USER-CENTRIC DESIGN AND IMPLEMENTATION OF A FILE SHARING PLATFORM WITH REAL-TIME COLLABORATION FEATURES

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Keywords:

File Sharing, Real-Time Collaboration, Virtual Mouse, Virtual Keyboard, Live Screen Sharing, User Interface, Security, Android App, Laptop Integration.

Introduction / Background:

In a digitally interconnected world, the need for efficient and secure file sharing solutions is paramount. This project, undertaken by students Anjaneya Mustoor, Gajendra M, and Venkatesh N under the guidance of Dr. Kumaraswamy S, aims to address this need by developing a user-centric file sharing platform with real-time collaboration features. Building upon existing research and technological advancements in file sharing and remote interaction, this project endeavors to create a comprehensive solution that enhances the seamless exchange of data between laptops and Android devices. By incorporating elements such as virtual mouse and keyboard functionalities, live screen sharing capabilities, and advanced security measures, the proposed platform aims to revolutionize the way users interact and collaborate across different devices.

Objectives:

1. Develop a robust file sharing application that ensures fast, reliable, and cross platform transfer of data between laptops and Android devices.

2. Integrate virtual mouse and keyboard features into the Android app, allowing users to remotely control their laptop's cursor and input text.

3. Implement live screen sharing functionality with low-latency and high-quality display to facilitate real-time collaboration and remote viewing.

4. Enhance the user interface of the Android app to seamlessly incorporate the new features and provide an intuitive user experience.

5. Strengthen security measures to safeguard virtual mouse and keyboard interactions, as well as encrypt live screen sharing to protect sensitive information.

6. Conduct extensive testing and optimization to ensure the performance, usability, and reliability of the file sharing platform under various usage scenarios.

7. Provide documentation and support resources to assist users in effectively utilizing the platform for their file sharing and collaboration needs.

8. Explore possibilities for future enhancements and innovations based on user feedback and emerging technologies, ensuring the continued evolution and relevance of the file sharing platform.

Existing System:

In the traditional file-sharing scenario, users typically rely on various methods, such as USB cables, email attachments, cloud storage services, or third-party file-sharing apps. While these methods may serve the basic purpose of transferring files, they often lack comprehensive features for remote control and real-time collaboration between a laptop and an Android device. Security measures may vary, and the user experience may not be as seamless or integrated.

Proposed System:

The proposed system is an advanced file-sharing application that goes beyond conventional file transfer methods. It introduces additional features such as virtual mouse, virtual keyboard, and live screen sharing, creating a more interactive and versatile platform. Users can not only transfer files efficiently but also remotely control their laptops and collaborate in real time. Security measures, including encryption, are implemented to safeguard data during transfers. The system is designed to provide a holistic and user-friendly experience, catering to various use cases, from personal file sharing to professional presentations and remote support.

Key Differences:

1. Remote Control Features:

Existing System: Typically limited to basic file transfer.
Proposed System: Introduces virtual mouse, virtual keyboard, and live screen sharing for enhanced remote-control capabilities.

2. Real-time Collaboration:

Existing System: Primarily focuses on file transfer without real-time collaboration features.
Proposed System: Facilitates real-time collaboration through live screen sharing.

3. Cross-Platform Compatibility:

Existing System: May vary in compatibility across different platforms.
Proposed System: Ensures compatibility and seamless integration between laptops and Android devices.

4. Security Measures:

Existing System: Security measures may vary based on the chosen method or platform.

Proposed System: Implements advanced security measures, including encryption, for secure file transfer and remote-control interactions.

5. User Experience:

Existing System: User experience may vary depending on the chosen method, and remote-control features are usually not integrated.

Proposed System: Enhances user experience with an intuitive interface and integrated remote-control functionalities.

6. Versatility:

Existing System: Primarily focused on file transfer.

Proposed System: Offers a versatile solution with a range of features suitable for different scenarios.

System Architecture:

In the proposed system, there is a client-server architecture. The Android mobile phone acts as a client, and PC/Laptop serves as a server. The client sends a request to the server for connection establishment via wireless communication (Wi-Fi). Connection is established using handshaking. After connection establishment, ports are assigned, and sockets are established at both ends for communication. The desktop application is in Java, and the mobile application is in Android.

Windows registry is a hierarchical database that stores some configuration setting options and some processes which help to control mouse movements. When the user controls the mouse from an Android mobile, then in the background, the process of the desktop application will communicate with the mouse process, which is in the Windows registry. And this communication is done through Inter-Process Communication.

