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Employee Performance Monitoring Using WMI and Opencv

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ABSTRACT: Productivity is a measure of the quantity and quality of work done, considering the cost of the resources used defined productivity as a measure of overall production efficiency, effectiveness and performance of an individual. It is the continued effort to apply new techniques for better productivity and our try now using image processing and ML to generate useful data for management and employ towards career & company growth. This paper presents a real time human face recognition based automated system for monitoring the work schedule and productivity of the employees in offices. Keeping track of the employ at desk with active working status, which are tracked using performance counters and vision image processing framework. The track records of the employees and monitoring their working hours is a time consuming task for the management of any company.

KEYWORDS*:* Human face recognition, image processing, ML, Production efficiency

I. INTRODUCTION

In these modern days, as companies are working to meet the high quality requirement of the client as the result of these companies look for productive work from employees without wasting time in office hours. Till date, the existing system focus on the only check-in and check-out details of the employee, this proposed system will give promising solution for this problem by detecting the drowsiness based on the eye blink state.

As it is important as productivity is to the continued economic development of the world, it is surprising that so little is known about measuring and managing productivity. Part of the problem may lie in the unit of analysis of industry uses to measure productivity and it fails to recognize the complexity of the relationships between the productivity of the individual worker and the total performance of the organization. The body of research knowledge provides little help to this. A multitude of micro studies of individual work behavior exist, but the measure of productivity used is rarely comparable to those developed in the industry. Organizational studies generally focus on the total performance of the organization, but even those that are centered on the organizational productivity seldom attempt to disaggregate findings to the business unit, workgroup, or individual level in any systematic way.

In general, the productivity of the world is a function of the productivity of each of the world's economies, the economies, in turn, are as productive as the organizations within them. Within the organization, individual workers performing specific jobs form the base level for all productive attempt. In modern, complex organizations, however, the linkage between individual productivity and the productivity of organizational systems becomes obscure. For a variety of reasons, the linkages are rarely one to one. Only by understanding the individual level of productivity, however, can practitioners and researchers begin to build the theories and models that deal with the defective.and cooperation that occurs when individuals are grouped into work teams, departments, organizational systems, and economies.

It is important to note at the beginning that focusing on individual productivity measures provides a biased view of the organizational world. Organizations are set in the context of a changing, competitive environment in which strategies are developed to guide the efforts of management and workers toward a common vision and set of objectives. Even the best-designed processes will fail without a supportive culture within the organization that values change, continuous improvement, goal commitment, group cohesion, and respect for people.

It is also important to note that productivity, although a major concern, is not the only indicator of individual or organizational performance. Productivity interacts with other aspects of employee performance, financial controls, innovation, and competitive effectiveness—any one of which can lead to organizational failureseven related but separable performance criteria for an organizational system: (1) effectiveness, (2) efficiency, (3) productivity, (4) quality, (5) quality of working life, (6) innovation, and (7) profitability (profit center) or budget ability (cost center). Other authors, such as

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Pritchard and Campbell, have slightly different ways of relating or combining these performance dimensions. Out definition of productivity includes effectiveness (producing the right products or services), efficiency (prudent utilization of resources), and quality (meeting technical and customer specifications).

Our purpose in this paper is to gain knowledge about the measurement and management of individual productivity in order to provide a link in the chain of understanding regarding how individual productivity contributes to group productivity, which in turn contributes to organizational productivity.

Normally, Companies keeps track of the employee using check-in and check-out time but this factor does ensure the productivity of the employee work, so our proposed system contains managing of employee at the desk itself w which will ensure the efficiency as well as productivity of the employee at the very basic level. It allows the administrator to notify the employee through emails or some stuffs, by this employee will also get to know that some higher authorizes is monitoring him. As the result the employee also concentrate on productive works instead of wasting time and getting noticed

II.LITERATURE SURVEY

1) According to Abbas & Yaqoob in 2009, Performance of an employee on a given job or task is strategic edifice of a business as a result, elements that give rise to enriched performance must be dissected in a more critical dimension by the establishments for success, advancement and growth

