CASHLESS SOCIETY MANAGING PRIVACY AND SECURITY IN TECHNOLOGICAL AGE

MR.K.VIJAY, P.ASHRITHA, K.PAVAN, S.NIKITHA, P.NAVADEEP, S.DEEPAKSAI

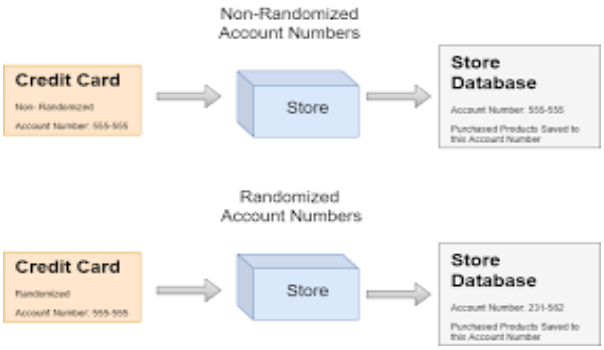
Abstract A cashless society is an economic state which handles financial transactions not in the form of traditional mediums of currency, such as cash or coins, but by transferring digital data (usually by electronic means, such as credit cards and mobile data) between participating parties. Participants of a cashless society must Figure out a way to protect their transaction data, acknowledging the risks of organizations collecting mass amounts of said data, which result in a reduction of personal privacy. Balancing individual privacy with data security is vital in the information age, especially considering the increasing risk of data breaches and exploitation. In order to increase privacy in a cashless society, a few courses of action can be combined to produce a lasting and desirable result for users: A new kind of banking service that assigns randomized numbers to credit cards, the use of blockchain to monitor all transactions from individuals, and a campaign to educate and inform key stakeholders about security and privacy risks to provide the necessary tools and background knowledge to safeguard their own information before interaction with a foreign entity or other third parties i.e. cyber security departments, IT technicians, etc. Blockchain and card number randomization are both susceptible to zero-day errors, bugs, and varied levels of social acceptance. This preliminary research draws on a systems analysis of cashless systems to identify and analyze a set of social and technical solutions to support a robust cashless system that protects users' privacy and maintains the security of the system. The information found and analyzed will be beneficial by exposing weak points in current methods of data integrity and security. Learning about current and future methods of managing privacy and data security in the technological age would be helpful in creating preventative counter measures.

***Key Words*:** Cashless economy, e-banking, card swipe, digital money, plastic money, transparency and digital transaction.

INTRODUCTION

India is an enthusiastic effort to move towards a cashless transaction economy by minimizing the use of corporal cash. Digitalization is a process which may help the economy towards a cashless society. The trend towards use of non-cash transactions and settlement began in daily life during the 1990's, when electronic banking became popular. By the 2010's digital payment method where widespread in many countries with examples including intermediaries such as PayPal, digital wallet systems operated by companies like apple, contract less and NFC payments by electronic card or smart phone and electronic bills and banking, all in wide spread use. By the 2010's cash had become actively disfavored in some kinds of transaction which would historically have been very ordinary to pay with physical tender and larger cash amounts where in some situations treated with suspicion, due to its versatility and ease of use in money laundering and financing of terrorism and actively prohibited by some suppliers and retailers, to the point of coining the expression of a "war on cash". By 2016 in the United Kingdom it was reported in 1 in seven people no longer carries or use cash. The 2016 United States user consumer survey study claims that 75% or respondents preferred a credit or debit card as their payment method while only 11% of respondents preferred cash. By 2017, digital payment methods such as Venmo and square contribute to cashless transaction. Venmo allows individual to make direct payment to other individual without having cash accessible. Square is an innovation that allows primarily small business to receive payments from their clients.

RELATED WORK



MODEL ANALYSIS

A. The Collection of Data

A system is composed of elements, interconnections of the elements, and a function or purpose [4]. A cashless society is a system composed of entities such as standard users, governments, and banks. A cashless system provides a means of digital currency exchange. Privacy and security concerns within a cashless system are abundant and must be addressed. A. The Collection of Data In a completely cashless society, and in today's age, every transaction one makes on their credit card is kept in the corresponding retailer's database. The information collected from customer transactions are used for accounting and tax purposes by all businesses, but many of them collect mass data about people. For example, when a person buys some product from Target, the store keeps a record of what that card has purchased [5]. This record is linked to that specific card and whatever other information Target can gather about that customer. As a result, people are unknowingly being exploited for the information they may not realize they are giving out. The desired level of privacy would include a user to avoid having their transactions be collected and unethically used by businesses and corporations. Any kind of obtainable data can be stored and sold if the quantity and quality of data is useful for business or government applications. Data brokers collect and sell personal information about people. This information is oft en collected about people without their knowledge nor explicit consent [5]. In this day and age, it's difficult to prevent data brokers from gaining information about individuals. Almost everything people do is tracked in some way and used for another purpose. People can view this as an inva sion of privacy. It is important to note that our daily lives are becoming less private.

