

Extending functionalities of default clipboard

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Abstract— The Clipboard is temporary buffer holding data contents for cut-copy-paste operations. When the data is to be moved in the operating system environment, it is stored in clipboard. When user copies any data content, that data content is stored in the clipboard. If paste operation is performed by user, the data content in clipboard is fetched and moved to the location from where the user executed paste operation. The built in Windows, LINUX or MAC-OS Clipboard only allows for storage of one item at a time. When we copy any content the previous content in the clipboard is get replaced with the new content. Clipboard of any OS doesn't have ability to maintain history of copied content, to store multiple contents at different locations at a time or to paste multiple contents at multiple locations. The problem can be solved by developing Clipboard manager. Clipboard manager developed will provide user a buffer for storing copied data and allow user to copy that buffered data. Clipboard manager will extend functionalities of default clipboard of any operating system.

Keywords— Clipboard, Copy-Paste operations, Temporary buffer, Clipboard Manager.

I. INTRODUCTION

The word 'Clipboard' generally denotes a board having clip which holds some information. In any operating system environment, data can be moved from one location to another by executing the cut-copy-paste operations. The working of copy-paste operation is simple. User selects data which is to be moved and press copy or cut button then press paste button at another location where data is to be moved. The data is moved at required location. In background of operating system, on each execution of cut-copy-paste operations, predefined functions are called which store and retrieve data in a temporary buffer called as clipboard. Clipboard is a temporary storage or buffer which is used by an Operating System for storing temporary data during cut-copy-paste operations. The Windows clipboard and Linux clipboard have similar functionalities. The data content in clipboard is the data which is copied or cut within the OS environment. In clipboard, data may be text, image, file or directory which user wants to move from one location to another. Many clipboards provide only one buffer, when any new data content is moved to the buffer previous content of buffer are overwritten. For overcoming these problems in word files and excel sheets, Microsoft Windows have provided a clipboard option which stores text and graphical data which are copied during working on that document. User can include these data contents in the document just by clicking on that data. But this clipboard does not store more than 24 contents. Also it is not permanent storage.

Consider any programmer working in company writing code for any project. For many times it may be happen that programmer has to write similar codes. For that purpose he will copy required code lines and paste them. He will repeat it for another lines. Now after some time if programmer wants same previously copied lines, he has to copy them again. This will reduce his code development efficiency by increasing time for writing code. Clipboard stores temporary data while operating system is running. During each shut down, the content of clipboard are cleared for maintaining efficiency of operating system. Due to this, the users are unable to collect information of previous copied data. Default Windows or LINUX clipboard does not have ability to copy multiple contents from multiple locations, to paste multiple contents at multiple locations, to keep track of copy-paste operations, to buffer data for longer time etc.

The problem can be solved by developing a clipboard manager, for Linux, which provides a buffer for large amount of data. A clipboard manager is a computer program that adds functionality to an operating system's clipboard. The clipboard manager allows the user to keep multiple clipped objects, available for later use. It can also keep a clipping history by automatically making a new buffer for each new cut or copy operation. Hence user can cut-copy-paste many contents, can take account of history and can have more paste options. While developing clipboard manager we have to take care of some requirements. A clipboard manager should be easy to setup and use. It should work as intended right out of the box, without any tweaks. While adding functionality to operating system's clipboard, clipboard manager can handle everything the default OS clipboard can handle and should be light on resources and fully compatible with the latest versions of OS. Also it must provide extra features for advanced users who need more options than simply copy, cut and paste.

Hence development of a new clipboard manager is needed for many users to support different operations. Clipboard managers enhance the basic functions of cut, copy, and paste operations with one or more of the following features:

1. Multiple buffers and the ability to merge, split, and edit their contents
2. Selecting which buffer "cut" or "copy" operations should store data in
3. Selecting which buffer(s) "paste" operations should take data from

4. Handling formatted text, tabular data, data objects, media content, and URLs
5. Saving copied data to long term storage
6. Indexing or tagging of clipped data
7. Searching of saved data

II. LITERATURE SURVEY ON CLIPBOARD

There are many limitations of clipboard which are provided by different operating systems. These limitations can be overcome by developing a clipboard organizer/manager that extends the functions of default clipboard of operating systems. Many developers are working for solving problems stated before. Hence till date there are many programs available for the same, having many facilities for users at different levels. The study of clipboard manager includes study of clipboard, study of user interaction etc.

