산업융합연구 제17권 제2호 pp. 1-7, 2019
ISSN 2635-8875
https://doi.org/10.22678/JIC.2019.17.2.001

Security Vulnerability and Security Measures of Kakao Bank in Industrial Environment

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산업환경에서 카카오 뱅크가 가지는 보안취약점 및 보안대책

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요 약 카카오 뱅크는 스마트폰과 신분증 그리고 타행은행 계좌만 가지고 있다면 누구나 편하게 사용할 수 있다. 그러나 카카오뱅크 출범 몇 일 되지 않아 타인의 스마트폰 명의로 계좌를 개설하고 대출을 받는 사례가 생겼다. 이 같은 사례를 방지하기 위해 FDS(Fraud Detective System) 가 짧은 간격으로 같은 금액이 인출 될 경우 금융거래를 탐지하게 된다. FDS의 탐지 시스템은 4가지의 기능을 갖추게 된다. 모니터링 및 감사, 정보수집, 분석 및 탐지, 대응으로 이루어져 있다. 카카오 뱅크의 보안 문제점은 다양한 방향에서 일어나는데 이 같은 문제에 대하여 카카오 뱅크가 FDS를 이용하여 대응하는 방법에는 어떤 것이 있는지 제안하였다.

키워드 : 카카오 뱅크, 보안문제, 정보보호, FDS

Abstract The Kakao bank can be conveniently used if there are only smartphones, identity cards, and bank accounts. However, a few days before the inauguration of Kakao Bank, the company opened an account for receiving loans from other people. In order to avoid such cases, the financial transactions will be detected if the SDS is withdrawn at a short interval of time. The detection system of FDS has four functions which are monitoring and auditing, collection, analysis, and response. There are security problems of the cocoa banks in various directions. The Kakao bank has a way to respond to the problem using FDS.: Keywords : Cocoa bank, security issues, information protection, FDS

Key Words : Kakao bank, Security problem, Information protection, FDS

1. Understanding Internet Banking

Kakao Bank is a mobile banking service for Korea's Internet professional bank. If you do not face your face and have only a few essentials, you can easily access the Kakao bank service. As such, we have taken a step into the mobile financial industry, putting low entry barriers at the forefront

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Received April 24, 2019 Revised May 21, 2019
Accepted June 20, 2019 Published June 30, 2019

of everyone, and we were concerned about security, which is as vulnerable as low entry barriers. One of the most problematic vulnerabilities in the Kakao bank is that it can be easily used with smart phones, ID cards and other bank accounts [1]. The fact is that not only you can use the service easily, but also others can easily access my information. Some people are talking about whether the security problem that had been a concern at the time of the launch of the Internet banking business has finally come to an end. According to reports, a customer of a Kakao bank recently suffered unauthorized withdrawal. Someone steals his check card dozens of times, or there is a surge in unauthorized withdrawal accidents such as delays in payment, duplicate payment or authorization errors [2]. A system for solving this problem is FDS (fraud Detective System). In Chapter 1, we discuss four basic functions of FDS and the analysis and detection process of FDS in Chapter 3. And we will discuss the solution and prospect of mobile security vulnerability of Kakao bank using FDS in Chapter 4 and conclude this study Chapter 5 .

"Internet Primary Bank" refers to a bank that runs a small number of branch offices or runs most of its business through electronic media such as ATMs and the Internet without branch offices. In case of the US and Japan, a completely non-store-type Internet bank was established at the beginning of the introduction. However, some forms of using offline channels such as ATM expansion, Internet cafes and Kiosk operation and even one or two branch offices started to appear. In other words, the online channel only works with a small number of offline channels. If so, what is the difference between the existing bank's Internet banking and Internet bank? Internet banking is a system that enables banking services to be viewed on mobile or Internet after a bank branch is first established off-line, while Internet banking is a bank that conducts financial transactions from the beginning to mobile and Internet without a branch office. However, Internet bank can use a mobile phone to send a copy of ID card to a smart phone without visiting a branch office, or to send a copy of an identification card to a smartphone To open an account. the commodity sold and the discount commission are also different. Unlike the existing Table 1 shows that through Internet banking, which sold only some financial products, all products are sold at the Internet bank. Most commissions are exempted even if some commissions, such as remittance fees, are discounted to consumers.

