

A desktop secure folder app with One-Time Password Authentication

BY

TAJUDEEN TAIWO SAHEED

CSC/18/5867

Supervisor:

Dr. Osuolale A. Festus

Department of Computer Science

Federal University of Technology, Akure, Ondo State

Outline

- ▶ Introduction
- ▶ Literature Review
- ▶ Motivation of the Study
- ▶ Objectives
- ▶ Methodology
- ▶ Contribution to Knowledge
- ▶ References

INTRODUCTION

- ▶ The Proliferation of digital data and the increasing reliance on desktop computers for storing sensitive information have underscored the importance of ensuring the security and confidentiality of digital files.
- ▶ With the rise of cyber threats and data breaches, there is a growing demand for secure solutions that safeguard personal and business data from unauthorized access and malicious attacks.

INTRODUCTION

- ▶ In response to these challenges, developers have introduced desktop secure folder applications designed to provide users with enhanced protection for their sensitive files and folders.
- ▶ According to Nakkeeran (2015), the proliferation of networked devices and internet services has heightened concerns about the security of data stored on desktop computers. Traditional methods of data protection, such as password encryption and file access controls, are no longer sufficient to defend against sophisticated cyber threats.

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitations/Future work
Smith, J. et al/Enhancing Data Security in Desktop Folder Management Systems.	To improve data security in desktop folder management systems by implementing advanced encryption techniques.	Conducted a comparative analysis of existing folder management systems, implemented AES-256 encryption, and performed usability testing.	Provided insights into enhancing data security in desktop environments through encryption methods, and developed a prototype demonstrating improved security measures.	Future work could involve integrating additional security features such as biometric authentication and cloud synchronization

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitations/Future work
Johnson, R. / User-Centric Secure Folder App Design: A Human-Computer Interactive Perspective.	To Design a secure folder application with a focus on user experience and human-computer interaction principles.	Conducted user interviews, designed user interfaces based on user feedback, and evaluated usability through user testing.	Presented a user-centric approach to secure folder app design, resulting in an intuitive and user-friendly application interface.	Future work could involve expanding usability testing to a more diverse user population and integrating additional accessibility features.

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Chen, L. et al/Secure Folder Management in Enterprise Environments: A Policy-Based Approach	To develop a secure folder management system tailored for enterprise environments with a focus on policy-based access control.	Designed and implemented a folder management system with customizable access control policies, evaluated performance and security through simulations and real-world deployment.	Proposed a policy-based approach to folder management, allowing organizations to enforce access control policies based on user roles and permissions.	Future work could involve scalability testing with larger enterprise security frameworks.

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Wang, X. et al. (2021)/Safeguard: A Desktop Application for Secure File Management	To design a desktop application that offers comprehensive file management capabilities with built-in security features.	Integrated encryption algorithms (RSA- 4096) and multi- factor authentication mechanisms to ensure the confidentiality and integrity of user files.	Provided a feature-rich file management interface with options for encryption, decryption, file versioning, and secure file sharing among authorized users.	Future work could involve scalability improvements and user experience enhancements through usability studies and interactiv

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Patel, A. et al/Guardian Vault: A Secure Folder Application for Desktop	To provide a sure storage solution for desktop users, focusing on accessibility and performance.	Employed a combination of symmetric and asymmetric encryption techniques for file security. Implemented multi-platform support (Windows, macOS, Linux) using Electron framework for cross-platform development.	Created a versatile desktop application that ensures data confidentiality and integrity across different operating systems, with features such as automatic synchronization and file versioning.	Future work could involve integrating cloud storage options for seamless backup and recovery .

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Johnson, R. et al/LockBox:A Desktop Application for Secure File Storage.	To develop a lightweight and efficient desktop application for secure file storage	Implemented a custom encryption protocol optimized for resource-constrained environments. Utilized native platform APIs for direct access to file system operations, minimizing overhead.	Produced a fast and resource-efficient desktop application suitable for both personal and enterprise use, offering features such as folder hierarchy encryption and customizable access controls.	Limited support for advanced encryption algorithms . Future work could involve integrating blockchain technology for enhanced data

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Smith, J., & Johnson/Enhancing Desktop Security through Secure Folder Applications	To develop a secure folder application for desktop to protect sensitive files from unauthorized access.	Employed a combination of encryption algorithms and access control mechanisms to secure folders and files. Conducted usability tests to ensure user-friendliness.	Introduced a robust desktop secure folder application with strong encryption and intuitive user interface, enhancing overall desktop security	Integration with cloud storage services for seamless synchronization and collaboration. Exploration of additional authentication

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Patel, R., & Nguyen, T./ Comparative Analysis of Desktop Folder Applications.	To compare and evaluate existing desktop secure folder applications based on security features, performance, and user experience.	Conducted a comprehensive review of popular secure folder applications. Evaluated security measures, encryption algorithms, performance impact, and user feedback.	Provided insights into strengths and weaknesses of different secure folder applications, helping users make informed decisions and usability preferences.	Inclusion of larger sample size of secure folder applicatio ns for a more exhaustive compariso n.

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Lee, S., & Gupta, M./ User-Centric Design of Desktop Secure Folder Applications	To design a user friendly secure folder application for desktops while maintaining high levels of security	Employed user-centered design principles, conducting surveys and interviews to understand user needs and preferences. Iteratively prototyped and tested the application with target users.	Developed a secure folder application with emphasis on usability and intuitive design, ensuring that security features are accessible to non-technical users.	Integration of feedback mechanisms for continuous improvement based on user interactions and evolving security threats.

