Age of Personal Credit Score

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With a prosperous development of e-wallet in China, people are using their phones to buy almost anything. It is in this respect that the competition between e-wallet companies is entering upon a new phase, one that relying on big data and artificial intelligence to generate more values for customers based on the large transaction data. With a study of the credit profile system developed by the central bank, these commercial firms find it hard to apply for their small and medium merchants due to lack of data source and limitation of access. Therefore, they decide to set up a personal credit score based on the transaction big data along with other dimension sources. Moreover, now the personal credit score behind the e-wallet is a proven success in various payment scenarios. In this paper, we are exploring the origins of personal credit score in China and how does the score affect people’s daily life both online and offline.

Keywords: China, mobile payments, big data, data modeling, credit reporting model

Introduction

In China, everyone pays for everything with their phones. Starbucks, 7-Eleven and even street hawkers. With such tremendous transaction data, e-wallet companies are considering how to generate more value for customers. When they are looking for examples in western countries, these commercial firms find out that a more flexible and dynamic credit score of the individual could be an entry point.

Nowadays, when Chinese citizens have credit deals, such as applying for credit cards, mortgage for purchasing real estate, banks will check their credit profile in the credit reference center powered by the People’s Bank of China. However, the source of credit history is limited in banks channels; for instance, if a customer has overdue credit card bills, the bank will file a report to the credit reference center. We can tell there is a shortcoming in terms of this credit collection. Firstly, the period of collecting credit history is a monthly basis, and there is no down drill of the default reason. Secondly, only banks and a few non-bank institutions are allowed to check customers’ credit profile, but many small and medium businesses still required such information when they have credit deals with the customer, such as car renting, visa applying and so on.

It is in these requirements that e-wallet companies, such as Alipay backed by Alibaba, WeChat Pay powered by Tencent, to start considering setup a personal credit score model for these merchants to evaluate customers credit history.

In this article, we are discussing three aspects of personal credit score including sources of data collection, credit score modeling methods, and applications of credit scores.

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Methodology

The methodology we apply for conducting research is mainly public search and experts interviews. Due to confidential business reasons, some data we present in the illustration is non-disclosed.

Results

Before we dive into the personal scores’ modeling, we shall have a brief understanding of credit reporting definition and industrial development.

Definition and Industrial Structure

Credit reporting is the credit profile of individual or enterprise set up by a professional and independent institution which can collect, store and analyze information obtained from individual and enterprise legitimately. The primary purpose of setting up this profile is to serve credit inquiry platform, helping them identify risks. A typical example of credit reporting and credit inquiry platform is the Credit Reference Center powered by the People’s Bank of China.

The credit score is a simplified version based on credit reporting. It is a ranking indicating an individual’s default rate and potential losses caused by him, which is evaluated by third-party credit inquiry platform based on debtors’ capacity and willingness to repay the debt principal and interest.

The industry structure of credit reporting is simple and clear; and three significant parties are getting involved, including data supplier, credit inquiry platform and credit score inquirer.

Data supplier mainly includes the bank, e-commerce site, water, electricity, and gas provider, telecom operators, educational department, hospital and medical departments, public security bureau and so on (Figure 1). It almost covers every functional department tightly related to people’s daily life.

After credit inquiry platform collects data from the above suppliers, they will process for data laundry and give out a personal credit score based on certain calculation models. There are three types of credit inquiry platform, including private credit inquiry institution, enterprise credit inquiry intuition, and financial rating agencies (Figure 1). Usually, depending on the business, personal credit and enterprise credit inquiry can be provided by the same platform.

Credit score inquirer is mainly from real-estate, car manufactures, peer-to-peer loans platform, financial institution, like banks (Figure 1). A majority request of personal credit score is for evaluating the risk of credit deals, such as personal mortgage of buying real-estate and cars, personal micro-loans, enterprise loans and purchasing bonds.

Credit Reporting Development Status in China

Currently, China’s credit reporting system is led by Credit Reference Center powered by The People’s Bank of China (CRC) and jointly developed by local and private credit inquiry platform (Figure 2). From the perspective of credit report service targets, the current market structure for large and medium-sized enterprise has been relatively stable. However, in terms of individual and small enterprise credit report service is still underdeveloped. There are two significant challenges for now.

Lack of quantitative ratings. The credit reports provided by CRC mainly includes credit bill overdue records, but there are no quantitative ratings which indicate an individual’s credit level intuitively. While most financial institutions use credit rating model from FICO or the three big credit firms (Experian, Equifax, and TransUnion), many medium and small-sized credit cooperation, peer-to-peer loan platform could not afford the
high cost of technical development. Therefore, their risks management is weak, and reviews of loan applications are less productive.

**Interoperable credit sharing not sufficient among financial institution.** Although the P2P Network Financial Information Sharing System (NFCS) have access to 957 institutions, less than half of the institutions have reported credit data. The total individual who has a credit report in NFCS is only 4,548,149, which is a small number in a market of 160 million online debtors. Moreover, credit reports contributed by banks, and the
big financial institutions are only available to private party or data exchanged partners. Therefore, it is quite difficult for small and medium financial firms and merchants to acquire complete individual credit reports.

**The Key Technology and Social Network Contribution for Internet Credit Score**

With 54% of e-wallets penetration rate in China, dominated by WeChat Pay and Alipay, the companies behind these two wallets, Ant-finance and Tencent start to study how to establish a credit score for its users, and allow its’ ecosystem partners to have better risk control when offering credit trades. Typically, credit score modeling consists of four steps.

