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Secure Messaging Application with Steganography-Based Encryption

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Abstract: *This project presents the development of a secure messaging application that incorporates advanced steganography. Techniques for message encryption and enhanced privacy protection. The application utilizes the Flask web framework, SQLite database management, and innovative image-based steganography to hide encrypted messages within randomly selected sticker images. The system implements multi- layered security through OTP-based authentication. encrypted message storage, and auto-delete functionality for sensitive communications. The application addresses growing concerns about digital privacy and secure communication by providing users with an intuitive platform for sending encrypted messages disguised as casual sticker exchanges. Key features include phone number-based registration with OTP verification, contact management, real-time messaging with steganographic encryption, and temporary message functionality with automatic deletion capabilities. The steganography implementation leverages PIL (Python Imaging Library) to embed encrypted message data within image metadata, making the communication appear as harmless sticker sharing while maintaining robust security protocols. Performance testing demonstrates successful message encryption/decryption rates with minimal latency and high user satisfaction scores for interface usability.*

Keywords: Steganography, Secure Messaging, Encryption, Flask, SQLite.

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