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Fintech Application: Artificial Intelligence and Blockchain

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Abstract: From academia to manufacture, artificial intelligence has a wide application and influence. on financial market. Finance is one of the earliest industries have a great connection with artificial intelligence. Through accurate profiling, neural networks and a series of artificial intelligence technology apply to finance. The traditional financial products, service way, credit finance invest decisions, risk control, etc. will have an innovation. Analysis of base, impact mechanism, development directions, risks on combination between artificial intelligence and finance has great theoretical value and practical significance to promote further combination between artificial intelligence and finance. Blockchain, originated from the concept of digital currency, has an extensive application in series of industries. Governments, financial companies, technology enterprise all over the world show great interest in blockchains. Blockchain, a rising distributed database protocol, apply cryptography technology, time-stamped chain data structures and distributed consensus mechanisms, have achieved decentralization, immutability, easy traceability and many advantages. Blockchains have solved the problem, high cost and insecurity of traditional centralized system, which has broad application prospects. This article focuses on two representative technologies apply in finance, artificial intelligence and blockchains. Start with the definitions of artificial intelligence and blockchains. The significance part is analysis on application of these two technologies. It compares different charge of robo-advisor platform and analyze non-performing loans rate to show the advantage of intelligence risk control. It also introduces five types and characteristic of blockchains, and uses ripple as example to show application of blockchains in cross-broader payments.

Keywords: FinTech, artificial intelligence, blockchain

1. Introduction

It is an era that science and technology develop rapidly, so all the industry should keep up with technology, and technology will bring a change in an industry or even an era [1]. The combination of Finance and Technology is urgently needed. As a result, Fintech is emerged. With the widely usage of Fintech, service mode and internal management mode are greatly changed. Fintech covers customer service, risk control, marketing, investment advisory, credit and so many core businesses. It also brings new financial service such as Internet bank, Internet insurance, Internet securities, P2P lending, Online credit reporting Third-party payments and so on. Fintech has a great influence on traditional finance business. Firstly, fintech offers media to disseminate of information, the phenomenon of information asymmetry being greatly reduced, which larger the customer base of finance.

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Secondly, under the mode of Fintech, traders can interact online, which breaks the limitations of space-time and improves transaction efficiency. So, the research on Fintech is of great significance. Nowadays, Fintech is transforming, from using Internet in finance into technology having change finance system. The core technology is artificial intelligence and blockchains. This article focuses on how artificial intelligence and blockchains used in finance, what effect they make and giving suggestions on it.

2. Artificial Intelligence Combined with Finance

Both Fintech and Internet Finance are widely used in finance industry at present, while similarities and differences coexist in these two edge technologies. Internet finance (ITFIN) is the combination of Internet technology and finance. Based on big data and cloud computing, it has formed financial business and service system, which includes financial market system relying on the network platform, financial service system, financial organization system, financial product system and Internet financial supervision system. Besides, it is a different model than traditional finance which includes Platform finance, information finance and fragment finance [2]. However, Fintech is based on plenty of technological innovations such as big data, cloud computing, artificial intelligence, and blockchain, and has a close application to six major financial fields such as payment clearing, loan financing, wealth management, retail banking, insurance, and transaction settlement, and will become the core technology in financial market [3]. So, it is concluded that Internet finance focus on mobile payments and investments. While Fintech is devoted to using edge technology such as Big Data, artificial intelligence or Blockchains. The combination between artificial intelligence and finance is using the core technology of AI (Knowledge Graph, robot learning, information processing and so on). It is obvious that the combination between artificial intelligence and finance play an important role in market of finance. Artificial intelligence is widely used in finance such as Intelligent risk control, Robo-advisors, Intelligent Supervision, Intelligent marketing. This article is focus on the two applications of artificial intelligence in finance, Robo-advisor and Intelligent risk control.

The first major artificial intelligence's application in finance is Intelligent investment advisor. It is a definition of Robo-advisor as Figure 1 shown. Robo-advisor refers to the use of big data analysis, quantitative financial models and intelligent algorithms, according to the investor's risk tolerance level, financial status, expected return objectives and investment style preferences, etc., the use of a series of intelligent algorithms, portfolio optimization and other theoretical models to provide users with intelligent and automated asset allocation recommendations [4]. This article uses Wealthfront as an example to give a brief introduction of the process of Robo-advisor. This article uses comparison of three representative wealth management platform to analyze the success of Robo-advisor in Table 1.

