An Intelligent Model for Efficiently Handling Diverse Formats of Files in Different OSes by Implementing the Unification of File Management Policies to Develop an Advanced Filing System

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Abstract: Over the years file management system has been the center of focus for many studies across various disciplines. There has been research over the explicitly and implementation of such systems however less focus has been put down over the management system of operating systems and its filing approaching of users for an advanced interface. Computers have become a part of daily life for every individual across global and there would be merely any individual who is not dependent on computers. File management systems are an intrinsic part of any operating system as they are the hierarchical system that forms the sub-directories and customizes various folders and files with names that are handled by multiple users across the globe. In the current, scenario we use various files and folders for multiple tasks and the management of files is a basic yet very complex task for any operating system. This paper presents a model for a unique and efficient file management system based on the unification of management policies and an advanced yet very approachable filing system for users to ensure a smooth process. Also, the proposed model increases the efficiency of processes by reducing access time. The paper also draws the comparison of the unified management system with the existing system to draw its advancement with the proposed model system and also proposes the application and future scope.

Keywords: File Management, Operating System, Memory Allocation, Access time

1. Introduction:

Computer users interact with files and folders daily. This interaction includes creating, downloading, naming, moving, saving, copying, reviewing, navigating, searching, and deleting files and folders. This file management is a difficult and complex task as it is influenced by a myriad number of factors which range from an individual user's behavior to the features of a specific operating system (OS) in use. Many studies have been conducted to understand how various factors affect file organization and retrieval approaches of users. However, how OSes and their file managers (FMs) affect and influence user approaches towards file management are not extensively studied. Since FMs of different OSes encourage, discourage, and forbid different interactions with files, they are likely to influence file management approaches employed by users. To what extent does FMs of different OSes facilitate different file organization and retrieval approaches adopted by users is still unknown. Also, what is yet to be understood is whether these approaches adopted by users are efficient in terms of organization and navigation step-count and step-time. This implies that armed with this knowledge of FM influences on file management approaches of users and their efficiency in terms of step-count and step-time, an

efficient file management approach can be devised by unifying the FM policies enforced by OSes and file management approaches adopted by users.

In that they are in the process of storing and arranging files so that they may be retrieved when needed, file systems play a crucial role in operating systems. The conventional file system concept is no longer able to suit modern users' expectations for storing and retrieving files based on metadata due to the high capacity of modern storage devices and the growing quantity of files saved. For users to effectively manage their ever expanding data collections, file systems need to provide an improved means of data organization and access. The study intends to devise an efficient file management approach by unifying file management policies enforced by FMs of different OSes, and different organization and retrieval approaches adopted by users. The study aims to do so by analyzing the file organization and retrieval approaches of users adopted by them on different platforms against the same structured task. For this purpose, the study will adopt an empirical research approach from the field of Human-Computer Interaction (HCI) to perform the analysis. This HCI research approach includes developing a structured task using the guidelines of file management research and executing that task using a standard dataset by the subjects of the study on different platforms. The data collected from the experiment will be subjected to analysis to determine the cause-and-effect relationship between file management policies of

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different OSes, and organization and retrieval approaches adopted by the subjects for the standard task. This data will be analyzed to determine the efficiency in terms of step-time and step count of OS policies and user approaches for every specific operation within the structured task. The results are expected to point toward a set of efficient policy-approach file management activities (efficiency in terms of step count and step time). This unified file management will be implemented, evaluated for its efficiency, and compared with existing ones.

2. Literature Review:

J.D. Dineen et al. have combined works from several disciplines looking into this activity and found that such work often seeks to understand users' FM behavior and the reasons affecting it. They also noted that the results can be used to improve the related systems and services. Researchers engaged in information science, personal information management, human-computer interaction, computer science, and other subjects have been working on such projects for a while, and the results have incorporated many techniques from these domains; Thus, the study of file management is related to and probably highly stunning for people interested in these domains as well as those with projecting interests, such as knowledge visualization, retrieval, and organizing. The author mentioned in his work the unsurprising and the file and folder context, where users manage items in customized information structures, appears to be basic in nature. [1]

N. Neave et al. in 2019 studied and designed a psychometrically-valid questionnaire to measure digital hoarding behaviors in the workplace and found such behaviors were associated with the known characteristics of physical hoarding. They have developed the Digital Behaviours Questionnaire (DBQ) comprising two sections that become pivotal for the Project [2].