<Table 1> Overseas Internet Banking Trends and Domestic Issues

division	Internet Banking	Internet professional bank
Channel role	- Using online banking in terms of channel diversification - The trend of increasing the proportion of online banking	- If online is the core channel (basically no face-to-face channel) -Utilization of some channels such as ATM expansion, Internet cafe
Legal entity	- Use as existing sales channels in existing banks - Some banks provide services in the form of business units (individual brands) (separate management of customers)	- Established and operated as a separate legal entity
Product Service	- Online-only products separated from face-to-face channels -Offers preferential rates and fees	- You can join all the products you offer and consult - In terms of interest rate commission and competitiveness compared to the basic bank

1.1 Domestic case (Kakao bank)

In 2002, some large corporations and venture companies jointly established V-Bank, Internet bank, but failed to attract foreign capital and institutional constraints. In 2008, the Financial Services Commission (FSC) initiated the introduction of a professional bank through the amendment of the Banking Act, but failed to enact the legislation due to the banking industry's weakness, profitability model vulnerability, and fearsome competition. However, in order to prevent Korea from lagging behind in the financial market due to the emergence of PinTech in the global market, it was necessary to nurture the PinTech industry. In the United States. In July 2015, the government initiated an amendment to the Banking Act.

In October 2015, three applicants, Kakao Bank, K-Bank and I-Bank, applied for Internet banking preliminary approval, of which Kakao Bank and K-Bank were accredited. KakaoBank has been recognized for its innovation potential of KakaoTalk-based business plan as well as being considered to be able to operate its business steadily as it is estimated that it is easy to build a customer base at the beginning of the business. K- We can get the approval because it is expected that we will be able to improve customer convenience by providing many customer contact channels and providing innovative services. I-Bank, however, failed to get accreditation because it was evaluated that the credit evaluation model using Big Data was somewhat assessed, but it was considered to be somewhat vulnerable in terms of high risk of business operation due to the loan method concentrated on the self-employed. Both Kakao Bank and K-Bank are aiming to open a niche market between high-interest markets such as low-interest markets and savings banks in existing off-line large-sized banks by using high-yielding loans of around 10% as target markets for loan business.

The Kakao Bank and K-Bank are planning to borrow at high interest rates by self-rating credit ratings for the same classes as the self-employed and other small business owners, which are difficult to cross the threshold of the first financial sector. As a way to achieve this, both banks are pushing for 'big data analysis'. Kakao Bank plans to use its Big Data to develop its own credit rating system, 'Kakao Store'. The Kakao score is based on the credit rating data, online utilization data, and additional data

① Definition of an Internet professional bank: A bank that conducts banking business as an electronic financial transaction method

② Reduction of minimum capital of Internet banking: 25 billion won

③ Deregulation of ownership of Internet banking companies: In order for Internet banking companies to actively participate in innovative ICT companies, it is decided to reduce the amount of equity holdings (10% → 50%). If the Kakao score credit model is used properly, it will be possible to analyze individual income and consumption information effectively. Particularly, credit evaluation can be done more finely than banknotes by using online commerce such as 'presenting kakao tokyo' and usage history based on simple payment 'kakao pay'. On the other hand, K-bank plans to use the payment information such as KT, BC card, KG INICIS / DANAL to make high-end loans. The strength of Woori Bank's WIBI Bank experience and the ability of Hanwha Life to develop its pin-tech scoring system are also highlighted. Based on a credit evaluation model that uses the Big Data to carefully assess customer risk of the lower grade credit rating, it will operate O'Donnell, apartment mortgage loan, high interest loan, SOHO startup loan [3].

2. FDS

FDS Article 2 (Provisional Measures Against User Accounts) A financial institution may, through its own inspection, suspend the transfer or transfer of all or part of an account for which the account of the user may cause damage to the telecommunication financial fraud, Stop measures shall be taken. With these provisions, the financial authorities have ordered financial institutions to strengthen their autonomous security systems to comply with special laws, and the financial industry has introduced a variety of self-monitoring measures. FDS is a representative digital financial security system of abnormal transaction detection system [4].

FDS should naturally intervene in financial transactions and inter-operate. The user media environment information generated after the user authentication process in the digital financial transaction is transmitted to the collection system of the financial company by the PDS 'information collection function. The collected information is used in the 'analysis and detection function' of the FDS together with various information (such as connection and financial transaction information) held by the financial institution itself to analyze the abnormal financial transaction [5].

Finally, based on the results of the analysis, the transaction is confirmed by determining whether to approve or cancel the transaction through FDS 'countermeasure and monitoring function.

2.1.1 Monitoring and Auditing

It serves as a supplement for auditing and efficient operation to maintain mutual close relationship between collection, analysis, and response phases [6].

2.1.2 Information gathering

And collecting information about users' information and activities. Information gathering function The information gathering function refers to the function of collecting information on the user's media environment (device, communication environment, etc.) and information on the type of financial accident for the accuracy of abnormal financial transaction detection [7].