Microsoft Windows [1] defines clipboard as a buffer for data. According to Microsoft Windows [1], the Clipboard is a temporary storage area for information that you have copied or moved from one place and plan to use somewhere else. You can select text or graphics and then use the Cut or Copy commands to move your selection to the Clipboard, where it will be stored until you use the Paste command to insert it at required destination. For example, you might want to copy a section of text from a website, and then paste that text into an e-mail message or in document. The movement of data is may be from one application to another. The Clipboard is available in most Windows programs. A clipboard, as defined, is special file or memory area (buffer) where data is stored temporarily before being copied or moved to another location. Many word processors, for example, use a clipboard for moving data. When you cut a block of text, the word processor copies the block to the clipboard; when you paste the block, the word processor fetch it from the clipboard to its final destination. In Microsoft Windows [1] and the Apple Macintosh operating system, the Clipboard can be used to copy data from one application to another that is to move data within operating system environment.

There are many software programs are available for implementing clipboard manager for Windows and Linux OS. Limitations of clipboard can be overcome by use of this software. Some of the clipboards are listed below [7]:

- a. Anamnesis: Clipboard manager that stores all the clipboard history and offers an interface to do a full-text search. It has both a command line and GUI mode available.
- b. Autocutsel: Command line and daemon interfaces to synchronize PRIMARY, CLIPBOARD and cut buffer selections.
- c. ClipIt: Fork of Parcellite with additional features and bugfixes.
- d. Clipman: A clipboard manager for Xfce. It keeps the clipboard contents around while it is usually lost when you close an application. It is able to handle text and images, and has a feature to execute actions on

specific text selections by matching them against regular expressions.

- e. CopyQ: Clever clipboard manager with searchable and editable history, custom actions on items and command line support.
- f. Clipper :Clipboard manager for the GNOME desktop with many features and plugin support.
- g. Xclip: A lightweight, command-line based interface to the clipboard.

The Macintosh uses two types of clipboards. The one it calls the Clipboard can hold only one item at a time and is flushed when you turn the computer off and other, called the Scrapbook, can hold several items at once and retains its contents from one working session to another. [2]

The development of a clipboard organizer/manager begins with proper understanding of copy paste operations. Apperley, Fletcher and Rogers [3] provided an overview on copy-paste cycle. Copy and paste operations are a fundamental part of the graphic style of user interface. They are amongst the most commonly used commands and are usually implemented so as to provide quick and convenient use. In the simplest form of selection a user can select an object by just clicking on its representation. Cut and paste commands are usually available from a menu for novice users, with keyboard shortcuts or mouse gestures providing quick operation for experienced users [3]. A copy (or cut) and paste facility has been a part of graphical user interfaces since their inception, providing the principal mechanism by which the user can move data within and between documents. When there is only a single piece of data to move, such as a bitmap or a segment of text, copy and paste works reasonably well. The user selects the information; issues the copy command; moves focus to the required destination application and document; and issues the paste command. The only drawback is the fact that the clipboard (paste buffer) is usually invisible. If there is some delay between copy and paste, say a need to edit the destination document in readiness for receiving the cutting, then difficulties can arise. It is often all too easy to inadvertently issue another copy command and overwrite the (invisible) information waiting in the buffer.

Many researchers and developers are working on developing a software mechanism for extending functionality of default clipboard of many operating systems. These software programs are known as clipboard manager. Some developers have developed such clipboard managers which allow users to store many data contents and that also for long period of time. But these software programs can be improved to provide user with more functions such as maintain logs of data, maintain sessions between them and the main, easy graphical user interface.

III. PROPOSED WORK

As stated above, Clipboard is a temporary storage or buffer which is used by an Operating System for storing temporary data. The default functionalities of clipboards of Microsoft Windows and Linux are similar. The data content in clipboard, of Linux, is the data which is copied or cut within the OS environment. Linux's clipboard

provide cut-copy-paste of only one item at a time. The problem can be solved by developing a clipboard manager which provides a buffer for large amount of data. I am developing a clipboard manager for Linux platform which is a computer program that adds functionality to an operating system's clipboard. The clipboard manager developed will allow the user to keep multiple clipped objects, available for later use. It can also keep a clipping history by automatically making a new buffer for each new cut or copy operation. Hence user can cut-copy-paste many contents, can take account of history and can have more paste options. The main focus is given on pasting options. The manager will provide multiple pasting options such as pasting multiple files, pasting files from history, pasting files from multiple locations etc.

IV. CONCLUSION

The functionalities of clipboard of Linux and other operating systems are described in above sections. Similar to other clipboards, Linux clipboard has many limitations. It allows buffer for only one item at a time and storage is temporary. These functionalities can be extended so that user can be provided with such interface by using which he can save time and efficiency. This can be done by developing a clipboard manager which fulfills user requirements with easy interface. In above sections, many clipboard managers and their functionalities are discussed.

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