J.D. Dinneen, et al. 2019 finds that records management requires an effective understanding of its activities and the artefacts it produces: collections of personal records. The research also described the current scale and structure of such collections, and thus a common point of comparison across prior, disparate works were successfully narrated [3]. Barreau et al. 2019 performed an observation to know about the various documents on their computer desktops or in their folders structure to organize activities and tasks. The study presented their design of the system Docksy. The focus of the preliminary study was the organization of documents concerning task accomplishment or project management. The research integrated various document management with their particular tasks and also observed the kind of users and their organization. [4]

Nehad Albadr, et al. Typical hierarchical file systems have a number of issues that have been noted repeatedly in the literature. In this paper, author compiled and expanded those and added a more thorough explanation of the major issues with metadata management. The introduction and formal outline of an innovative file system structure that reuses the idea of tags but incorporates it into the tried-and-true hierarchical paradigm constitute the paper's main contribution, nevertheless. It has been proven that TreeTags can fix the issues identified.

3. Methodology:

File management research presumes a particular instance of, the skill set and abilities of users. It observes the various file management practices in terms of their complexity and terms of their behavior or the usefulness of the FM tools. Moreover, there is a great lack of knowledge in understanding file management exists among users. And, this is likely truer for less experienced users and they should be notified.
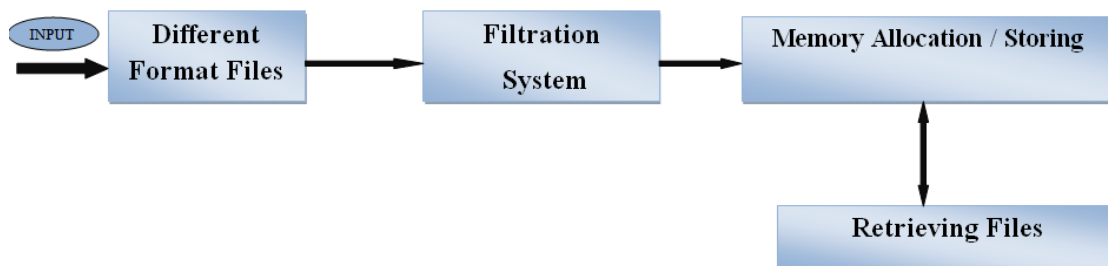
Fig 1. Block Diagram for Proposed Model

Figure 1 depicts the block diagram for the proposed model. The input is formatted into different files then it is forwarded to the filtration system where each format file is formatted separately, the according to the process allocation and storage are done as per their respective format. It decreases the access time of the operating system which in turn increases the efficiency of the system. The filtration system examines each input and output for particular criteria. It is very beneficial for computer programs and multimedia programs. Memory allocation and storing is done in three types viz working memory, short-term memory, and long-term memory. It helps the execution of programs and processes. The whole process is memory management in an optimised way.

Access Time: The amount of time needed by the computer to process a read-write request and then obtain the necessary data from the disk storage is known as access time. It is the amount of time in a computer between the moment an instruction control unit starts a call for data or a request to store data and the moment the data delivery is finished or the storage is commenced. Access time plays an important role in the performance and efficiency of the overall system. In our proposed model, the typical access time for a conventional filing system is comparatively decreased for improving the performance of the system.

