# Computer Activity Tracking Software

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**ABSTRACT***:- In this age of Internet, data security has become essential for enterprises. Misuse of sensitive data and resources can be deleterious to the integrity and security of the enterprise. It is beneficial for the enterprise to monitor how its resources and data are being utilized by its employees. Computer Activity Tracking Software (CATS) is an easy-to-use, easy-to-install monitoring service allowing employers of on-site and remote workers to monitor web and application usage, better improving performance and work-place control. CATS allow managers to keep an eye on how their computers are actually being used. For each workstation, it records statistics on application use and websites visited including window title bar and URL.*

*CATS is proposed to be a live visual monitoring software allowing users to inspect web and application usage, better productivity and maintain work-place control in corporate environments. CATS shall provide a highly representative picture of the user's activity, in terms of both topic & time.*

*CATS allows live recording of each connected client machine providing VISUAL logs/reports in stipulated intervals. It provides REAL TIME monitoring & tracking of the user's activities.*

**Keywords:-** *monitoring, logs, real-time, streaming, screen recording.*

## I. INTRODUCTION

Employee monitoring and tracking systems are used to check how the employees are using the company data and resources while working on company computers. Employers have the right and responsibility to track employees' computer activities. Because the workplace owns the equipment, the company can set the ground rules for how computer stations should be used. However, with multiple employees, monitoring how people are using computers can be quite a challenge [1]. When we look at employee monitoring systems, we observe that in spite of the presence of high functionality tracking software, they still aren't able to communicate the exact activities of a user on a system. For instance, a background running process & a foreground process both appear running and it gets intricate to postulate by the written logs on which process is the user active specifically. However, by providing a visual medium to convey the running processes of a system, one can certainly determine the current activity of a user.

Thus, the concept of a concurrent monitoring can be established which can ease derivation of intricate faults or errors. Such an idea can have applications in all spheres of ERP systems. Work-places can be controlled to make employees more productive. Strong restrictions can be maintained for malicious websites and app. Choices in recording spans can provide a better way to use system memory for storage.

There are large number of commercial products based on monitoring and tracking the system activities available in the market. But most of the systems are log based systems where it is difficult to recognize the process user is currently working on. Also live monitoring of the system is not possible. CATS is a real time monitoring software which provides live recordings of the connected client machines. So in a case of the failure of some process on the client machine, reading the logs and finding the malfunctioning process is not required. One just need to playback the recordings at the server and can know the cause of the failure.

The primary objective of Computer Activity Tracking Software is to create an aggregated platform to monitor & track activities of a user or a set of users and to provide a lucid visual of the processes on a system for

effective analysis & error detection. It provides live visual recordings of the client machines along with normal log based monitoring. It also facilitates optional storage for recording into memory.

One of the biggest features of the proposed software is that it aims to provide visual logs for complete & robust error/failure detection. Visual provision of data has always proved more effective in analysis than a written provision. Further, recording options allow the central user to choose an exhaustive or non-exhaustive mode of recording. Thus, recordings for stipulated times involving stress testing can be arranged or complete recordings can be stored on a daily basis too. Given the many-one client-server architecture, critical monitoring of multiple computer systems can be done simultaneously. Application & web usage can be easily controlled and thus a better productivity can be expected in the system using this utility. All in all, CATS shall provide a highly representative picture of the user's activity, in terms of both topic & time.

## II.  LITERATURE REVIEW

There are many monitoring and tracking software currently available in the market such as ActivTrak, TeamViewer, PCMag, WebWatcher, Spytech, et al. All these software provide log based recording of the clients' activities. ActivTrak has been referred for designing our system. For live recording and streaming of the videos TeamViewer has been referred. It provides remote control of the clients' computer. By referring both these software, we have implemented live visual based remote monitoring system.

### A.  *ActivTrak*

ActivTrak is a log based system. ActivTrak is an easy-to-use, easy-to-install free cloud-based monitoring service allowing employers of on-site and remote workers to monitor web and application usage, better improving performance and work-place control[2]. It does not support live visual monitoring and monitoring of multiple systems. Installed on each Windows workstation, this activity tracking software allows the viewer to take a snapshot of the user's screen as they are working. At the same time it also records complete URL for a browser, application usage time and compiles the data into convenient statistics.

### B.  *TeamViewer*

TeamViewer connects to any PC or server around the world within a few seconds. You can remotely control your partner's PC as if you were sitting right in front of it[3]. The TeamViewer supports live visual screening of remote machines but does that on a one-one infrastructure. It does not support multiple clients at the same time. Moreover, it does not support tracking / monitoring of client systems.