2.1.3 Analysis and detection

And the analysis of abnormal behavior through collected information. Analysis and detection function Analysis and detection function refers to the function to detect abnormal behavior by analyzing various correlations and rule checking according to user type and transaction type using the collected information. Abnormal use environment using abnormal transaction modeling. Deal patterns, abnormal advance detection of the act in advance. The types of detection modeling are as follows and are used singly or in combination according to service type [8].

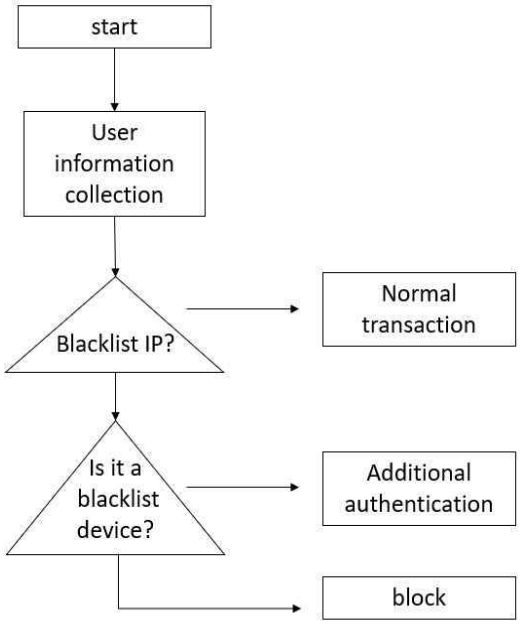
2.1.4 Corresponding normal discrimination and countermeasure against abnormal transaction.

2.2 FDS detection method

2.2.1 Misuse Detection Model Detecting misconduct by examining whether it matches the presently known pattern based on past misconduct patterns

2.2.1.1 Pattern detection model

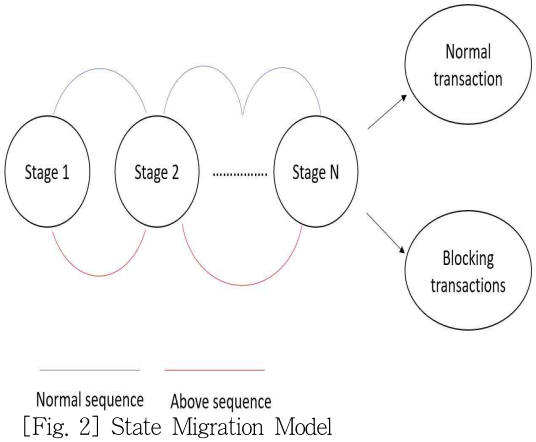
A detection model that generates a detection pattern using only the accident information that is mainly generated and judges whether there is an abnormal financial transaction only for a transaction that exactly matches the pattern. Fig. 1 shows pattern detection model.



[Fig. 1] Pattern detection model

2.2.1.2 State previous model

The pattern used for patterning is mainly used for the accident information that occurred in the past. Figure 2 shows state migration model.



[Fig. 2] State Migration Model

3. Limitations of FDS

Although FDS has prevented many financial fraud crimes, the key to FDS operations is to strengthen detection and response quickly, and to continue to analyze it after it has been built. Recent advances in machine learning and deep learning have enabled automated processing in many areas, but they are evolving during fraud. To do this efficiently defend will need to be a couple of ongoing operating a devoted liaison to actively carried out the patterns and sharing among the industry and strengthen the analytical capacity [9].

4. Mobile security vulnerability solution and prospect using FDS

The Kakao bank had difficulties in getting money out of the account or making dozens of payments by stealing check cards. If the same amount is withdrawn at short intervals, FDS can be used to prevent financial transactions. FDS is developed based on detection pattern of machine learning method when it is important to improve large data processing and detection / analysis ability based on big data. Each developer is also launching and developing FDS based on the deep-run method. In April 2016, KDB has disclosed its business under the name of 'Machine Learning based FDS detection model'. In the user environment collection process, it is divided into AGENT / AGENTLESS depending on whether the program is installed or not. Najik has not had enough strengths and weaknesses and it is expected to gradually improve. At present, the FDS industry, which is an infinite competition system, is expected to survive only major companies that have dominated the market and technology since 2017. In this process, when the financial sector is the competitiveness of SMEs such as a low bid as much as you can eventually have an adverse effect in the financial sector will have to invest boldly recognized under 'Security is directly connected with the success of the business.' [10,11].

5. Conclusion

FDS is an anomaly detection system that collects monitoring and audit information when an abnormality is felt on the network financial services, analyzes and detects security problems on the issue, and responds appropriately to the problem [12,13]. The FDS in the Kakao bank, which has gained explosive popularity but has not gained much faith in the security system yet, will do its best to counter each attack on the attack[14,15].

ACKNOWLEDGMENTS

This research is supported by 2019 Baekseok University Research Fund.

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