ABSTRACT

The increasing prevalence of duplicate Student ID Cards at Telkom University, enabling unauthorized access to restricted areas and sensitive data, necessitates the implementation of stronger security measures. This study proposes a two-layer security system that integrates RSA encryption and SHA256 Rolling Code authentication system to protect the data stored on Student ID Cards. RSA encryption ensures that sensitive data remains secure, preventing breaches even if the card is lost or stolen. The Rolling Code system dynamically generates a unique hash value for each transaction or tap, effectively eliminating the risk of card duplication or replication by attackers. To address practical challenges, the system is designed to balance robust security with computational efficiency, making it suitable for large-scale deployment in environments such as universities. However, the inclusion of an additional debugging device introduces a slight increase in computational overhead due to an additional data verification step. Future enhancements recommend removing this debugging device to further optimize resource efficiency while exploring additional encryption techniques or mechanisms that strengthen security at a manageable computational cost. By combining advanced encryption with dynamic authentication methods, the proposed system provides a secure and scalable solution for protecting access to sensitive areas and information, ensuring the integrity and security of Student ID Cards in academic institutions.

Keywords: Data Encryption, RSA, Rolling Code, SHA256