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Enhanced Security Framework for Multi-Layered Wireless Communication Systems

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Abstract: This project aims to develop a lightweight and efficient Intrusion Detection System (IDS) tailored for secure communication environments, implemented entirely in Java using Eclipse IDE. The system integrates a rule-based detection mechanism that identifies known malicious input patterns such as SQL injections, system command exploits, and scripting attacks by comparing user input against a predefined list of suspicious keywords. It operates with a full-stack architecture that includes JSP, HTML, CSS, and JavaScript for the frontend, Java for the core detection logic and encryption processes, and MySQL (configured through phpMyAdmin) for backend storage and log management. A key feature of the system is its simulated honeypot mechanism, embedded within the login interface to capture and record unauthorized access attempts such as brute-force attacks or invalid username entries. These attempts are logged separately for administrator analysis without disrupting legitimate users. The system also incorporates AES (Advanced Encryption Standard) for secure file transmission, allowing encrypted input from users to be scanned for threats and safely stored in the database. Unlike machine learning-based IDS models that require large datasets and complex training, this system provides a deterministic, transparent, and fast response by leveraging simple yet effective rule-based logic. It ensures real-time feedback through a responsive GUI built with Java Swing and web technologies, while maintaining a clear separation of valid, malicious, and honeypot log entries in the backend. Designed for academic use, smallscale enterprise security, or as a prototype for future IDS enhancements, this solution balances simplicity with practical security functionality, offering high maintainability, auditability, and modular design suited for standalone or LAN-based deployment

Keywords: Intrusion Detection System

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