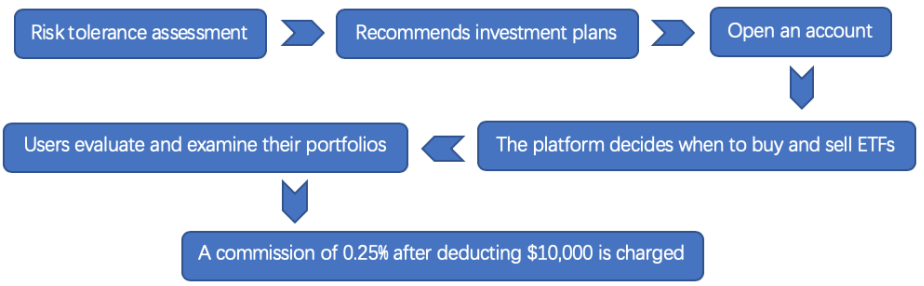

Figure 1: Definition of Robo-advisor.
(Photo credit: Original)

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Table 1: Comparison of representative wealth management platform [5].

Platform	Charge	
Wealthfront	0.25% annual advisory fee	
Betterment	Fee	Condition
	No fee	$0 minimum balance
	0.25% annual fee	$0 minimum balance~$2.50/year for every $1K
	0.40% annual fee	$100K minimum balance~$400/year for every $100K
FutureAdvisor	It charges a flat annual management fee of 0.5% of assets directly managed. TD Ameritrade stock/ETF trades are now free. Mutual funds may cost up to $24 per trade, depending on the fund.	

It is concluded that these reasons lead to the great success of Robo-advisor. Low fees. Mostly, these platforms don't cost much. For example, you deposit $10,000 in your account, you only need to pay a fee about $25 a year. Such low fees make it easy to get involved in this market. Automation. Once you deposit your money into account, you don't need to decide which stock to buy or when to sell it. Robo-advisor will automatically diversify deposits and can help save you taxes. It gives customers great convenience and efficiency. Though it has achieved great success, it still needs suggestion to refine its system. Propaganda should not be exaggerated. Robot is robot. Person should have his. own idea about portfolio. If someone lost much because of the over-reliance of Robo-advisor. It can cause ethical issues.

The second application is Intelligent risk control It has a clear definition of Intelligence risk control as follow, Intelligence risk control is an important means to apply intelligent technology to strengthen risk management and control in the financial sector [6]. The traditional risk evaluation has flaws that cannot avoid, which is reflect in non-performing loans and the non-performing loan ratio obviously. Table 2 shows the balance of non-performing loans and the non-performing loan ratio of China's commercial banks in the past ten years.

Table 2: Balance of non-performing loans and ratio of China's commercial banks [7].

	Non-performing loans (Billion yuan)	Non-performing loan ratio
2010	433.6	1.10%
2011	427.9	1.00%
2012	492.9	0,95%
2013	592.1	1.00%
2014	842.6	1.25%
2015	1274.4	1.67%
2016	1512.2	1.74%
2017	1705.7	1.74%
2018	2025.4	1.83%
2019	2413.5	1.86%
2020	2701.5	1.76%

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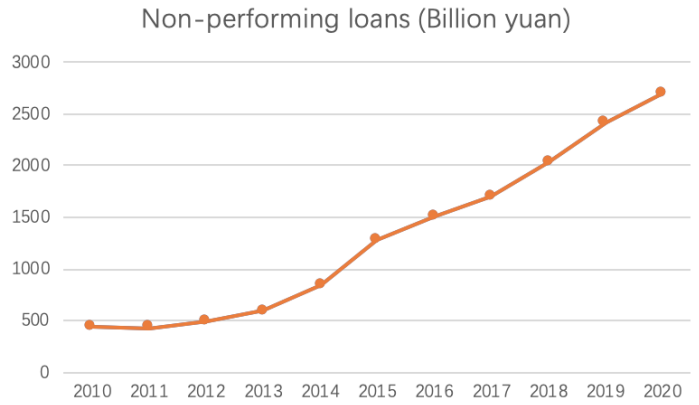

Figure 2: Non-performing loans from 2010 to 2020.
(Photo credit: Original)

