payments are not considered in current credit scoring models. Consumers do not have ready access to their credit score nor is it freely available. As a result, most consumers never check their credit score or check them once in a blue moon. Hence credit scoring system today does not encourage greater personal financial discipline in a consumer's daily life. Consumers have very little awareness as to how they can improve their credit score or why their credit score could drop as a result of financial indiscipline. The credit score currently indicates a consumer's credit worthiness at a particular point in time but does not show how the score has improved over time. There is no incentive for consumers to build their credit score since its utility is limited to loan applications and they do not receive other benefits for possessing a higher credit score.

Financial Institutions cannot proactively identify consumers who are likely to default on their loans. The reputation of consumers and the connections they have in society play no role in how their credit score is derived. Adding qualitative measures like depth and breadth of social connections and alternate payment data could help refine algorithms used to derive credit scores. Self-help groups and social enterprises with no formal banking relationships currently do not have a credit profile.

***Index Terms*— Credit score, contractual agreements.**

I. INTRODUCTION

Credit score is a numerical expression based on a level analysis of a person's credit files, to represent the credit worthiness of the person. A credit score is primarily based on credit report information typically sourced from credit bureaus. Lenders, such as banks and credit card companies, use credit scores to evaluate the potential risk posed by lending money to consumers and to mitigate losses due to bad debt. Lenders use credit scores to determine who qualifies for a loan, at what interest rate, and what credit limits. Lenders also use credit scores to determine which customers are likely to bring in the most revenue. The use of credit or identity scoring prior to authorizing access or granting credit is an implementation of a trusted system. Credit scoring is not limited to banks. Other organizations, such as mobile phone companies, insurance companies, landlords, and government departments employ the same techniques.

Over the past 20 or so years, credit scoring has been transforming how traditional lenders interact with their consumer and small business customers. By dramatically reducing the cost of making loan decisions, scoring has been increased with the willingness of for-profit lenders to make small business loans previously believed to be unprofitable. It also has allowed them to increase their risk tolerance without undermining their profit margins. As a result, banks and other lenders are increasingly moving "down-market" towards the customers historically left to microenterprise lenders. Credit scoring can offer micro lenders the same benefits of improved cost-efficiency and risk management that it offers to traditional for-profit lenders. These benefits are increasingly important to non-profit lenders faced with pressure to increase scale and self-sufficiency, as well as with increasing competition from for-profit lenders.

Credit scoring also has much overlap with data mining, which uses many similar techniques. These techniques combine thousands of factors but are similar or identical. In India, there are four credit information companies licensed by Reserve Bank of India. The Credit Information Bureau Limited (CIBIL) has functioned as credit information from January 2001. The CIBIL credit score is a three-digit number that represents a summary of Individuals, credits history and credit rating. This score ranges from 300 to 900, with 900 being the best score. Individuals with no credit history will have a score of -1. If the credit history is less than six months, the score will be 0. CIBIL credit score takes time to build up and usually it takes between 18 and 36 months or more of credit usage to obtain a satisfactory credit score.

It is important to understand what scoring is, how scores are developed, and the specific benefits that credit scoring offers to lenders. Credit scoring is a "system of rating that uses past behaviour and/or the characteristics of people that have already received a loan, with the objective of forecasting his/her behaviour with a future loan or financial service." In other words, credit scoring is a means of judging or evaluating the desirability of a loan customer based on his/her basic characteristics and past experiences with credit. Scoring can be used to predict a range of behaviours whether a loan will go "bad," whether a client will take on a repeat loan, and so forth. In most instances, scoring focuses on the likelihood that the borrower will become delinquent, or the loan will go "bad," and is used to inform the loan decision.

Credit scores can be developed based on either qualitative or quantitative information on customer behaviour and characteristics. A system based on qualitative information is called "subjective scoring." Credit evaluation grids, which are used to organize and apply numeric scores to information collected in the

lending process, is one example of a subjective scoring tool, and in that typically the weighting system used to develop an applicant's score is based on the experience and belief of the organization's underwriting staff. A system based on quantitative information stored in a data base is called "statistical scoring." Statistical scoring is the type of credit scoring now used by most private lenders, and by credit bureaus – the form of scoring that has so dramatically altered lending practices – and is the type of scoring discussed in this paper.