**Data preparation.** Build a database for data recording, cleaning, and filtering. The source of data comes from various dimensions including:

- Personal identity, such as education, driving license, employer information;
- Credit history, such as credit card repayment history, house mortgage;
- Contact network, an individual’s friends credit can affect his own as well;
- Transaction behavior, such as shopping, borrowing devices, peer-to-peer money transfer.

Before further processing the above data, necessary computation will be done, such as normalization and noise rejection.

**Metrics selection.** For an individual credit score, different companies have different weights on the metrics of the rating model. Typically, credit repaying history will contribute the most, followed by transaction records in terms of volume and frequency.

**Univariate analysis.** Through univariate analysis, we can find out the projection maps between univariate and default rate. For example, a continuous overdue of credit card bills may be more likely to indicate the individual is a defaulter compared to his late confirmation of order upon received.

**Model fitting and parameter estimation.** For example, a logistic regression model using forward feature selection. The parameter estimation of the model usually adopts the optimization method, such as the least squares method, maximum likelihood estimation, and maximum posterior probability.

Also, for a commercial enterprise like Tencent, the social network data is a featured source which they can apply in credit score modeling in two ways: feature development, and credit score correction.

Feature development consists of two essential metrics: self-network structure and friends network structure. Self-network structure mainly refers to the user’s network topology, which can be described using some features. For example, the user’s reading behavior can reveal his latest interest which can be taken into consideration when issuing micro-loan.

The friend’s network structure is a look-like analysis model which may reflect a user’s potential behavior. For instance, a friend’s packet money interaction and group package money interaction will conclude some relative effects based on their demographics.

**Applications of Personal Credit Score**

Generally, there are several mainstream services which personal credit score is applied including shopping, renting, accommodation, recycling, transportation, telecommunication, and micro-finance. In this paper, we mainly discuss the application of renting and micro-finance.

Since Chinese mobile phone users spend much time on the handset, such as watching videos, playing games, a typical scenario is running out of battery when they hang out with friends. In the past, they may need to carry a power bank along, which makes it inconvenient but now thanks to companies like JieDian, there are
many power bank renting shops in shopping malls, restaurant, and cinemas. The process of borrowing a power bank is quite straightforward (Figure 3). Firstly, use an app like WeChat to scan the QR code on the power bank machine, then agree to the terms and conditions, pay the deposits which they can withdraw later, and the power bank will pump out of the machine. Many people may not be willing to pay the deposit since they are afraid that they cannot get back the money. Similarly, JieDian also has concerns that consumers may not return the power bank and lost it forever. That is how personal credit score plays its role. With users’ authorization to check his credit score, JieDian will waive the deposit if the score is high enough. Moreover, subsequently, credit score platform will check whether the customer returns the power bank and pay the renting fees. If not, the customer’s credit score will be adjusted accordingly.

Figure 3. Borrowing a power bank and authorize merchants to check credit score for waiving deposit

As for microfinance, a typical example is loans. Let us see an example of Weilefen, a product which customers can lend money to pay credit card bills with low interest. Weilefen is built within WeChat’s ecosystem, through official account, a mini-portal that merchants interact with its followers, an individual can check his loan limit. For the first-time users, he needs to authorize Weilefen to check his credit profile in Credit Reference Center powered by The People’s Bank of China by providing IC number and full name. Then in the backend, Weilefen will calculate the loan limit based on his credit profile and the credit score model designed by Tencent for internal business. After the user gets the limit, he may proceed to pay the credit card bills by several installments right inside official account. By default, Weilefen will read the card information bound in WeChat Pay, but users can add another credit card as well. The loan will be released within 30 minutes after users’ confirmation (Figure 4).

Discussion and Conclusions

As personal credit score is getting mature, the usage scenarios are getting richer, hence providing much more convenience to customers since it not only offers an intuitive way for individuals to understand his credit level better but also a secure bridge for merchants to estimate default risk when offering credit deals. Nevertheless, the voice of privacy concerns is getting louder and louder as people realize more and more data are being collected.

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1 JieDianCorporated with WePay Credit Score. 2019. Retrieved from https://www.cnbeta.com/articles/tech/810043.htm
In order to strike a balance between credit score applications and personal privacy protection, it is essential to have clear and comprehensive policy both from regulators and commercial companies. Firstly, regulators should improve personal information and privacy legislation protection system by integrating existing laws and regulations on personal information protection, privacy protection, credit information regulation, etc., and accelerate the establishment of special regulations, such as the Personal Information Protection Regulations and the Personal Credit Information Management Regulations to protect Internet personal information and privacy. In the era of big data, the protection of privacy should pay more attention to the actual control of personal information by the information subject, fully respect the “informed consent” of the information subject and the right of correction, dissent, and deletion, and improve administrative responsibility and criminal responsibility. Based on this, a scientific and reasonable civil compensation mechanism is constructed to make the protection of privacy more comprehensive and efficient.

On the other hand, for commercial companies which provide credit scores, they should strengthen self-discipline and take the initiative to protect personal privacy and safeguard the authority and social influence of themselves and the industry. Besides, commercial companies should establish corporate self-regulatory organizations, issue initiatives or conventions to form corporate protection personal privacy alliances, promote privacy protection certification, and play the role of industry organizations. At the same time, the company should sort out the risk points within the company that may reveal privacy, strengthen internal control and improve technical protection tools, and update the concept of technological protection.

“All data is credit” is becoming a reality. While data is quietly changing people’s online and offline life, it is also reshaping the basic rules of credit reporting. While serving the economic and social development, personal credit scores need to protect and respect personal privacy and protect the freedom of individuals to free their data from the collection and analyze.

References