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Designing of Smart and Secure Single ATM Card for Multiple Bank Accounts

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ABSTRACT

In the era of digital banking, security and convenience are paramount in financial transactions. This paper presents the design of a smart and secure single Automated Teller Machine (ATM) system that incorporates Radio Frequency Identification (RFID) technology for enhanced transaction management. The proposed system utilizes a single RFID card for multiple transactions linked to a mobile application, allowing users to manage account selections, initiate transactions, and access banking details conveniently. This groundbreaking method not only streamlines the user interface but also fortifies protection through cutting-edge verification and information safeguarding techniques. The objective of this study is to create a resilient ATM system capable of safeguarding user information while providing seamless transaction capabilities, ultimately contributing to a more efficient banking ecosystem in line with modern technological advancements

Keywords: RFID card, RFID Reader, RFID Tag, Digital banking, Mobile Application, Arduino UNO.

INTRODUCTION

In today's digital era, banking is facing a radical shift through technological advancements and evolving customer demands. With increasing financial transactions going online, the demand for secure, efficient, and user-friendly banking products has never been more intense. Traditional Automated Teller Machines (ATMs) have been part of banking convenience for decades, enabling users to view their cash and conduct transactions with simplicity. However, these machines also have their limitations. Factors such as card skimming, unauthorized access, and having to carry several bank cards are significant drawbacks for users. In an attempt to bridge this gap, this project offers a cutting- edge smart ATM system that utilizes Radio Frequency Identification (RFID) technology. The system allows customers to access various bank accounts from a single RFID card, thereby increasing security during transactions as well as customer satisfaction. In addition, the inclusion of a mobile application facilitates real-time account management and transaction tracking so that users can perform their banking services with confidence and convenience. This innovative product not only increases the customer experience by being convenient to use but also increases security through sophisticated authentication and data protection techniques.

PROPOSED APPROACH

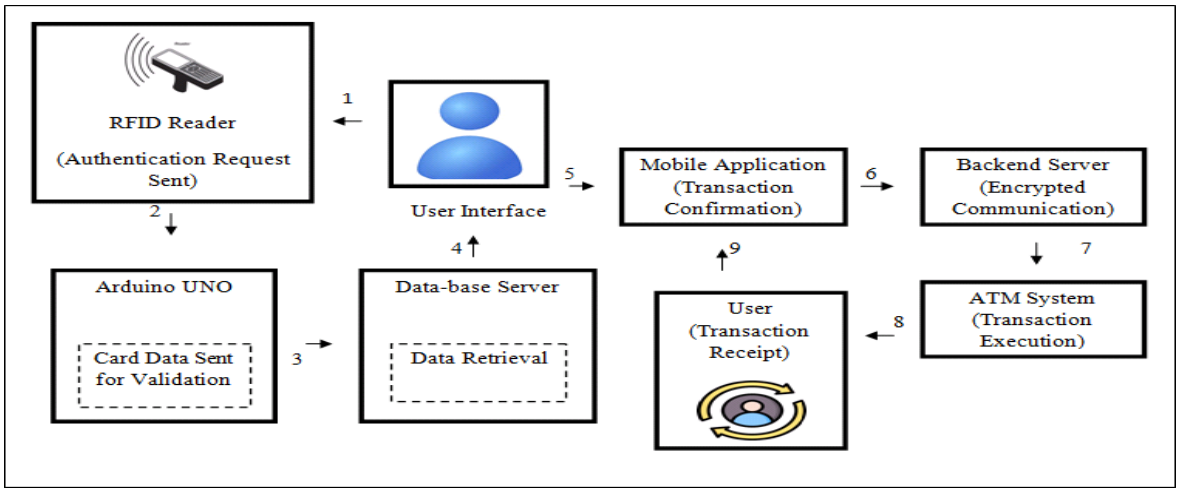

Figure 1: Architecture for proposed Approach

Fig.1 depicts the design for the new and secure automated teller machine (ATM) card that can effectively handle multiple bank accounts. This design uses cutting-edge technologies, including RFID and biometric authentication, to offer a smooth experience to the users while ensuring high-end security practices.

RESULT

The application on the smartphone is provided instantaneous feedback from Arduino Uno through integration of wireless data standards, such as radio frequency (RF) or internet protocol (IP) networking, used to enable the real-time exchange and synchronization of data. This innovative design improves user experience by streamlining the transaction process, facilitating quick access to varied accounts by means of an intuitive ATM interface and easy-to-use mobile application. The integration of advanced security features, including elliptic curve cryptography, anti-tampering capabilities, and dual-factor authentication, provides users with a powerful and secure framework for managing financial transactions. Significantly mitigates risks associated with unauthorized access and fraud. Additionally, real-time transaction management features empower users to monitor their financial activities, providing transparency and control over their accounts.

Figure 1: Output in LCD Display

Figure 2: Output in LCD Display

Figure 3. The LCD screen instructs users with the message "Insert the ATM card," directing users to start the transaction process. The explicit direction provides a clear user experience through the focus towards the required action.

Furthermore, Additionally, the system's architecture is designed to be scalable and

flexible, allowing for easy upgrades and the integration of emerging technologies, including cognitive computing and predictive analytics, to further enhance its functionality and keep pace with changing industry trends By prioritizing user experience through accessible design and real-time feedback, the smart ATM system not only addresses common vulnerabilities of traditional ATMs but also aligns with the evolving expectations of modern banking customers. Figure 4. The LCD screen shows a list of banks that are available, such as "1. SBI, 2. IOB, 3. IB, 4. HDFC, 5. FR, 6. PH," and users can choose their desired bank. This is a user- friendly feature that makes it easy for users to choose their account during the transaction process.

comprehensive Additionally, the system's architecture is designed to be scalable and flexible, allowing for easy upgrades and the integration of emerging technologies, including cognitive computing and predictive analytics, to further enhance its functionality and keep pace with changing industry trends.

CONCLUSION

In addition, the system's architecture is designed to be flexible and scalable so that it can be easily upgraded and incorporate emerging technologies, including cognitive computing and predictive analytics, to further enhance its functionality and keep up with changing industry trends. this proposed system effectively addresses common vulnerabilities associated with traditional ATMs, promoting a more efficient banking experience. The integration of advanced security protocols, such as encryption and multi- factor authentication, ensures that user data remains protected against potential threats, making this innovative solution applicable across a wide range of banking environments. Moreover, the system's design prioritizes user experience, featuring intuitive navigation and real-time feedback that empower users to manage their accounts with ease and confidence. Future work will focus on real-world testing and further refinement based on user feedback, ensuring that the system meets the evolving demands for security and usability.

This iterative process will involve gathering insights from in addition, the system's infrastructure is designed to be scalable and flexible, supporting effortless upgrades and the integration of emerging technologies like cognitive computing and predictive analytics, further enhancing its capabilities and keeping pace with industry developments. Additionally, the potential for integrating emerging technologies, such as artificial intelligence and machine learning, could further enhance the system's capabilities by providing personalized financial insights and predictive analytics. Continued innovations and improvements in both security features and user interface design will be essential to meet the dynamic needs of modern banking customers, ensuring that the system not only adapts to technological advancements but also aligns with changing consumer expectations for convenience, security, and accessibility in their banking experiences. UltimatelyFinally, this smart ATM system has the potential to transform the banking model, making it more robust, efficient, and customer-centric, thus establishing a new standard for the sector and reshaping the future of financial transactions.

Declaration by Authors

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