Credit scores are developed by collecting data on a range of factors related to the customer at application – most typically their past credit behaviour, their business, personal factors and characteristics such as whether they rent or own a home, their marital status, etc. as well as data on their repayment history. Data on a large number of customers or individuals is required in order to ensure the validity of the analysis. Data on these individuals is placed into one large data set, and correlations are then run to determine which factors relate to strong or weak payment. Once the factors that correlate to repayment are identified, a second level of analysis is conducted to build a statistical model that determines the weight of each factor. For example, factors that are more predictive of repayment behaviour are weighted more heavily in the scoring system. That analysis is then used to develop a rating system that gives a "score" that describes the probability that a customer will pay on time.

The above process is used by the large credit bureaus and credit-scoring agencies (Experian, Trans Union and Equifax, as well as Fair Isaac). These firms have built their own models – or constructed them for their business clients – based on large volumes of data accumulated on individual consumers and/or businesses. With sufficient data on its loan applicants and customers, a non-profit micro lender could use this same approach to develop its own credit-scoring system.

The objective of the project is to develop an Android application so that it will be very easy for a common person to know about his credit score and be aware of the different kinds of benefits of having a good credit score and losses due to bad credit score. This application will help the common person to make his credit score good and have a good control on his credit score.

Using the user's PAN NO. All account details of different banks pertaining to that user can be tracked using this app. It also provides the prediction which provides the user's future credit behaviour.

This app provides the benefits of credit score and the notifications which remind user about the tasks regarding to their credit. This app provides credit graph which make user to understand easily.

Offline payments for Non- Governmental transaction, for those people who feel insecure to make online transactions.

As there is no such platform or application for the common people who does not usually involve in bank loans or any other kind of credit from bank, they never get to know about their credit score, benefits of credit score and how to optimize his/her credit score. The current credit score calculation does not take in to account of bills.

II. RELATED WORK

The credit score is a strange piece of financial alchemy. And yet many Americans see their scores which claim to encapsulate everything from one's credit history to one's attitude toward debts normal, even natural. But, of course, it is not. Credit reporting, in its modern sense, is fewer than 200 years old invented as part of America's transition to capitalist modernity. Already, however, its history has proved both alarming and empowering, helping millions realize the American Dream through access to credit, while integrating many more into surveillance networks rivalling the NSA's. Just as importantly, it has saddled the majority of Americans with a lifelong 'financial identity': an un-erasable mark that reflects bad behaviour in the past and compels good behaviour in the future. At a moment when credit reports are being used to inform a wide range of life decisions from where people live and work, to how much they will pay for insurance and utilities this history is more important than ever. Isaac and Company was well positioned to take the risk to calculate credit score which is founded in 1956, the firm had already been selling credit-scoring algorithms for decades when the Big Three began their quest for an industry-standard credit score. The result, which hit the market in 1989, was remarkably similar to the algorithm still in use today. History reminds us that, common as it now seems, credit scoring is anything but universal. People in the past rightly worried about the concentration of power in the hands of secretive, privately-held organization. Even today, worries remain. As in the past, credit reporting can function as a way of maintaining social hierarchies. Especially among poorer Americans, low credit scores often translate into larger down payments and higher interest rates on purchases terms that place an undue strain on household budgets and that often result in high rates of bankruptcy and default, which in turn lower credit scores even more. Most of all, knowing the history of credit reporting shows us why it's important to pay attention to the institution as a whole, and not just to our own scores. Today, credit reports are used to inform decisions about housing, employment, insurance and the cost of utilities. But errors on credit reports are common. And many of the consumer protections in FCRA are being circumvented by opaque, in-house rating systems under development at major financial institutions. Though cloaked in.

III. PROBLEM STATEMENT

Credit score is calculated based on data shared by banks reflecting timely payment of an individual's loans and credit cards dues. Alternative payment data of contractual agreements (such as utility bills, cheque bounces, insurance premiums, rentals etc.) are not taken into consideration in the traditional credit score calculations to measure and profile financial discipline. Consumers do not have ready access to their credit score nor is it freely available. As a result, most consumers never check their credit score or check them once in a blue moon. Hence credit scoring system today does not encourage greater personal financial discipline in a consumer's daily life. Contractual payments made online do not contribute to building credit scores.

