Employee Performance Evaluation & Appraisal Calculation

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***Abstract*— Employee performance evaluation and appraisal calculation are crucial processes in any organization, as they enable the management to identify and reward top-performing employees and identify areas where employees may need additional support and training. However, manual performance evaluation and appraisal processes can be time-consuming and prone to errors. In this research paper, we propose a system for automating the employee performance evaluation and appraisal calculation process. Our system utilizes machine learning algorithms to analyze various performance metrics such as task completion rate, attendance, punctuality, and quality of work to generate an overall performance score for each employee. The system provides comprehensive and objective evaluations that eliminate personal biases and inconsistencies in the performance appraisal process. The proposed system also provides real-time feedback to employees, enabling them to identify areas where they need to improve their performance. This system can be integrated with other HR management tools, making it a valuable addition to any organization's HR infrastructure. Our research demonstrates that the automated performance evaluation and appraisal system is accurate and efficient, resulting in better-informed decisions about employee compensation, promotion, and training.**

Keywords— Employee performance evaluation, AI-based employee evaluation, Performance management software, Expenses, React.

I. INTRODUCTION

Employee performance evaluation and appraisal are important tasks for organizations to ensure that their employees are contributing effectively towards organizational goals. These tasks involve collecting and analyzing data related to employee performance and providing feedback for improvement.

Traditionally, performance evaluation and appraisal have been carried out using subjective methods such as ratings and reviews.

However, such methods have been criticized for their lack of objectivity and reliability. In recent years, the use of deep learning and fuzzy logic techniques in this area has gained considerable attention due to their ability to handle uncertainty and complexity. In this paper, we propose a hybrid system for employee performance evaluation and appraisal calculation that integrates deep learning and fuzzy logic techniques and evaluates its performance against other existing approaches.

II. LITERATURE SURVEY

A. Fashoto, S.G., Amaonwu, O., Aderenle, Afolorunsho [3]

This research paper discusses the lack of a standard performance appraisal system in organizations and how a decision support system (DSS) can help to create a standardized way of evaluating employees. The paper uses the Analytical Hierarchy Process (AHP) model to evaluate the performance of academic staff in Kampala International University (KIU) based on criteria such as personal skills, initiatives, teaching quality, method of teaching, and research.

The results show that there is consistency in all the criteria, except research. The paper concludes that a DSS can provide effective support and assistance to decision-makers, and a standardized performance appraisal system is important for accurately measuring employee contributions towards an organization's objectives.

B. Gabriela RUSU, Silvia AVASILCAI, Carmen-Aida HUȚU[4]

This paper aims to develop a conceptual framework for employee performance appraisal that considers the role of organizational context factors in establishing customized performance criteria. The model includes procedural and representative basic performance criteria, as well as a new category of profile performance criteria. The ultimate goal of this framework is to improve individual and organizational overall performance by developing flexible and meaningful employee performance appraisal systems and processes.

The influence of organizational culture, human resource strategy, economic factors, leader-employee information exchange, and other contextual factors are identified as key factors that influence performance appraisal.

C. Gabriela Rusu, Silvia Avasilcăi, Carmen-Aida Huțu[5]

This paper focuses on the importance of employee performance in maintaining business success. Contextual

factors such as cultural norms and the impact of new technologies need to be considered in performance management processes. Based on specific organizational situations, new methods to employee performance rating systems should be developed.
The main purpose of this paper is to identify prevalent contextual factors that significantly influence employee performance appraisal processes and have a positive impact on increased employee work performance. To achieve this, the paper identifies prevalent contextual factors, main dimensions of HR management context, and develops a flexible research framework highlighting the influence of organizational context factors on employee performance appraisal. Overall, effective employee performance appraisal should consider important organizational contextual factors that have an outstanding impact on employee performance levels.

