

Employee Performance Appraisal System and Use of Iris Biometric System in Human Resource Management Software

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Abstract- Human Resource is the backbone of any organization. Human resource management (HRM) is the only responsible factor ensuring that the right people at the right place and at the right time to execute corporate plans. Computerized Systems are being used to this effect in a big way. In this paper proposed a system for calculate performance appraisal of employee by a mathematical model and describe an eye's Iris-based biometric attendance system. We propose a performance appraisal system using multi aspect evaluation of employee in a software company. These aspects are Skills, Knowledge, Regularity, Effectiveness, Coordination and administration. Further these aspects are sub divided into sub aspects to ensure employee performance appraisal truthful.

The proposed software store employee details and Iris image in database. Every day when employee comes, camera detect Iris image and match with stored template in database. Employee id gets from database and makes employee today attendance and stored in database permanently. At the end of month, salary also calculated with help of attendance and also maintains leave status.

Index Terms- Human resource management, Iris Biometric system, performance appraisal system

I. INTRODUCTION

1.1 Human Resource Management System

A Human Resource Management System refers to the systems and processes in which the intersection between human resource management (HRM) and information technology. It merges HRM as a discipline and processes with the information technology field, whereas the programming of data processing systems does in enterprise resource planning (ERP) software.

These ERP systems have their origin on software that integrates information from different applications into one universal database. Human resource management system is the availability of professionally qualified HR managers and staff in effectively supported HRH units with capacity to carry out critical HR functions like recruitment, deployment, implement retention schemes, use workforce data to plan/manage staff, assist with budgeting [14].

The HR maintains a complete employee database including contact information, salary details, attendance, performance evaluation and promotion of all employees. To reduce the manual workload of these administrative activities, organizations began to electronically automate many of these processes by introducing specialized Human Resource Management Software.

1.2 Employees' Performance Appraisal

Employees' performance appraisal process is a crucial task undertaken by the HR department in each organization [15]. It involves various steps, ranging from preparing a questionnaire, conducting a face-to-face interview between the team supervisors or the HR manager and the employees, taking the help of outside appraisers, preparing reports, database and so on. No doubt, the whole process is quite troublesome and time-consuming. But thanks to new-age Appraisal System, this task can be done quite professionally with precision. This automated tool helps to keep track of each associated step with minimum headache.

Through Performance Appraisal System there is hardly any fear of mistake as the whole module is automated. Some of its key offerings include a 360° appraisal process, managing Appraisal Managers and database, keeping track of the relevant functions of the external appraisers, customizing appraisal templates etc. Modern versions of HRMS (Human Resource Management Software) offer this comprehensive module to ease up the tasks of the HR departments across the industries. The tool's easy-to-use and user-friendly characteristics have contributed in a big way behind popularizing this automated system.

Performance Appraisal Software has given freedom from dreadful paperwork. This robust software has initiated a silent but powerful revolution in the HR department by helping a smooth transition from a total manual job to fully automated process. A standard Employee Appraisal System enables the organizations to seamlessly align their corporate outlooks with that of the employees[15]. Now, equipped with this tool, the HR manager can fill the appraisal forms, prepare the questionnaire via online medium and forward them to the selected employees and receive them in the same way.

Automated appraisal systems help to maximize ROTI (Return on Talent Investment) in the organizations. Performance Management Module is a key accessory of this system that enables monitoring each employee's performance, picking up the flaws and finding the areas for which the concerned employees need to be trained. The whole system automates the task of chalking out, implementing, tracking, and evaluating a robust appraisal process in systematic and confidential way for ensuring best results.

The yardstick to scale employees' performance varies from organization to organization. Employee Performance Appraisal System is flexible enough to enable companies define the fields and parameters associated with the process. It ensures flawless mapping of employee-wise role KPI and KRA. HRMS has already become an inseparable accessory of the HR department

across the organizations and Appraisal System has contributed richly to its success.

Performance appraisal of candidates in relation to a particular position is a key task towards managing the human resources of an organization. Supervisors are concerned with performance appraisal judgments and evaluations that they have to make on their subordinates [1]. On the other hand, subordinates are increasingly realizing the importance of performance appraisal since it would very much affect their rewards and future career path. As the world began to shift towards knowledgebase capitalism, it reminds all organizations on the importance of maintaining their talented knowledge workers [1]. Therefore, discovering and promoting the most qualified candidates is essential because valuable human expertise is the main source of competitive advantage for the organizations. Thus, the creation of performance criteria is an important requirement towards performance appraisal [2].

In the organizational context, performance is usually defined as the extent to which an organizational member contributes to achieving the goals of the organization. Performance appraisal is defined as “the process of identifying, evaluating and developing the work performance of the employee in the organization, so that organizational goals and objectives are effectively achieved while, at the same time, benefiting employees in terms of recognition, receiving feedback, and offering career guidance [4].