### C.  *WebWatcher*

Webwatcher allows viewing of recorded PC activities remotely from a secure online account. WebWatcher for PC begins monitoring and recording all historical activity discretely and then sends it to secure online account[8].

### D.  *SpyTech*

SpyTech provides computer monitoring and security solutions. SpyAgent logs all keystrokes, applications, windows, websites, internet connections, emails sent and received, chat conversations, file usage, and even screenshots[9].
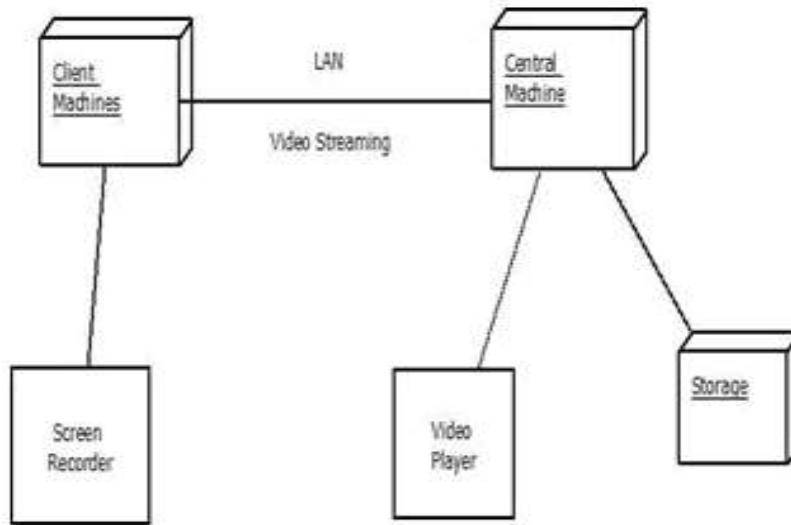
## III. PROPOSED SYSTEM



**Fig. 1 System Flow**

The logs of the client machines are created. These logs can be written, visual or both. The logs are stored in the database. Visual recordings are streamed to the server using LAN connection. The server monitors the live visual recordings it receives from the clients. These recordings can be optionally stored by the administrator. The logs are monitored by the central user. If some suspicious activity is detected, the central user can inspect the logs in detail to detect error. In the end, a report is generated by the central user which can be viewed by clients as well as central user as shown in Fig. 1.

The Computer activity Tracking Software is a multiple client single server based system. Multiple clients are connected to a single centralized server. The video recordings and log based reports from multiple clients are sent to the server where they are monitored and stored. The system uses LAN connection for streaming videos and data from clients to server as shown in Fig. 2
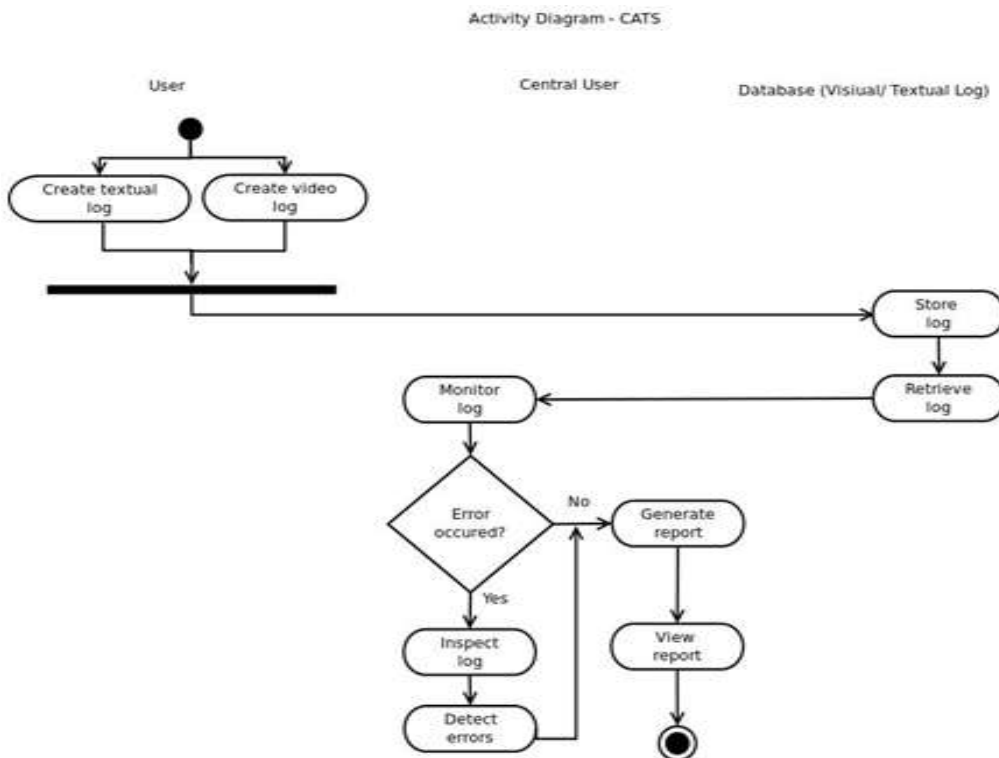