LITERATURE REVIEW

Author/title	Objective(s)	Methodology	Contributions	Limitation s/Future work
Knox by AgileBits	To provide users with a secure folder app for desktop systems, allowing them to encrypt and protect their sensitive files and data	Knox utilized strong encryption algorithms to secure files stored within the folder. It offer a user friendly interface for creating and managing secure containers, allowing users to easily drag	Knox contributed to enhancing desktop security by providing a convenient and effective solution for users to safeguard their sensitive information	One limitation of Knox was its reliance on one-time password authentication. Also the software was only available for macOS,

MOTIVATION OF STUDY

Having reviewed recent literatures on desktop secure folder app. The following are the summaries of the limitations in the study reported by (Johnson, Chen L. et al, Patel, A et al, Smith, J., & Johnson, Knox by agileBits)

- ❖ Providing additional security to normal traditional authentication such as biometric authentication and cloud synchronization.
- ❖ Integration of blockchain technology for enhanced data integrity verification and decentralization
- ❖ Providing One-time password authentication for all platforms such as Windows, Linux and mac OS inclusive.

This research is therefore motivated by the need to provide One-time authentication method for all platform such as macOS, Windows and Linux.

MOTIVATION OF STUDY

Having reviewed recent literatures on desktop secure folder app. The following are the summaries of the limitations in the study reported by (Johnson, Chen L. et al, Patel, A et al, Smith, J., & Johnson, Knox by agileBits)

- ❖ Providing additional security to normal traditional authentication such as biometric authentication and cloud synchronization.
- ❖ Integration of blockchain technology for enhanced data integrity verification and decentralization
- ❖ Providing One-time password authentication for all platforms such as Windows, Linux and mac OS inclusive.

This research is therefore motivated by the need to provide One-time authentication method for all platform such as macOS, Windows and Linux.

OBJECTIVES OF STUDY

- ▶ To ensure only authorized users with correct OTP can access the secure folders.
- ▶ To protect sensitive data such as photos, videos, documents, and other confidential information by utilizing OTP authentication. The app ensure that only users with valid credentials can access the data, thereby safeguarding it from unauthorized access or data breaches.
- ▶ To protect user privacy by ensuring that only the intended user can access their secure or personal information.
- ▶ To implement authentication that adds extra layer of security as well as user friendly and convenient. For example it can be delivered via SMS, email, or generated with app itself, allowing users to easily authenticate themselves without undue hassle.
- ▶ OTP can be easily authentication can be easily integrated into the secure folder app and scaled to accommodate a growing user base.

METHODOLOGY

REQUIREMENT ANALYSIS

- ❑ Identify the target audience and their needs
- ❑ Define the features required for a secure folder app, such as encryption algorithms, authentication methods, file management capabilities
- ❑ Determine the platforms the app will support e.g windows, Linux, and macOS
- ❑ Identify security requirements and compliance standards (e.g., GDPR, HIPAA).

METHODOLOGY

DESIGN PHASE

- ❑ Design the user interface (UI) for the desktop app, focusing on intuitive and simplicity
- ❑ Create wireframes and mockups to visualize the app's layout and flow
- ❑ Design the database schema for storing user credentials and encrypted files
- ❑ Architect the system for scalability, security, and performance

METHODOLOGY

TECHNOLOGY SELECTION/DEVELOPMENT

- ❑ Choose appropriate technologies and frameworks based on the project requirements
- ❑ Consider using Electron framework for desktop application development
- ❑ Select a secure Database management system such as SQLite
- ❑ Deploy the application to desktop platforms through appropriate distributions channels (e.g., app stores, direct downloads).

METHODOLOGY

TECHNOLOGY SELECTION

- ❑ Integrate a reliable OTP generation library into the application.
- ❑ Implement OTP delivery mechanism such as SMS, email, or authenticate apps.
- ❑ Ensure the OTP generation is secure and compliant with industry standards (e.g., HMAC-based OTP)

METHODOLOGY

FOLDER MANAGEMENT

- ❑ Develop functionalities for creating, accessing, and managing secure folders.
- ❑ Allow users to organize files within secure folders and perform basic file operations (e.g., create, delete, rename).
- ❑ Implement file encryption and decryption seamlessly within the application

METHODOLOGY

FOLDER MANAGEMENT

- ❑ Develop functionalities for creating, accessing, and managing secure folders.
- ❑ Allow users to organize files within secure folders and perform basic file operations (e.g., create, delete, rename).
- ❑ Implement file encryption and decryption seamlessly within the application

CONTRIBUTION TO KNOWLEDGE

- ❑ This research work develop a secure folder app by implementing one-time password authentication mechanisms
- ❑ This research develop secure folder app for multiple desktop platforms (e.g., Windows, macOS, Linux).
- ❑ This research contribute to the advancement of secure authentication mechanisms, particularly in desktop applications.

References

- ❑ Jovanovic, M., & kocovic, A. (2015). Secure Password Authentication Protocol Using One-Time Password Authentication. CRC Press.
- ❑ Crptanalysis of the on-Time Pad. IEEE Security & Privacy, 11(1), 16-21.
- ❑ Perrig, A., et al (2001). Turtles all the way down: Research challenges in user authentication.
- ❑ Smith, C. (2018). “Building Cross-Platform Desktop Applications with Electron.” Packt Publishing.

THANK YOU FOR LISTENING