Performance appraisal is usually conducted periodically within an organization to examine and discuss the work performance of subordinate so as to identify the strengths and weaknesses as well as opportunities for improvement among employees. Following this, most of the employers use the performance appraisal result to determine if a particular staff should be terminated or reinforced; as an employee development and coaching tool; to give a practical evaluation of an employee’s readiness for promotion; and to serve as the foundation for giving merit bonus.

1.3 IRIS Biometric System

Biometric authentication has grown in popularity as a way to provide personal identification [6]. Biometrics is a Method to identifying individuals based on a physical or behavioral characteristic. Examples of physical characteristics include fingerprints, face recognition, and iris recognition [8].

Behavioral characteristics are individuality that are learned or acquired. Dynamic signature verification, Voice verification are examples of behavioral characteristics.

Biometric authentication requires comparing an enrolled biometric sample against a newly captured biometric sample. Iris recognition is treated as the most reliable biometrics and has been widely applied in public and personal areas for security and Human management [9]. Iris recognition related with the eye. The iris is the colored section between the pupil and the white region of the eye. Its primary function is to control the size of the pupil .The unique features of the iris include the trabecular meshwork (the tissue that gives the iris its ‘radial’ impression) as well as other physiological properties such as freckles, furrows, rings, and the corona.



Fig. 1 Flow diagram of Iris Recognition

II. PROPOSED EMPLOYEE PERFORMANCE APPRAISAL SYSTEM

2.1 Performance Appraisal Process

Performance appraisal is used by an organization to reward and develop the human resource of the organization to ensure that the organization runs smoothly and grow. Every year, staffs are required to fill up Yearly Work Plan to report on the progress of the tasks assigned as agreed early of the year. This is done at the beginning and at the middle of the year. At year end, the Yearly Work Plan is used to evaluate the performance of the staff throughout the whole year. The process of performance appraisal is shown in Fig. 2 below.



Fig. 2 Performance Appraisal Process

2.2. Proposed Performance Appraisal System

Six aspects will be taken into consideration when evaluating employee performance of a software company. Further these aspects will be divided into three sub-aspects, as follows:

Aspect-1(Skills): This aspect evaluates various types of skills of employee. Sub aspects are (1) Communication skills (2) Delegation Skills and (3) IT Skills.

Aspect -2 (Knowledge): This aspect evaluates the staff’s knowledge in various fields. Sub aspects are (1) Job Knowledge (2) Technical Knowledge and (3) problem solving and decision making knowledge.

Aspect- 3 (Regularity): This aspect evaluates the staff’s regular performance in various places. Sub aspects are (1) Time management (2) planning, budgeting and forecasting (3) energy, determination and work-rate.

Aspect- 4 (Effectiveness): This aspect evaluates the staff’s efficiency in various areas. Sub aspects are (1) Steadiness under pressure (2) Creativity (3) Quality of work.

Aspect- 5 (Coordination): This aspect evaluates the staff’s headship quality in various areas. Sub aspects are (1) Team-working and developing others (2) Leadership and integrity (3) Adaptability, flexibility and mobility.

Aspect- 6 (Administration): This aspect evaluates the staff's administrative quality in various areas. Sub aspects are (1) Reporting and Administration (2) Commercial judgment (3) Corporate responsibilities and ethics.

To evaluate these aspects, proposed software use following screen, here in screen aspect-3 (Regularity) is shown.



Fig. 3 Performance evaluation aspects

When evaluating staff's performance, appraiser will use a scale of 1 to 10 to rate each sub-aspects. The grade for the scale is shown in following Table-1.

GRADES	SCALE
Excellent (E)	9-10
Good (G)	6-8
Satisfactory(S)	4-5
Poor(P)	1-3
Not applicable(NA)	Nil

Table-1 Grades and scale

In proposed system we have 3 multiple choice questions in each aspect. According to selection parameter we find an Average of first aspect like this:

$$AVG (Aspect-1) = \frac{Q1+Q2+Q3}{3}$$

Here we have following point to remember:

- Each question has 10 marks.
- According to select option, final getting marks of particular question calculated using above table grades and scale.
- If any select option not applicable, then question remove from aspect and total (30 marks) reduce by 10.

For example $AVG (Aspect-1) = \frac{Q1 + Q3}{2}$
(If 2nd question is N/A)

In same way we calculate all six aspects.

Now we design a matrix of Average value of each aspect in following form.

	Average value of aspect
Aspect-1	9
Aspect-2	8

Aspect-3	10
Aspect-4	5
Aspect-5	7
Aspect-6	4

The above matrix is made between aspects and Average value and it is called matrix-A.

Now we assume 100 marks for all 6 aspects. Now assign value to each aspect according to employee type from value 100. Every aspect has its role according to employee type.