**Fig. 2.  System Architecture diagram of CATS**

### A. Central Machine

The central machine is monitored by the administrator. It is where all tracking and monitoring activities take place. It consists of a video player where live videos streamed from multiple clients are played.

### B. Client Machines

These are the multiple clients being monitored. The client machines have a screen recorder which records all the client activities and stream live videos to the central machine through LAN. The client logs are also sent to the central machine.

### C. Storage

All the streamed videos are stored in this component. It has limited memory required for storing the videos for maximum 30 days. After that the administrator has to take back up in the secondary storage if required or else data will be overwritten. It also stores the activity logs of the client machines.

## IV. IMPLEMENTATION

The proposed Computer Activity Tracking Software is implemented in Java. It has three modules: Activity monitoring using Logs, Screen Recording, and Live Playback of streamed recording. The streamed videos would be saved in a temporary buffer for a fixed duration of time decided by the user, after which user would be notified to take backup if required. Default duration provided by the system is 30 days which can be changed during setup time or later. Also the amount of memory allocated for storing videos would be decided by the user; default being 10GB. A pop-up window indicating the available free disk space appears whenever the storage location is selected, as shown in Fig. 3. The quality of the video can be controlled by the administrator. The administrator can select the storage location of the videos during the setup of the system which can be changed later. The number of client machines being monitored with minimum network delay depends on the bandwidth of the network. The number of client machines to monitored can be provided during system setup time, which can be changed later if need arises. A new client machine can be added by entering its name and the IP address as shown in Fig. 4 and Fig. 5 respectively. The system proposes the network speed to be high enough to support at least five clients at the same time.

### A. Log based monitoring

The system provides simple Log based monitoring by providing running process information. Process information is acquired from Task Manager/Event Viewer using the Java RunTime library[4]. The acquired information is first transmitted to the server where it is stored. The administrator can even store the process information on a secondary device for backup if required. Acquired process information is displayed with UI developed using the Java AWT class [4].

### B. Screen Recording

The system provides recording of the screen so that the user activities can be recorded. Videos are recorder using Vlcj library. The recorded video is stored and can be transmitted to the server for playback. The administrator can select the storage location of the videos during the system setup and can change it later on. Also the quality of the videos can be controlled. Depending upon the available memory and importance of the recording, quality of the videos can be varied by the administrator. The administrator can also take the backup of the old videos if required in case of limited available memory.

### C. Video Streaming

The recorded videos are streamed to the server continuously. The videos can be directly played at the server and also be stored for future use. Vlcj library is used for live streaming of videos[6]. A snapshot of the function used to stream videos is shown in Fig. 6. The videos are stored in temporary buffer by default. The buffer has the capacity to store videos for 30 days after which backup is required. If the buffer is full, new videos overwrite the old ones. A notification is sent to the administrator of the system to take back up when the temporary buffer is 80 percent of its capacity.