Comparative Analysis:

Proposed System	Conventional System
Fast Access time for Read/ write operation	Slow Access time
Optimization of file management	This feature is not available
Organized memory space	Comparatively less organized memory space
More Cost effective	Expensive
Optimized Data security	This feature is not available
Data Consistent system	Less Consistent
Multiple users can access data at one time	Only a single user can access data at one time
More Complex System	Less Complex System
Optimization of Memory	Suboptimal organization of memory
Unification of file management policies	Data stored in files
Efficient storage and retrieval of data	Data redundancy and inconsistency
Technical training required for manipulating data	Not much training required

Our proposed model primarily focuses on the Access time of OS and the effective memory utilization to increase the overall performance of the system efficiently by handling different files on various OSes. A correlative analysis of the proposed model with the conventional methods of optimization of file management in various OSes has extensively shown that the proposed model decreases the Access Time for Read/Write operation of memory. Also, it shows that the proposed model optimally organized the memory space comparatively with the existing file management approaches. The access time is the instant at which a particular set of programs starts a call to store data, it is the time at which the data storage process is initiated. It is the total time that a computer takes to process, request data, and

initiate storage. It is directly linked to the computer memory. The access time can be measured in nanoseconds or milliseconds. It has a direct link with efficiency. The paper draws a comparative result with conventional systems. In conventional systems, the access time was more due to which operating systems and whole computer systems used to perform slowly. The proposed system has a unified file management system and very low access time which speeds the performance and efficiency of the whole computer system. It is associated with the managing of collection of data to retrieving of data efficiently. It also helps in data security and protects against unauthorized data access. The proposed system is also cost-effective over conventional systems. Multiple users can access the data

at one time. If data gets distributed in many files still is easy to approach it. Due to the process normalization, there is a procedure for data consistency. It is less complex. With so many advantages over conventional systems, this proves that the proposed system is very efficient.

4. Conclusion:

The paper presented a ubiquitous system for the file management system to perform complex tasks and discussed the research methodology and synthesized the various observations to draw the conclusion determining the services and distinction of the proposed system. Moreover, the paper presented a comparative study of various digital file systems and file locations of computer systems. The paper described the role of access time in the efficiency of computer systems. The lower the access time better the computer system performs. With the implementation of the unification of the file management system, the access time gets decreased and thus the computer performs efficiently. Access plays a crucial role in the smooth running of operating systems as it is the time or latency between the electronic systems from the request being made to the task being completed.

The Paper also covered the significance of effective file placement in computer systems and how access time affects overall performance. It clarified how the suggested unification of the file management system led to a considerable reduction in access time, resulting in more effective computer operations, through thorough comparative research of existing digital file systems. The implications of the suggested method in delivering better services and distinguishing benefits over traditional file management systems were emphasized in the paper's findings. It emphasized how important access time is to operating systems' smooth operation and how the suggested method successfully addressed this issue, improving overall performance and user happiness.

5. Future Scope:

In conclusion, there are a number of incremental and revolutionary prospects that offer potential for altering the nature of file management, but it also appears likely that the conventional file and folder metaphor will endure. Although it is tempting to believe that cutting-edge software could at any time drastically alter how we interact with digital objects and that files will therefore soon vanish, the fact that a similar belief about FM existed in the 1980s (e.g., Burton, 1985) suggests that this state of promise along with uncertainty is not new File management's longevity may be due to the fact that it is a common, albeit flawed, computing feature, similar to the Sholes (or QWERTY) keyboard layout, which has been challenging to abandon. Although the aforementioned literature demonstrates that traditional FM is fraught with difficulties, it still fulfils a crucial computing function by enabling users to store, arrange, retrieve, share, and interact with a variety of digital objects. FM and its difficulties appear to make for an interesting and fruitful subject of study.

Over time, both widely used software and specialized PIM applications include the concepts tested in FM proto types. This fact plus the study fields mentioned above may suggest that over the ensuing years, FM software will just keep getting better and better until all FM is carried out at its best. However, these advancements have been gradual and call for a more thorough explanation of FM behavior, as well as its constituent parts and determining variables, than what is currently available. Additionally, before this information is identified, changes in computing brought on by software developers may well modify or replace the FM a figurative. Therefore, expanding the adoption of such software is an excellent long-term objective for the PIM and HCI research communities, possibly through more direct engagement with OS vendors.

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