(Reference: Abbas & Yaqoob An introduction to rapid system prototyping. IEEE Transactions on Software Engineering, vol. 28(9), 2009, pp.817-821)

2) According to Kelidbari, Dizgah, & Yusefi, 2011, Performance and productivity of an employee is seen an issue of momentous vitality for employers, managers and the entirety of an organizations as well

(Reference: A. Kelidbari & Dizgah "Systems analysis and design: An object-oriented approach with UML," John Wiley & Sons, Mar, 2011)

3) According to Kelidbari, Dizgah, and yusefi and According to Ahmad,khurram in 2011 Are of the opinion that employees performance the all - enclosing believe of the personal in relation their conduct and aids in the direction of the achievement of the organization.

(Reference: A. Kelidbari, Dizgah, Ahmad, & Khurram "Systems analysis and design: An object-oriented approach with UML," John Wiley & Sons, Mar, 2011)

4) According to Khan,Razi and Ali in 2011 there view was an employee job must be work performance in relation with the both quality and quantity i.e. anticipated for an employee due to persistent competition among different business organization, employees of labor have realize the significance of employees performance so as to attempt today's global market employee while realizing the fact that employees performance increases so does the firm's overall performance as well as profitability also rises as the result of it.

(Reference: Khan,Razi & Ali"Systems analysis and design: An object-oriented approach with UML," John Wiley & Sons, Mar,2011)

5) According to Susanty, et'al in 2013 and Liao et-al in 2012, both shows their opinion about employee performance as their workers complete ability productiveness in achievement the calculated value and result of everyday job in line with us prescribed procedure and the timeline of the organization. In the same way Liao et-al(2012) he seems indexed for improvement as employee job performance, idleness recompenses, retribution, reviews and remuneration changesthe projected value and realization of everyday jobs in line with the prescribed procedure and timeline of the organization. In the same way, Liao et-al, (2012), sees employee job performance as an index for improvements, idleness, recompenses, retributions, reviews, and remuneration changes. It also delights the desires for employees to realize themselves. Therefore, Performance of an employee gives a chance for innovativeness in employees and general firm's performance and innovativeness, in a manner, that thriving work of accomplished, inspired and dedicated human resources give groundbreaking concepts for newer goods and services and also improves performance quality and satisfaction of the clients, according to Sadikoglu & Cemal. (Reference:Susanty, et'al in 2013 and Liao et-al in 2012 Mobile networksformobilelearningtools.JournalofTelecommunication, Electronic and Computer

Engineering, 10 (1-4), 2018, pp. 47-52).

6) Furthermore, Ahmad and Shahzad in 2011 argued that the apparent performance of an employee expresses the entire judgment of an employee in regards to the actions and input to the achievement of the organization's goals and mission. They further mentioned that practices of compensation, evaluation of performance and practices concerning the promotion of and employee is the benchmark for the performance of a worker. So also, Anita in 2013 stated that the performance of an employee is a measure or a pointer of monetary and the result of the employee that has a constant relationship with organization performance and achievements as well. Anita in 2013additionally states that the atmosphere or environment at which employee performs the task and other schedules, relationship with bosses, co-employee relationship and that of the team, compensation procedure, and engagement of an Employees have settled factors for performance. According to Alagaraja1 and Shuck in 2015 states that employee performance can be measured by means of regular training and improvement. In addition, Thomas and Feldman in 2010 take on measures of the employee performance as a core job performance, that includes in-role performance, security performance, and inventiveness, trailed by citizenship performance, branded into equally targets-specific and wide-ranging organizational citizenship.

(Reference: Ahmad and Shahzad in 2011 Information systems Development Methodologies, Techniques and Tools.3rd Edition. McGraw-Hill Education Limited Bershire)

III.EXISTING SYSTEM

The Existing system only focused on check-in and check-out details of the employee using biometrics till date this was the only method used for taking the attendance or ensuring the presence of the particular employee. This system was only ensuring the presence of employee but not the productivity of the employee. Due to the lack of productivity measuring tools companies' productivity was decreasing so, this lead to the discovery of the proposed system.

