Department of Computer Science & Engineering
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PROJECT SYNOPSIS

Smart File Organizer with Audit Trail

A Smart File Organizer that automatically monitors, organizes, logs, versions, and optimizes files in real time using Node.js, Express, MongoDB, and intelligent rules.

Batch-13 Configuration

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1. Introduction & Problem Statement

In modern computing environments, managing large volumes of files efficiently has become a major challenge. Files are often scattered across directories without proper categorization, leading to wasted time, storage inefficiency, and security concerns. Manual file organization is error-prone and lacks transparency and traceability.

The Smart File Organizer with Audit Trail aims to solve these problems by providing an automated and intelligent file management system. The project monitors file system changes in real time, automatically organizes files based on predefined rules, and maintains a detailed audit trail of all file operations.

2. Problem Statement

- Traditional file management systems
- Require manual organization of files
- Do not track file movement and modifications
- Lack rollback mechanisms for accidental changes
- Waste storage due to duplicate files

There is a need for a system that can automatically organize files, track all file operations, and provide recovery and optimization features.

3. Objectives & Proposed System

Project Objectives

- To automatically organize files based on type, date, and custom rules
- To monitor directories in real time for file changes
- To maintain a complete audit trail of file operations
- To provide a web-based interface for managing organization rules
- To implement versioning and rollback for file organization changes
- To reduce storage usage using content-based deduplication

Proposed System Overview

The proposed system uses Node.js to monitor file system events using the fs module. When a file is created, modified, or moved, the system automatically categorizes it into appropriate folders. All file operations are logged in MongoDB, ensuring a complete and secure audit trail.

An Express.js web interface allows users to manage file organization rules and view logs. A Git-like versioning mechanism enables rollback of file organization changes. Shell scripts are used for efficient batch processing of large numbers of files. Content-based deduplication is implemented using hashing techniques to identify and link identical files, saving storage space.

4. System Architecture

- File Monitoring Layer: Node.js fs module watches directories in real time
- Processing Layer: File categorization, deduplication, and versioning logic
- Database Layer: MongoDB stores audit logs and file metadata
- Web Interface: Express.js API for rule management and monitoring
- Batch Processing: Shell scripts for large-scale file operations

5. Scope of the Project & Technology Stack

Scope of the Project

- Automatic file organization
- Real-time directory monitoring
- Audit trail for file operations
- Versioning and rollback support
- Storage optimization through deduplication

Technology Stack

- Backend: Node.js
- Web Framework: Express.js
- Database: MongoDB
- File System Monitoring: Node.js fs module
- Scripting: Shell scripts (Unix/Linux)
- Hashing: SHA-256 for deduplication
- Cloud Integration: Google Drive / Dropbox (optional)

6. Applications & Future Enhancement

Real-World Applications

- Enterprise file management systems
- Cloud storage organization
- Secure document management
- Backup and recovery systems

Future Enhancement

- AI-based file classification
- Role-based access control
- Real-time notifications
- Full cloud synchronization
- User authentication and authorization

Conclusion

The Smart File Organizer with Audit Trail provides an efficient, secure, and automated solution for file management. By combining real-time monitoring, intelligent organization, audit logging, and storage optimization, the system significantly improves reliability and usability over traditional file management approaches.