B. Solution Analysis

i) Randomized Credit Card Numbers

In order to prevent stores and businesses from collecting information about their customers, randomized card numbers can be u sed. If a customer using the randomized card system purchases groceries from a store, the

items bought will be linked to a certain card number. If the customer with the same card returns to the same store on another day, the purchase will be linked to a different card number than the previous day. Figure 1 depicts the difference between using a standard credit card and a randomized card, in relation to a store's database. The database saves the real card number for standard credit cards, and a different number for the randomized one.

ii) Blockchain

Another system that all levels of government will need to set in place will be a nationalized blockchain network, which will handle tracking transactions in a secure and private manner. According to Melanie Swan's Blockchain: Blueprint for a New Economy, blockchain operates as a public ledgerof all transactions [8]. The blockchain will have complete information related to each transaction and the data of each person involved in said transaction. Such technology is more secure than other record-keeping systems. Blockchain's ability to track in realtime allows for the elimination of error handling, which also allows for improved traceability. Such a feat would first need to be built by the collective efforts

of developers, engineers and designers. Regulations and operators/maintainers can be established through lawmakers initially passing laws that address who will be operating and maintaining the secure blockchain network and moving the financial aspects of life to the network.

A. Algorithm

Merkle tree is a fundamental part of blockchain technology. It is a mathematical data structure composed of hashes of different blocks of data, and which serves as a summary of all the transactions in a block. It also allows for efficient and secure verification of content in a large body of data. It also helps to verify the consistency and content of the data. Both Bitcoin and Ethereum use Merkle Trees structure. Merkle Tree is also known as Hash Tree. The concept of Merkle Tree is named after Ralph Merkle, who patented the idea in 1979. Fundamentally, it is a data structure tree in which every leaf node labelled with the hash of a data block, and the non-leaf node labelled with the cryptographic hash of the labels of its child nodes. The leaf nodes are the lowest node in the tree.

How do Merkle trees work?

i) A Merkle tree stores all the transactions in a block by producing a digital fingerprint of the entire set of transactions. It allows the user to verify whether a transaction can be included in a block or not.

ii) Merkle trees are created by repeatedly calculating hashing pairs of nodes until there is only one hash left. This hash is called the Merkle Root, or the Root Hash. The Merkle Trees are constructed in a bottom-up approach.

Every leaf node is a hash of transactional data, and the non-leaf node is a hash of its previous hashes. Merkle trees are in a binary tree, so it requires an even number of leaf nodes. If there is an odd number of transactions, the last hash will be duplicated once to create an even number of leaf nodes.

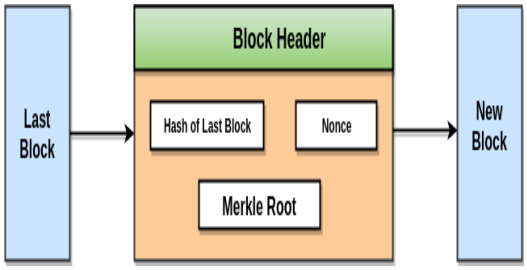


Fig 6: the Block Header of Merkle Tree

The Merkle Tree maintains the integrity of the data. If any single detail of transactions or order of the transaction's changes, then these changes reflected in the hash of that transaction. This change would cascade up the Merkle Tree to the Merkle Root, changing the value of the Merkle root and thus invalidating the block. So everyone can see that Merkle tree allows for a quick and simple test of whether a specific transaction is included in the set or not.

2. RESULT ANALYSIS

To run this application, go to any browser and type localhost://2021(port number)

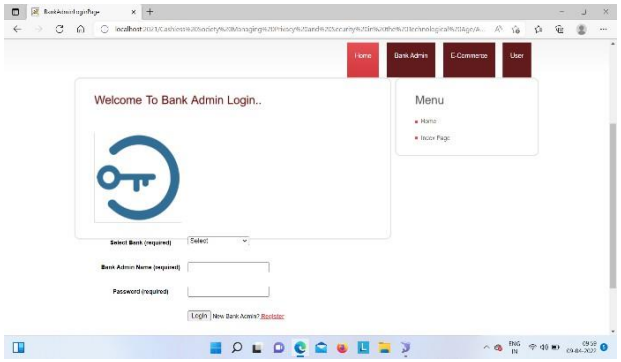


Fig 7: Bank Admin login where admin has to login if he is an existing user else he need to register as a new user.