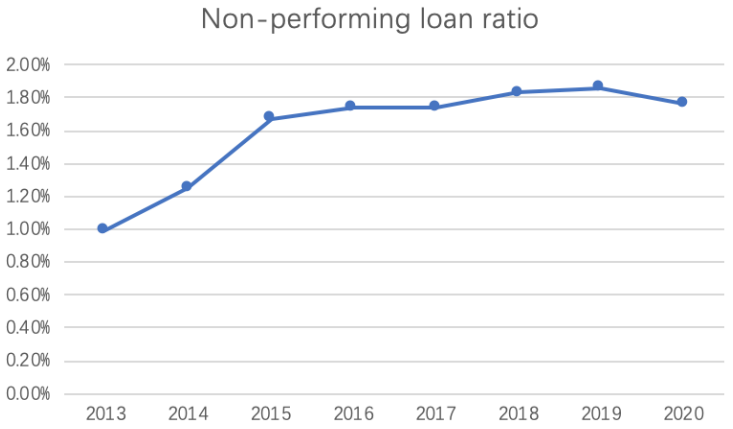

Figure 3: Non-performing loan ratio from 2010 to 2020.
(Photo credit: Original)

As Figure 2 and Figure 3 shown, it is obvious that the non-performing loans continued to rise after 2015. It is concluded that the rise of non-performing loans comes from two sides. One reason is that the economic market is sluggish. More importantly, traditional risk control has disadvantages. Commercial bank's risk control system lack of tendency and good regulatory mechanisms. The model of commercial bank is focus on the ability to pay off loans, which evaluate from both subjective and objective sides. Objective evaluation is mainly about monthly income, kind and position of applicant's job, marriage and credit. But they ignore that personal hobbies, consumption habits and so on also affect the capacity to pay off loans. Meanwhile, subjective evaluations are more unstable because people judgement decides mostly. But people have limit capacity to calculate than computer and be susceptible to complex credit reporting messages. Because of the special process and character of Intelligence risk control, Intelligent risk control system has better risk circumvent. Step one, build a multi-channel intelligent risk control system. Step two, integrate in-line data and external data to form a multi-dimensional, cross-industry, cross-scenario data system. Step three, create a complete customer profile, global list and rating, and build an intermediate support system in the base model Share lists, tags, portraits, models, and unified customer reviews. Step four, independent application isolation by business line or department, fine-grained permission control and authorization mechanism, relatively independent. The final step, improve the all-round intelligent risk control operation and monitoring system and create a closed loop for decision-making. Through these steps, Intelligence

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risk control system can accomplish real-time prevention and control of high-risk products and known fraud risks, realize omnichannel, cross-product, known and unknown fraud joint prevention.

3. Blockchain Applied in Finance

The blockchain is origin in Bitcoin, and on November 1, 2008, a man named himself as Satoshi Nakamoto published a paper titled "Bitcoin: A P2P Electronic Cash System." [8]. Several years later, blockchain became a core component of the Bitcoin: as a public ledger for all transactions. By using P2P network and distributed timestamp servers, it can manage blockchain's databases autonomously. Blockchain, which invent for Bitcoin, has become the first virtual currency to solve the repeated consumption problem. The design of bitcoin has become the inspiration for other digital currencies.

Till now, there are several different types of blockchain in usage. The first one is Public Blockchain. It is validly for any individual or group around the world to send transactions. It also permits anyone to participate in its consensus process after blockchain gives confirmations. Public blockchain is the first chain and has a most widely usage. A series of virtual digital currencies such as Bitcoins are based on the public blockchain [8]. Besides, the definition of Consortium Blockchain is that bookkeepers are selected from multiple pre-selected nodes in a group. All pre-selected nodes have the right to decide the new generation of each block collectively, other access nodes can participate in transactions, however, bookkeeping doesn't record this process (it becomes distributed accounting, but essentially is escrow bookkeeping. The number of pre-selected and how to determine each block of the bookkeeper turns to the highest risk part of blockchain), Through the open API, anyone has the right to inquire blockchain with limitation [8]. And the Private Blockchain is still in research and development, and the definition is as follow. Using the general technology of the blockchain to make bookkeeping merely. It can be an individual or a company to enjoy the right to write access of the blockchain. Meanwhile, it has little difference from other distributed storage solutions. While application of public chain such as bitcoin has industrialized, traditional finance hopes to have a touch with private chain, but the application of private chain is still in exploring [8].