1. Credit score is calculated based on data shared by banks reflecting timely payment of an individual's loans and credit cards dues. People who have no access to formal channels of credit are

financially excluded due to low/nil credit score. According to the World Bank, less than 1 In 10 people in low and middle income countries around the world are on file in public credit registries.

2. Alternative payment data of contractual agreements (such as utility bills, cheque bounces, insurance premiums, rentals etc.) are not taken into consideration in the traditional credit score calculations to measure and profile financial discipline.

3. A People who have a credit score and have credit relationships with banks have a skewed picture of their financial discipline since alternate payments are not considered in current credit scoring models.

4. Consumers do not have ready access to their credit score nor is it freely available. As a result, most consumers never check their credit score or check them once in a blue moon. Hence credit scoring system today does not encourage greater personal financial discipline in a consumer's daily life.

5. Consumers have very little awareness as to how they can improve their credit score or why their credit score could drop as a result of financial indiscipline. The credit score currently indicates a consumer's credit worthiness at a particular point in time but does not show how the score has improved over time.

6. There is no incentive for consumers to build their credit score since its utility is limited to loan applications and they do not receive other benefits for possessing a higher credit score.

7. Financial Institutions cannot proactively identify consumers who are likely to default on their loans.

8. The reputation of consumers and the connections they have in society play no role in how their credit score is derived.

9. Adding qualitative measures like depth and breadth of social connections and alternate payment data could help refine algorithms used to derive credit scores.

10. Self-help groups and social enterprises with no formal banking relationships currently do not have a credit profile.

11. Contractual payments made online do not contribute to building credit.

IV. PROPOSED MODEL

System design is the mode of describing the components, modules, interfaces and data for a system to fulfil the stated requirements. System development is the method of creating or altering system, along with the processes, practices, models and methodologies used to develop them.

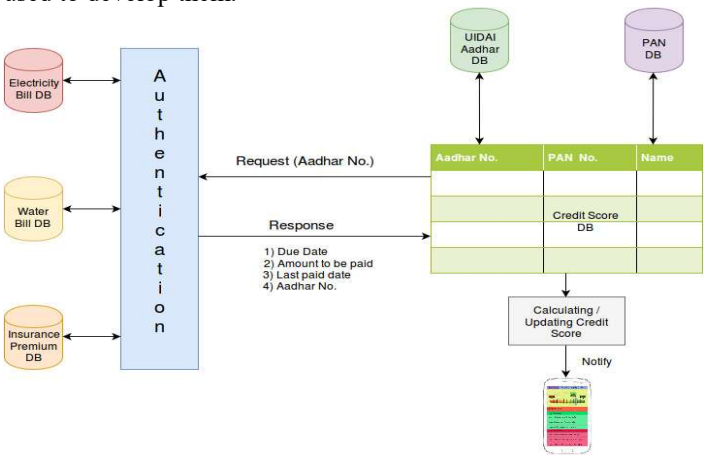

Fig 1: Block Diagram of Database

Figure 1 credit score is calculated by fetching all the payment bills from their respective databases i.e., electricity bill database, water bill database and insurance premium database.

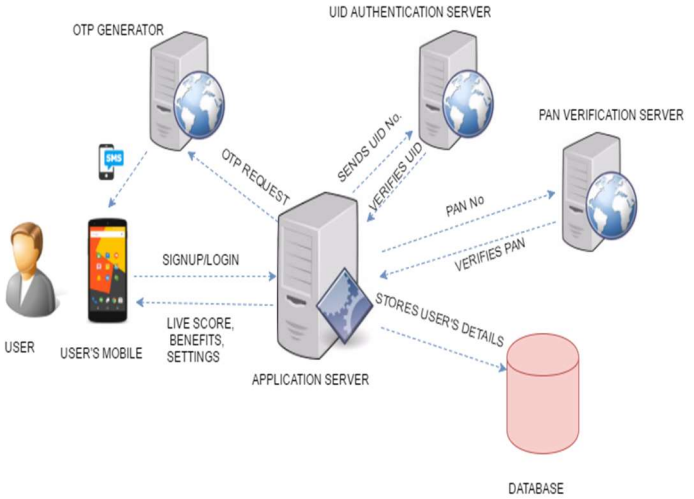

Fig 2: System Architecture

When user Signup through his android by giving his PAN and UID number application server will verify these request by sending to PAN and UID authentication server, this will verify whether the entered details are correct if not it will show an error to the user, if it is correct then the details of the user are stored in database after all these process application server request OTP generator to generate one time password and to send to the user for secure login.