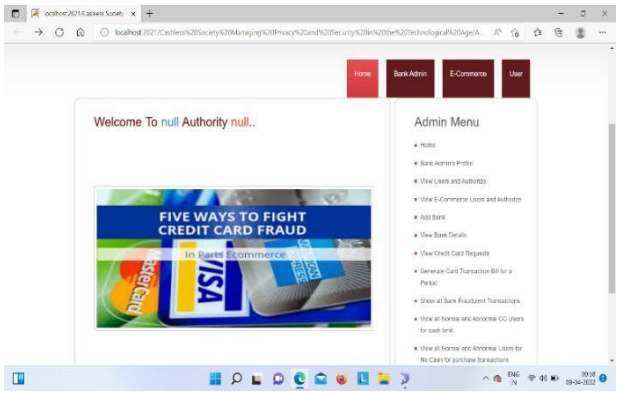


Fig 8: authorizing users and adding their bank details.

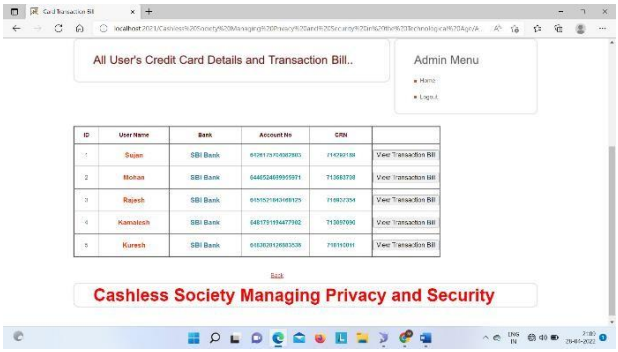


Fig 9: all user's credit card details and their transaction bills(tracking).

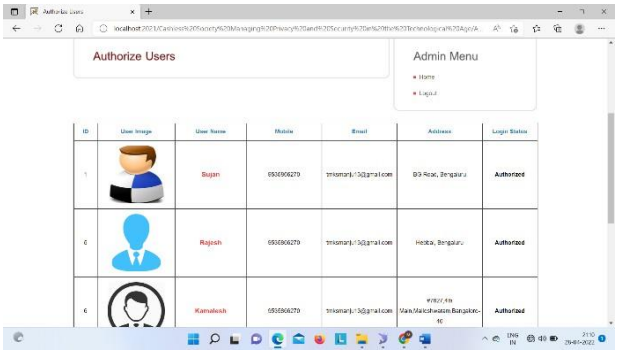


Fig-10: Details about the authorized users.

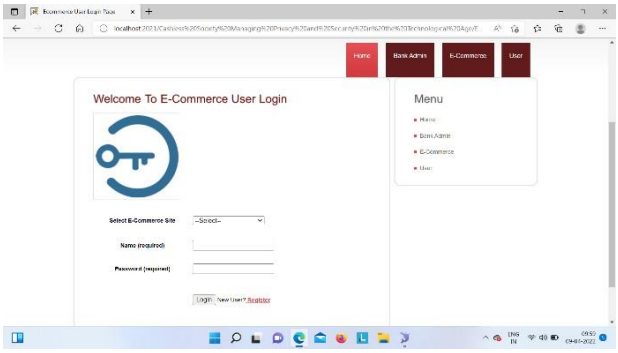


Fig 11: E-commerce User login where user has to login if he is an existing user using the credentials else he need to register as a new user.

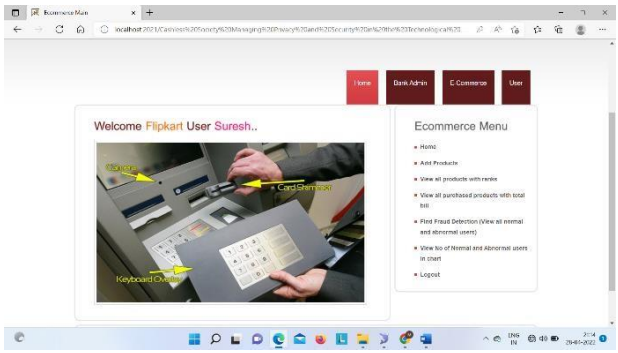


Fig 12: e-commerce menu where we can find different options like purchasing products, fraud detections, normal and abnormal users.

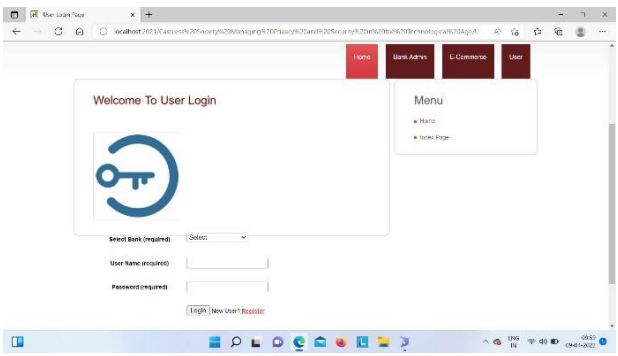


Fig 13: User login where user has to login with his credentials if he is an existing user else he need to register as a new user..