IV. PROPOSED SYSTEM

The proposed system presences the real time human face detection, face recognition, idle time track of the employee based on automated system for monitoring the work schedule and productivity of the employee in the offices. Performance counter and visional image processing frame work are used to track the employee at the desk with the active working status. The tracked records of the employee, and monitoring their working hours is a big time assuming task for the management of the companies. Thought the existing system uses thefacial and card based attendance system to the record of employee attendance, measuring the actual productive work of the employee in the offices is still a challenge. The proposed experimental system comes up with the promising solution to mark the attendance along with the monitoring the time of the employee spends in his/her workstation for work through real Time face recognition. Face detection can be done by haar cascade classifier followed by the implementation of components analysis algorithm for recognition of the faces. This system allows theadministrator to monitor the report of the employees working hours, this increases the management efficiency.

A. DROWSINESS

Drowsiness is stated as a decreased level of consciousness portrayed by sleepiness and trouble in staying alarm but the person awakes with simple excitement by impulse. It might be caused by tiredness, substance misuse, or cerebral issues. It is mostly the result of drowsiness which can be both mental and physical. Physical weariness, or muscle weariness, is the short term physical failure of a muscle to perform ideally. Mental weariness is a short term failure to keep up with ideal psychological performance. The start of mental exhaustion among any intellectual action is increasing and relies on an individual's psychological capacity, furthermore upon different elements, for example, lack of sleep and general well-being. Mental exhaustion has additionally been appeared to diminish physical performance. It can show as sleepiness, inertia, or coordinated consideration weakness. Haar cascade algorithm is very useful and used for human face detection followed by the carrying out of the Principal Component Analysis algorithm for recognition of the faces approximating the Euclidean distance of the eigenvalues. The system allows the company administrator to monitor the report of the employee working hours through a website or an android smart-phone providing those companies the purview of increasing management efficacious.

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OpenCV is an effectual algorithm used to search faces in the given picture. Because detecting face in a given picture is a very complex process, one cannot do just only one simple test that will detect whether it is a face or not.
WMI is a set of tools and extensions in the windows driver model, it allows scripting languages to manage PCs and servers connected locally or remotely. System information salvage made easier by using well-documented object models using WMI, and queries will be similar to those used with SQL
IMAGE CAPTURE: We can get the picture of the employee by using a web camera induced inside the application. in spite of the fact that the camera creates a video clip, we have to apply the developed algorithm on the edge of the video stream. This code is only concentrating on applying the processed mechanism only on a single frame.
DIVIDING INTO FRAMES: We are dealing with real-time situations where the video is recorded and has to be processed. But the processing or implementation of algorithms can be done only on an image. Hence the captured video has to be divided into frames for examining.
FACE DETECTION: In this stage, we detect the region that containing the face of the employee. A specified algorithm is used for the detection of a face in each and every frame. By face detection, we mean that locating the face in a frame or in other words finding the location of facial characters through a type of technology and with the use of Pcs and computers.
EYE DETECTION: After successful detection of face eye also needs to be detected for further processing. In our method Eye is the decision parameter for finding the state of the employee. Though the detection of it is easier to locate, it's really quite complex. At this point, it performs the detection of the eye in the required particular region with the use of detection of several features. Generally, the Eigen n approach is used for this process. It is a time taking long process. When eye detection is over then the result is compared with the threshold value for deciding the state of the employee.
STATE OF THE EYE: In this stage, we are going to find the actual state of the eye that if it is closed or open or semi-closed or open. The identification of eye status is the main specification. If the system detects that the eyes are closed we channelize an employee is in drowsy state and If the system detects that the eyes are open then the steps are repeated again and again until it finds a closed eye