For example, Aspect-1 has 15, Aspect-2 has 15, Aspect-3 has 15, Aspect-4 has 20, Aspect-5 has 20 and Aspect-6 has 15 for Employee type Team Leader.

Now we get a matrix B= [15 15 15 20 20 15] using aspects value. Now we calculate BXA

$$BXA = [15 \ 15 \ 15 \ 20 \ 20 \ 15] \times \begin{bmatrix} 9 \\ 8 \\ 10 \\ 5 \\ 7 \\ 4 \end{bmatrix}$$

$$BXA = 15 \times 9 + 15 \times 8 + 15 \times 10 + 20 \times 5 + 20 \times 7 + 15 \times 4$$

$$BXA = 135 + 120 + 150 + 100 + 140 + 60$$

$$BXA = 705$$

To calculate Overall Performance Ratings (OPR) of employee we divide BXA by 10.

$$\text{Now } OPR = \frac{705}{10}$$

$$OPR = 70.5$$

Final Report of employee performance calculated from following parameter:

Overall Performance Ratings	Group	Remarks
Above 80	High Performer	<ul style="list-style-type: none"> • Entitled for "Best Service Award". • A certificate of appreciation.
Less than 80 but more than 50	Average Performer	<ul style="list-style-type: none"> • Advised to improve their Performance in the coming year.
Less than 50	Low Performer	<ul style="list-style-type: none"> • Disciplinary action might be taken Towards the staff. • Should constantly report his / her Work progress to his / her assessors in a stated period.

Table-2 Overall performance rating

III. USE IRIS BIOMETRIC IN HUMAN RESOURCE

Management Software

When new employee join organization, capture employee's either left and right eye's Iris image with help of Iris camera or other cameras. With his/her detail Iris image also taken, make template for future use and stored in database. Now with help of

proposed software images of Iris are stored in database with all employee details.



Fig. 4 Input screens for both eyes Iris

Every day when employee comes in organization, camera detect Iris image and match with stored template in database. When successfully matched, employee id gets from database and makes his/her today attendance and stored in database permanently with help of proposed software.

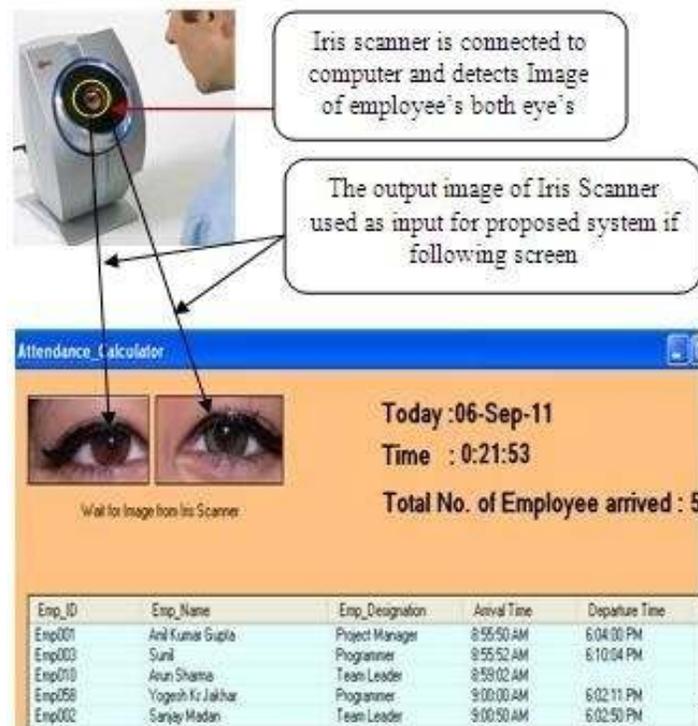


Fig. 5 Screen for manipulation attendance

When both image are comes to proposed system from Iris Scanner, the system perform matching these image template with already stored image temple. When matching performs successfully employee attendance adds in screen's table with emp_id, emp_name, emp_designation, arrival time. when these same image are detect next time, it means this time is employee's departure time and entry will made in screen's table and record

update for today's attendance. When match not successful, the system reset and wait for another input from Iris Scanner.

The proposed software screen also shows the status of coming employees in order to the entered in organization and total no of employee entered in the organization. At the end of month, salary also calculated with help of attendance and also maintains leave status.

IV. CONCLUSION

Employees' performance appraisal process is a crucial task in HR department. In this study, we have developed a performance appraisal system using various aspects related to employee performance. Further these aspects are sub divided into sub aspects to ensure employee performance appraisal truthful. Here we also develop Software to store employee details and Iris image in database. Every day when employee comes, camera detect Iris image and match with stored template in database. Employee id gets from database and makes employee today attendance and stored in database permanently. At the end of month, salary also calculated with help of attendance and also maintains leave status.

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