V. CREDIT SCORE CALCULATION

- General Usages (10%)
  3 % 1:4 expenditure to income ratio (increases) less than this decreases
  4 % 1:3 expenditure to income ratio (increases)
  3 % 1:2 expenditure to income ratio (increases) above than this decreases
- Payment History (30%)
  9 % Defaulter loans with higher EMI (increases) and decreases
  8 % Defaulter loans with smaller EMI (increases) and decreases
  6 % Credit Cards (increases) and decreases
  4 % government bill payments (increases) & decreases
  3 % private bill payments (increases) and decreases
- Credit Utilization (25%)
  10 % credit utilization of credit cards (decreases)
  5 % >1:2 EMI to Income ratio (decreases)
  3 % 1:4-1:3 EMI to Income ratio (Decreases)
  2 % <1:4 EMI to Income ratio (Decreases)
  5 % credit due to private bills (Decreases)
  2 % credit due to government bills like electricity and all (Decreases)

- Credit length history (15%)
  7 % loan hsitory (increases) if a user does not have hisotry for more than 9 months then it will affect adversely
  5 % credit card history (increases) if a user does not have history for more than 12 months then it will affect adversley
  2 % governmental bills continous service (increases) if a user does not have history for more than 1 month then it will affect adversely
  1 % private bills continous service (increases) if a user does not have history for more than 1 month then it will affect adversely
- New Credit (10%)
  4 % Loans services (increases) decreases if the number of new credits taken in a year are more than 2
  3 % credit card service (increases) decreases if the number of new credits taken in a year are more than 2
  3 % Government and private services (increases)
- Credit Mix (10%)
  5 % loans and credit cards kind of services (increases) if exists or else decreases
  3 % govermental kind of services (increase) if exists or else decreases
  2 % private kind of services (increases) if exists or else decreases.

$$\boldsymbol{Score} = \pm(\boldsymbol{Categoty\ Percentage} * \boldsymbol{Sub - Category\ Weight})$$

VI. CONCLUSIONS

Credit score is formally defined as a mathematical expression for the quantitative analysis of credit. It is ranging from 300 to 850. This application will provide the features such as live credit score which depends on several categories, it will predict the future credit behaviour of a user from the past one year credit scores. This information helps banks to offer effective services to a user. This application will provide the benefits for current credit score of a user as well as for the user selected credit score range. It will also provide notification about user payment details such as due date for paying water bill, current bill, loans and insurance premium. This application provides an easy access for a user, he has to give only his PAN and UID details, by verifying these details it will provide an OTP for a user to secure login and these details are stored in the database. This application calculates credit score by considering Alternative payment date of contractual agreements.

VII. FUTURE WORK

Using the user's PAN NO, all account details of different banks Pertaining to that user can be tracked using this app.
Offline payments for Non – Governmental transaction, for those people who feel insecure to make online transactions can be taken into account.

REFERENCES

[1] Liran Einav, Mark Jenkins and Jonathan Levin, "**The impact of credit scoring on consumer lending",** GRAND Journal of Economics Vol. 44, No. 2, pp. 249–274, 2013.
[2] Jiang Wei-Li, **"Research and Application of Credit Score Based on Decision Tree Model",** D. Zeng (Ed.), Part I, CCIS 224, pp. 493–501, 2011.
[3] AI Marques, V Garcia and JS Sanchez, **"A literature review on the application of evolutionary computing to credit scoring"**, Journal of the Operational Research Society Vol 64, pp. 1384–1399,2013.
[4] Dr. Rajinder Kaur and Kuljeet Kaur, **"Credit Rating in India: A Study of Rating Methodology of Rating Agencies"**, Global Journal of Management and Business Research Volume 11, 2011.
[5] Miss Neetu, **"A study of awareness about CIBIL and credit information reports among customers at commercial banks"**, International Journal of Research Aspects of Engineering and Management, Vol. 1, pp. 29-34 , 2014.
[6] https://www.cibil.com/creditscore/cibilscore
[7] https://www.bankbazar.com/cibil//cibil-score-calculation.html