It is concluded that due to these characteristics of blockchain make it real a potential the most significant technologies in finance. The first is Decentralized. Blockchain technology dose not rely on additional third-party management institutions. In hardware facilities, except the self-contained blockchain itself, there is no centralized control. Every block reaches the realization of self-verification, transmission and management with the usage of distributed accounting and storage. Decentralization, the most essential characteristic of blockchain [9]. The second is Open. All the technology of blockchain is open source so all the data is open to everyone, except the information of transaction from both parties is encrypted. Using the open access to blockchain, anyone can check the data of the blockchain and develop related applications. So, the information is highly transparent. The third is Independence. Based on consensus specification and agreements (various mathematical algorithms, such as hashing algorithm applied by Bitcoin), the whole blockchain system does not depend on any other third parties. At the same time, all nodes are able to exchange data and verify it automatically, which human no need to get involved in. The fourth is Security. There is a rule to control and change the data of blockchain. If it does not have the right to control 51% data nodes, it is impossible to arbitrarily manipulate and modify network data. This unique stipulate has the ability to keep blockchain data relatively secure and avoids subjective and artificial data changes. The final one is Anonymity. On technology level, the identity information of each block node is no need to publicize or verified So it is anonymous to transmit all relative information unless legal regulation requires [9].

Nowadays, international trade is indispensable to all countries, so the cross-border payment becomes a relatively important part in finance. This article gives detailed analysis of the application of blockchain technology in cross-border payment. To the first, it introduces the traditional mode of cross-border payment. The fundamental process of financial circulation is cross-border payment

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business. Meanwhile, cross-border payment plays an important role in guarantee of the domestic commercial trade transaction. Nowadays, the traditional cross-border payment methods common in China include the following four types mainly: SWIFT-based bank cross-border telegraphic transfer, expert remittance company remittance by procuration and international credit card payment [10]. This article will introduce two major type which widely used at present. The first type is SWIFT-based bank cross-border telegraphic transfer. Nowadays, SWIFT is the most widely used payment method in cross-border. A message is. sent from the remittance bank to the entry bank. After the message is accept successfully, the remittance bank then pays the corresponding amount to the recipient. Till now, all the process of cross-border payment is finished. It is obviously that SWIFT has slow arrivals and high fees these two disadvantages. On the other side, SWIFT can guarantee the security of large-scale remittance. The other one is international credit card payment methods. For example, using international credit cards such as VISA, MASTER make cross- border. payments. Generally, it is widely used in consumption. The payment failure rate is relatively high. And because the construction of the domestic credit card system is not perfect, as a result, the convenience of using international credit cards is lower than in developed countries.

Compared with traditional cross-border payment, Ripple, based on blockchains, a cross-border payment system has its own characteristic. Components of Ripple is quite different. In contrast with traditional cross-border payment system, blockchains eliminate. remittance banks and central banks, which helps settlement between banks faster. Ripple's payment includes four basic components as follow. Ripple Connect is used as a plug-in between remittance bank and entry bank. It opens the way to exchange information between banks. ILP Validator. It is a validator that confirm trade between banks success or fail. It used. encrypted way to confirm trade and assist in the flow of funds across ledgers. ILP Ledger. It implements the ILP ledger in the respective payment bank and. beneficiary. bank ledgers. It can track loan, debit and liquidity in both sides, which means settlement in time or terminate immediately. FX Ticker. It can provide forex quotes to confirm exchange rate of traders. It can also. track ILP Ledger.

Meanwhile, the procedure of Ripple is also unique. Before the transaction. A guarantee of the deposit, which save as corresponding monetary funds in payee bank, should be offered by the liquidity providers. In the way of Ripple's cross-border payment, both parties of the bank account should open an extra account, which names Ripple Suspense Account. The balance of the Ripple Suspense account is mapped to the ILP Ledge ledger in external way. In this way, Ripple can trace the funds of liquidity provider perfectly. If the fund of liquidity provider status changes, through the plug-in account, the Liquidity Provider in the ILP Ledge ledger will accept this information immediately. Once all the information has mapped to ILP Ledge already, the entire transaction runs in the Ripple blockchain network. During the transaction. Ripple Connect begin to exchange all related payment information, which includes KYC/AML of Company 1 and Company 2, between both parties when Company 1 start the payment. During this part, Ripple Connect of the paying bank (USD bank). And Ripple Connect accept the information of foreign exchange price from the receiving bank (Euro bank) to calculate the processing fee. After that, Ripple Connect synthesizes the information, including the fees both parties need to pay. Eventually, it is 'all-in cost'. The summary of the whole process of transaction. It is obvious to find that, Ripple Suspense Account acts as a platform to offer the account status of the liquidity provider. If the plug-in account and ILP Ledger are mapped successfully, it means that this information has already been sent into Ripple blockchain. Meanwhile, this mapping relationship is regulated by the ILP Ledger Protocol, which all the bank who access to the Ripple network must follow these rules. Ripple has broken the traditional accounting mode which banks follow, through the distributed consistent accounting design supported by Ripple blockchain. Actual funds no longer need to exchange and shorten the time of processing information and delivering funds greatly.

