Chapter 8

CRYPTX Novel Approach for Data Encryption With a Customized Solution for Smarter Human-Computer Interaction

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ABSTRACT

With the increasing need for secure communication and data protection in the digital age, cryptography and network security protocols have

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emerged as crucial tools for safeguarding information from unauthorized access. This paper proposes a novel approach that combines cryptography and steganography to create a customized solution for securing data with a smart human-computer interaction system. The paper begins with an in-depth analysis of various cryptographic algorithms, strengths and weaknesses of each algorithms has been evaluated, and a customized encryption scheme is designed that leverages the advantages of different algorithms to enhance security. Next, Steganography is integrated into encryption with a custom algorithm that hides encrypted data in innocent cover objects like images or audio files, tailored to application-specific requirements. This work contributes to the field of information security by introducing a novel approach that offers increased protection against unauthorized access and data breaches with smart human computer interaction facilities

1. INTRODUCTION

As the number of instances of unauthorized access and data breaches continues to rise in the modern digital world, data security has become an extremely important concern. In the era of digital transformation, data security has emerged as a critical challenge due to escalating cyber threats, including unauthorized access, data breaches, and sophisticated malware attacks. The global cost of cybercrime is projected to exceed $10.5 trillion annually by 2025 (Cybersecurity Ventures, 2023), underscoring the urgency for advanced protective measures. While cryptography ensures data confidentiality and integrity through encryption, its standalone use often fails to address detection risks—encrypted data, though secure, signals its sensitivity to adversaries. Conversely, steganography conceals data within innocuous cover media (e.g., images, audio), but lacks intrinsic protection if discovered. For the purpose of ensuring the confidentiality and integrity of data, cryptography and steganography are powerful techniques that are utilized in the field of information security. These techniques provide robust encryption and secure storage of user data. In this work, we suggest a revolutionary approach that combines cryptography with steganography to enhance data security. Additionally, we present a