*D. Playing Multiple Videos*

        The system supports playing multiple videos at the same time. Given the many-one client-server architecture, critical monitoring of multiple computer systems can be done simultaneously. The Vlcj project provides a Java framework to allow an instance of a native Vlcj media player[7] to be embedded in a Java AWT Window or Swing JFrame. We have added a Standard Swing User Interface for GUI[5] and Vlcj as a media player. Videos can be played live or from the storage. Default duration to store the videos is given as 30 days after which the videos are automatically deleted if failed to back up. The administrator is notified to back up the videos after 25 days of storage.
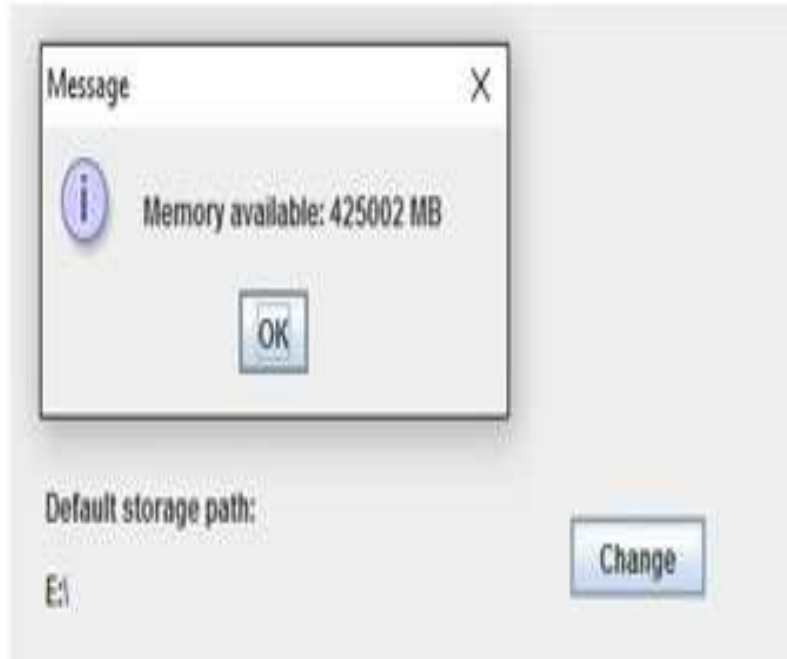
**Fig. 3. Pop-up window indicating available memory**

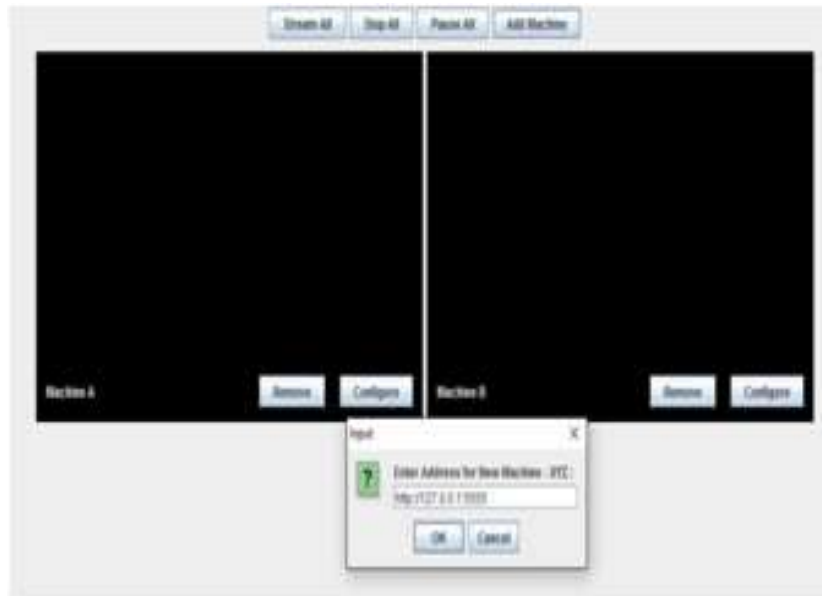**Fig. 4. Enter name of the new client machine**

**Fig. 5. Enter IP address for new client machine**



**Fig. 6. Method to stream video**

## V. RESULT

Continuous real-time streaming of client machines' activities along with a provision to store these video logs, was a primary aim of the proposed system. CATS can successfully stream data from multiple client machines along with provision to customize various media attributes as shown in Fig. 7. The basic events i.e. pause, rewind and skip are applicable to all the videos being played. The server side administrative dashboard is shown in the Fig. 8.

**Fig. 7. Live streaming from the client machines**



**Fig. 8. Administrative dashboard of CATS**

## VI. CONCLUSION

Computer Activity Tracking Software (CATS) is the new generation monitoring system and system features to meet organization requirements. By using this system it is possible for the administrator to monitor the critical activities in the organization. The administrator can view the live screen recordings of the clients' machines. Also these recordings can be stored for future reference. Log based monitoring is also provided. The administrator can select the number of client machines, and the storage location of the videos. Quality of the videos can also be decided depending on the memory availability. Amount of videos to be stored and the number of days the videos are to be stored can also be decided by the administrator with default options given. Thus CATS provides live monitoring of critical activities in the organization.

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