A DIGITAL GREEN BANKING FRAMEWORK: A BACKGROUND ANALYSIS FOR FINGERPRINT APPROACHES

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I. INTRODUCTION AND OBJECTIVES

The fundamental activity of the bank is the money transaction. To perform such transaction, the banking service providers, expect a valid and accurate signature from the customer to verify them. The customer could step forward to make their necessary actions with the placement of signature only.

Even though the signature is an essential factor in Sri Lankan banks, the customers and employees are facing several problems in banking activities. Moreover, the customers change their signature frequently, children and teenagers also can change their signatures until they established a unique one and elders who got the nerve and eye disorder, unable to place their signature properly.

Therefore, the digital fingerprint can be implemented in a banking transaction to make more comfortable services. The fraudulent withdrawal, unauthorized transactions, online financial forgeries, and other offenses can be easily tracked and reported to the relevant legislative actions through this approach. This is because fingerprint is the most secure and powerful biometric element to identify unique customer's identity and validate electronically [1].

II. RESEARCH METHODS

The initial step is to get the fingerprint as an essential input data into the bank database to store as a unique and primary record. Fingerprint scanners are the input device which senses the pattern of a fingerprint after touching the finger on the surface of a fingerprint scanner. Fingerprint scanners are programmed with a pattern matching algorithm. Generally, a fingerprint scanner captures the fingerprint as an image format, then convert ridges and valleys of the fingerprint region in the image into a binary format (black for ridges and white for valleys) [2].

A banking staff can enter information of the customer along with scanned fingerprint. Once a customer gives his/her fingerprint, then they can gain other facilities without any additional procedures and information. When a customer needs to withdraw money, they can feed their fingerprint using scanner instead of filling forms and place signature. Thereafter the system can verify placed fingerprint with stored fingerprint from the banking database using dedicated pattern matching algorithm for the confirmation of a customer. Further, the fingerprint scanner can be placed with ATM for verification of a customer

instead of PIN number and possible to control unauthorized ATM access when its necessary. This may help to block accessing the stolen or lost ATM cards.

This study analyses the possibilities of implementing the fingerprint system in the banking transactions. The customers from several departments were interviewed, and the data was collected through a structured questionnaire according to the guidance of banking administrators. The practical difficulties of manual signature in daily banking practices for customers and employees have been observed. Further, for the purpose of performance comparison between a number of ATM transaction and manual transaction of selected dates of months' especially salary and pension dates were collected. Further, the existing literature and frameworks were studied to propose a better fingerprint based digital transaction mechanism for the banks. The fingerprint algorithm should have higher throughput, computational efficiency and accuracy as the bank must maintain the quality of service and fast performance to cater a wide variety of customers.

III. RESULTS AND DISCUSSIONS

According to the survey with banking stakeholders, more than 80% of the bank customers and employees expect the technological advancement of green banking. More than 86% of customers got a knowledge regarding the fingerprint system and nearly 48% of customer knows that already fingerprint system is adopted in several foreign banks. Customers and employees are interested in practice with the fingerprint system rather than a manual signature system. Sri Lankan banks are highly busy on 10th, 20th and 25th dates in a month due to the pension, teacher's salary and other salaries respectively. During these peek days minimum 400 and maximum 700 transactions available in town branches, 350 to 400 transactions are possible in the out of city branches via the counters of the banks. ATM and CDM consist maximum 900 and minimum 150 number of transactions. The number of transactions through the counters depends on the time that the customers spend in the banks. Employee's service time per customer also increase based on the delay of transactions. If the banks introduce a fingerprint system, then the bank can increase the number of transactions approximately by double. Further, the customers also can get faster and accurate service.

Customers can place their fingerprint to withdraw money. If the placed fingerprint is correct, then the system allows to continue further operations regarding withdrawal otherwise it tries up to the maximum level of the attempt, if the attempt is exceeded, then the system stops the transaction and identify the person as not an owner of the account or a perpetrator immediately.

Further, the digital fingerprint framework allows to identify bank frauds easily, detect perpetrator, and unauthorized transactions on time by bank officers before any complaint from customers. This system can be reducing the internal audit works and minimize the time to tally the account at the end of the day.

Based on the literature, there are efficient algorithms available to match the accurate fingerprint from the banking database. Nearly seven algorithm gives more than 90% of

accuracy for fingerprint matching algorithm. Especially, "A correlation-based fingerprint verification system", "Pores, Difference of Gaussian filtering, pore – valley descriptor", and "Redundant discrete wavelet transform, Dezert– Smarandache theory" gives 98%, 98%, and 97.98% of accuracy respectively [3].

Some of the governments and non-government sectors introduce fingerprint system to register the attendance of employees. Most of the other developed and developing countries adopt fingerprint technology in the banking sector while doing mobile and online transactions. ATM also installed with fingerprint system as a password protector [4]. Therefore, adopting a fingerprint system to Sri Lankan banks are an effective and efficient strategy to provide better and secure customer services and protect both customers and employees from banking fraud.

IV. CONCLUSIONS

Banking Sectors are getting the manual signature of customers for their basic requirements to fulfill the banking activities; this is a burden procedure to customers as well as employees. This study proposed to convert the traditional signature system into digital fingerprint system in banking sector. More than 80% of general public got a knowledge regarding fingerprint technology and they are eager to accept new technology in the Sri Lankan banking sector. Efficient fingerprint matching algorithms are available with 98% accuracy for match fingerprints. This system increases efficiency and reduces the time consuming of banking activity. It can be used to identify unauthorized activity and banking fraudulent access immediately and accurately. It helps to change over banking framework into digital green banking. Protect unsafety transactions and reduce manual, paper-based works in banks. The banks can attract more customers, and customers would feel secured while dealing their transactions with banks.

REFERENCES

[1] Israa M. Alsaadi. (2015). Physiological Biometric Authentication Systems, Advantages, Disadvantages and Future Development: A Review, International Journal of Scientific & Technology Research, 4(12), 285-289

[2] Annapoorani. D & Caroline Viola Stella Mery. M, (2014). A Survey Based on Fingerprint Recognition – Minutiae. *International Journal of Science and Research (IJSR)*, 3(10), 607-611

[3] Shoba Dyre, & C.P. Sumathi. (2016). A survey on various approaches to fingerprint matching for personal verification and identification, *International Journal of Computer Science & Engineering Survey (IJCSES)*, 7(4), 1-17

[4] Priyanka Mahajan, et al. (2016). Secured Internet Banking Using Fingerprint Authentication, *International Journal of Innovative Research in Computer and Communication Engineering*, 4(3), 6199-6208