B. CLIENT-SIDE VALIDATION

This application basically runs on User's machine who needs to be tracked, i.e. this software is installed in a particular employee laptopwho needs to be tracked. This software should be also made compulsory in the companies' laptop. There are basically two events occurring in this application, one is python part and another is C# part. These two events are stored in a cloud database. The timeout is considered based on the value of "n" where the value of "n" can be customized. If the value of "n" is more than "n" sec i.e. the user is downy and the value is store in cloud database. The database entries consists of serial number, timestamp and the IP address of the downy employee. Finally the entries of same employee is multiplied by the value of "n", all these jobs are done using python code. Similarly the idle time of the employee is tracked using, i.e. If the value "n" is more than "n" sec, the value is stored in cloud database. The database entries consists of serial number, idle time, IP address, timeout using C# code

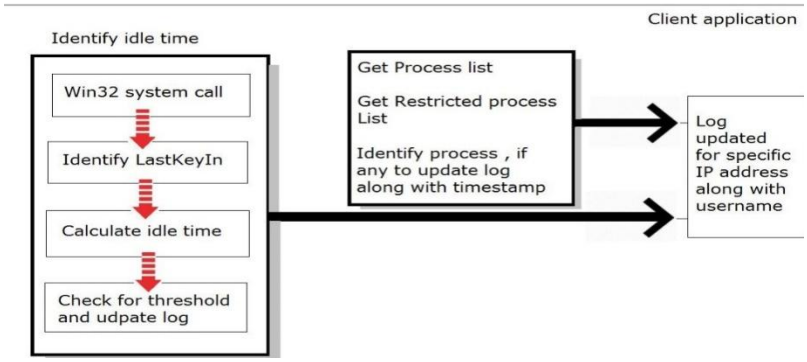

Fig. 1. Client-side validation

C. ADMIN-DASHBOARD

The App is created where the IP address or User Name is given to the administrator in the form of drop down list. The user and the IP address mapping are also documented. The administrator gives the report about the employee in two forms one OUT OF DESK, for example if the entry of the particular employee is present in the idle time database but is not present in the drowsiness table the employee is not at all present in front of desk. Another NON PRODUCTIVE, if the

employee IP address entry is present in the drowsiness table, the employee is present in front of desk but he/she is drowsy. Finally the report can be calculated for one month or week and employee preformation graph is plotted. Likewise the administrator also configured in the employee laptop that some particular applications should not be run. for example if the employee run the particular application that was not supposed to be run, for few minutes the process list is extracted and compared with the should not run list if the application matches the process name and time is stored in different table. If the particular employee is not so productive the administrator is also given an option to send the notice though email.

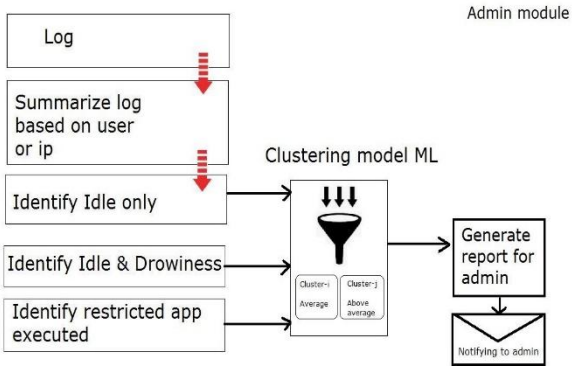

Fig .2. Admin dashboard

D. IMPORTING OPERATING SYSTEM DLL

WMI(WINDOWMANAGEMENT INSTUMENTATION) used to extract the idle time and application running on the operating system by querying.since it is needed frequently if we stored it in a memory it consumes more space. So this drawback can be avoided by storing these functions in DLL (DYNAMIC LINK LIBRAY),DLL loads the function into memory during run time and destroys it once the job is done this also achieves efficient memory management.There are certain programs which are written in C/C++ which cannot be directly available in the programming language as a built library but it is possible t to access those DDLs in our program as external functions. External functions means the functions that are coded in some other languages but it is allowed to use within our application.

V. CONCLUSION

Employee productive management is an approach in the management and development of human resources in an effort to improve carrier paths in the long term and for organizational development. One form of performance management is performance appraisal, which is a system that is used by management to evaluate individual performance within a certain period, providing feedback to individuals so that each individual is expected to improve his/her performance. Improving individual performance will certainly improve organizational performance

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