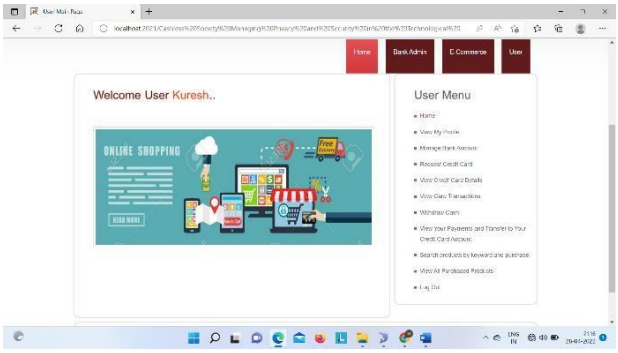


Fig 14: User Menu where we can find different options like my profile, bank details, requesting credit card, viewing transactions.

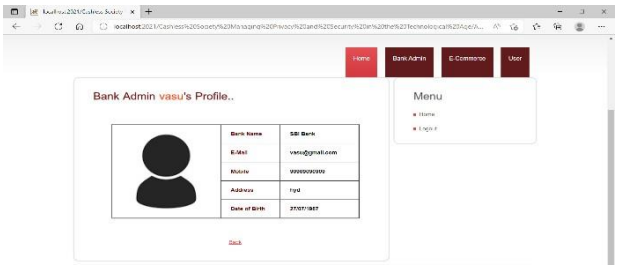


Fig 15: example for bank admin user's profile.

CONCLUSIONS

We have provided an overview of the credit card processing mechanism and some insight into the real-time online credit card processing systems. Critical factors such as cost, complexity, and security associated with the implementation and maintenance of such systems are also discussed. No matter what method of payment processing mechanism is considered, an online merchant must realize that real-time payment processing can be highly complex there is no one size-fits-all solution for all merchants. Whatever payment software is chosen, it needs to be integrated with the e-commerce system, unless one can purchase an integrated e-commerce and payment system. Furthermore, choosing the right payment gateway-provider can relieve a lot of headache of handling payments and interacting with other parties of e-business processes. A payment gateway must support all aspects of payment processing – authorization, capture of funds, refunds, and reports. Products offered by selected vendors should be compared according to the factors such as complexity of the system and software, implementation time and cost, software cost and maintenance fees, transaction costs, and security features for consumers and merchants.

REFERENCES

[1] Abrazhevich, Classification and characteristics of electronic payment systems, in: Lecture Notes in Computer Science, LNCS 2115, 2001,
pp. 81–90.

[2] More wedge, C. K., Holtzman, L., &Epley, N. (2007). Unfixed resources: perceived costs, consumption, and the accessible account effect. Journal of Consumer Research, 34(4), 459 467)

[3] Humphrey, D. B. (2004): ―Replacement of cash by cards in U.S. Consumer Payments, Journal of Economics and Business, 56, 211–225.

[4] Marco, A. &L.Bandiera (2004): -Monetary Policy, Monetary Areas and Financial Development with Electronic Money, IMF Working Study, IMF.

[5] Moses-Ashike, H. (2011), ―Cashless Economic can Reduce Risk of Carrying Huge Cash‖, [Online] Available: http://www.businessdayonline.com/…/22217.

[6] Odior, E.S., and Banuso, F.B. (2012): Cashless Banking in Nigeria: Challenges, Benefits & Policy Implications. European Scientific Journal. Vol 8, pp. 12 – 16.

[7] Roth, B. L. (2010).―The Future of Money: The Cashless Economy – Part 1‖. [Online] Available: https://www.x.com/.../futuremoney- cashless-economy—part-i.

[8] Woodford M. (2003). ―Interest & Price: Foundation of a Theory of Monetary Policy‖, Princeton University Press.2019 Data Breaches - Identity Theft Resource Center. (2020). Retrieved 27 March 2020, from https://www.idtheftcenter.org/2019-data-breaches/"Leverage Points: Places To Intervene In A System." The Academy for Systems Change. N. p., 2020. Web. 3 Feb. 2020.

[9] "What's New In The 2019 Cost Of A Data Breach Report." Security Intelligence. N. p., 2020. Web. 6 Feb. 2020.

[10] Arthur, W. (2018, March 23). Lawsuits may be key to tighter US data privacy rules. Retrieved March 26, 2020, from https://dailybrief.oxan.com/Analysis/DB230635/Lawsuits-may-bekey-to-tighter-US-data-privacy-rules