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In this part, this article gives analysis the success that Ripple made and prospect the future of Ripple. Positive externalities have a great connection to Ripple success. It is concluded that the more nodes connect to the Ripple network, the more stable the consensus mechanism of Ripple protocol is, which hoists the commercial value of Ripple. The Ripple network is one of the core technologies that helps Ripple develop progressively. Meanwhile the Ripple network is also act as a platform that turns real money into network. Nowadays, Ripple network has shown the characteristics of platformization. It is especially convenience for small and medium-sized banks to have the access to Ripple network because of a relatively low fee. Besides, the self-created Ripple's RPCA has many great characteristics such as high consensus efficiency and extensibility. As a result, more and more large financial institutions manage to have access to Ripple's network. Additionally, the initial design of Ripple has managed to risk aversion, which satisfy the business and supervision need of financial institutions in cross-border payment. The efficiency and security make Ripple's first-mover advantage more and more obvious. A reason to this fact is that low cost and high efficiency are a great temptation to large commercial enterprises, so it is a significant progress in Ripple's development. However, with the maturity of the technology in blockchain, more company will come up to imitate Ripple's idea. Under the great pressure, the world's first open-source payment network, Ripple needs to connect more communities abroad, maintain operational channels, and attract more partners to participate in the Ripple network.

4. Conclusion

This article starts with Fintech, a combination between finance and technology. It gives generalization of the definition, application and the meaning of fintech. More importantly, it introduces two core technologies used in Fintech, artificial intelligence and blockchain. Analysis on artificial intelligence and blockchain becomes the core of this article. Firstly, the difference between Internet finance and Fintech is given. This article uses Intelligence investment advisor and Intelligent risk control as example to show artificial intelligence apply in finance. In Robo-advisor part, it lists the comparison of different mode of Robo-advisor from several platforms and analyzes the reasons of the success, low fees and automation. In Intelligence risk control part, it uses the high rate of non-performing loans to show the flaw in traditional process of credit evaluation. And the intelligence risk control's advantages are obvious, objective, the ability to process big data and so on. Secondly, this article is devoted to give detailed information of blockchain. In Different types of blockchain, it tells the characteristic of public blockchain, consortium blockchain and private blockchain. And in it lists five core characteristics of blockchain. In it compares traditional cross-border payment and blockchain and uses Ripple as example to introduce the core process of blockchain application in cross-border payment. It is concluded that Ripple's efficiency, security and relatively low process fees attract plenty of enterprises.

The combination of artificial intelligence and finance is irreversible, which means risks and chances coexist, so financial market should change the way to development. In the era of technology, traditional financial managers should transform to compound managers. Financial institutions should adjust themselves to the development of fintech, increase the investment in development of edge technology, encourage the application of fintech, and strengthen the management of risk prevention and control. Meanwhile, application of blockchains in finance is still at the first step. Lack of supervision, construction of financial market system and operation in commercial world are significant challenges which blockchains must face. Suggestions are that the financial supervision department should clarify the responsibilities of supervision and improve the degree of intelligent regulatory automation.

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References

[1] JIN Mohan. Research on the Application of Artificial Intelligence in Finance.: JiLin University of Finance and Economics. (2016/9)

[2] Ten departments, including the People's Bank of China, issued the Guiding Opinions on Promoting the Healthy Development of Internet Finance.Financial Stability Board (FSB) https://www.fsb.org, last accessed 2022/10/10.

[3] the US Monetary Authority (FINRA) https://www.mas.gov.sg , last accessed 2022/10/10.

[4] Wealthfront Homepage, https://www.wealthfront.com/investing, last accessed 2022/10/10. Betterment Homepage, https://www.betterment.com, last accessed 2022/10/10.

[5] FutureAdvisor Homepage, https://www.blackrock.com/futureadvisor last accessed 2022/10/10.

[6] China intelligent risk control industry boutique report. (2020)

[7] China banking and insurance regulatory commission, http://www.cbirc.gov.cn/cn/view/pages/index/index.html, last accessed 2022/10/10.

[8] ZHANG Jian.: Blockchain: Defining the New Pattern of Finance and Economy in the Future. China Machine Press (2016).

[9] DENG Qing. Research on Application of Cross-border Payment Based on Blockchain-Take Ripple as an Example.: Jiangxi Normal University, (2020/06).

[10] JIANG Haifeng. Research on The Application Mode of Blockchain in Financial Industry.: Zhejiang University, (2018/06/01).