Similarly, the Windows task manager provides limited information about computer performance and applications as well as processes running on that computer. For example, the processes of applications such as Windows Media Player, VLC, Power Point Presentations the processes reside in the task manager. The procedure of controlling these applications is similar to the procedure of controlling the mouse.

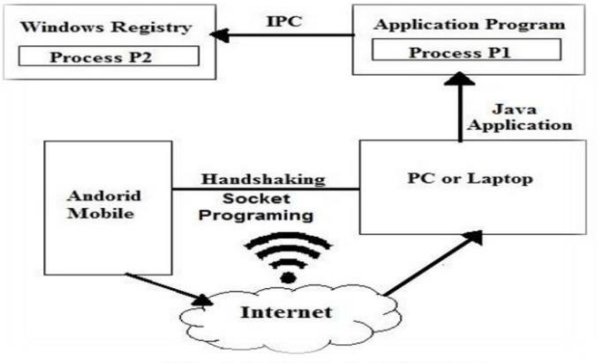

Fig. 1 System Architecture

Advantages:

The proposed file-sharing application with additional features offers several advantages:

1. Efficient File Transfer:

- Facilitates quick and reliable file transfers between a laptop and an Android device, providing a seamless user experience.

2. Remote Control Capabilities:

- Enables users to remotely control their laptop using virtual mouse and keyboard features, offering convenience and flexibility.

3. Real-Time Collaboration:

- Live screen sharing allows for real-time collaboration, making it ideal for scenarios such as presentations, remote assistance, or collaborative work.

4. Cross-Platform Compatibility:

- Ensures compatibility across different platforms, allowing users to share files and control their laptop regardless of the operating system.

5. Enhanced User Experience:

- The addition of virtual features and live screen sharing enhances the overall user experience, making the application more interactive and dynamic.

6. Security Measures:

- Implements advanced security measures, including encryption during file transfer, ensuring the protection of sensitive data.

7. Versatility:

- Adaptable to various use cases, from personal file sharing to professional presentations or remote technical support, providing a versatile solution.

8. User-Friendly Interface:

- Incorporates an intuitive user interface that accommodates all features seamlessly, making it easy for users to navigate and utilize the different functionalities.

9. Time and Cost Savings:

- Reduces the need for physical connectivity methods or third-party applications, saving time and potential costs associated with alternative solutions.

10. Enhanced Productivity:

- The combination of efficient file transfer and remote-control features contributes to increased productivity, especially in collaborative and remote work environments.

11. Accessibility:

- Provides access to files and control of the laptop from a distance, enhancing accessibility and usability in various situations.

Technology Stack:

- Android App: Java/Kotlin

- Laptop App: Java

- Networking: Sockets/HTTP for file transfer, additional protocols for live screen sharing.

- UI Enhancement: Android UI toolkit, responsive design.

Development Phases:

1. Requirements Refinement:

   - Update and refine project requirements to incorporate the new features.

2. Technology Integration:

   - Integrate technologies for virtual mouse, virtual keyboard, and live screen sharing into the existing application architecture.

3. Enhanced UI Design and Implementation:

   - Design an intuitive interface that seamlessly incorporates file transfer, virtual mouse, virtual keyboard, and live screen sharing functionalities.

4. Security Implementation:

   - Extend security measures to cover the newly introduced features, ensuring a secure and private user experience.

5. Testing and Optimization:

   - Conduct thorough testing to identify and address any issues related to the enhanced features, optimizing performance and responsiveness.

6. Documentation:

   - Create comprehensive documentation for users and developers, detailing the added functionalities and usage guidelines.

7. Deployment:

   - Release the updated application on the Google Play Store for Android users and distribute the enhanced laptop application through appropriate channels.

Conclusion:

The development of a file-sharing application with advanced features, including virtual mouse, virtual keyboard, and live screen sharing, represents a significant leap forward in addressing the limitations of traditional file transfer methods. The project's success lies in its ability to offer a holistic solution that goes beyond mere file exchange,

providing users with a versatile tool for seamless interaction between their laptop and Android device.

As technology continues to evolve, this file-sharing application positions itself as a progressive solution that aligns with the changing needs of users in an increasingly dynamic digital landscape. The successful execution of this project not only meets the immediate requirements of efficient file exchange but also anticipates and addresses the growing demand for versatile, secure, and user-friendly interactions between devices.

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