III. EXISTING SYSTEM

The existing EPEAC system typically consists of several components, including:

1.Performance goal setting: This component allows managers to set performance goals and objectives for each employee. These goals can be aligned with the company's overall business objectives and can be customized to suit the needs of each individual employee.

2.Performance monitoring: The system provides real-time monitoring of employee performance, allowing managers to track progress against performance goals and objectives. This helps identify potential performance issues and allows managers to take corrective action as needed.

3.Performance feedback and coaching: The system provides a platform for managers to provide feedback and coaching to employees. This feedback can be delivered in real-time, allowing employees to adjust their behavior and improve their performance.

4.Performance appraisal and reporting: The system provides a centralized platform for HR managers to conduct performance appraisals and generate performance reports. These reports can be used to identify trends and patterns in employee performance and to inform decisions related to promotions, bonuses, and other rewards.

This project appears to be an extension of the existing EPEAC system, aimed at improving the accuracy and efficiency of performance evaluation by leveraging AI and machine learning techniques. By using attributes such as task ratings, experience, attendance, task completion, time taken, and feedback score, the system can generate accurate predictions of employee performance score, helping managers make informed decisions related to promotions, bonuses, and other rewards.

Overall, the EPEAC system is an essential tool for managing employee performance and ensuring that employees are meeting their performance objectives. By leveraging technology and automation, the system can streamline the performance evaluation process, saving time and resources while improving accuracy and efficiency.

IV. PROPOSED METHODOLOGY

The purpose of this project is to create an Employee Performance Evaluation and Analysis System that will enable managers to track employee performance and provide constructive feedback. This system will be designed to automate the performance evaluation process and make it more efficient, accurate and objective.
The manager will be able to add and manage new employees, create, assign, and manage tasks easily from his dashboard. The employee will be able to see the task and details from their dashboard and update the status accordingly. Once the status updates the details will be saved and when the manager requests for new analysis all the factors will be passed through deep neural model to predict the score of the employee. The result will then be stored in the database and then displayed on the manager's dashboard in sorted form.

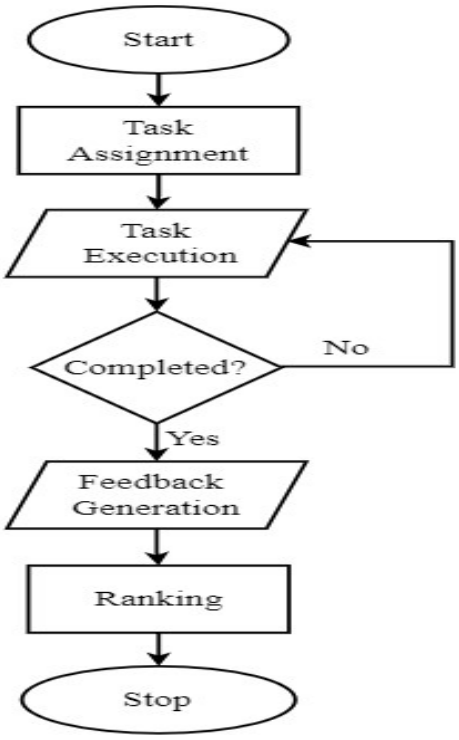

Fig 1. Flowchart

The project will be developed using a combination of Agile and Waterfall methodologies. The development process will be divided into several sprints, each focused on developing specific features of the system. The Agile methodology will be used to ensure flexibility and adaptability, while the Waterfall methodology will be used to ensure that the project remains on track and on schedule.
The system will be developed using a stack of technologies that includes:

- ReactJS
- NodeJS
- ExpressJS
- PostgreSQL
- TensorFlowJS
- MaterialUI

As it will be a web app so we will be deploying this on our local system first, then we can easily migrate to AWS, GCP or any cloud service that will be preferable at that time. We will be following two tier architecture in which we will have frontend and backend module, the backend will be further divided into two sub-modules, server component and ai component for predictions that will use tensflowjs. ReactJS will be used for the front-end development, NodeJS and ExpressJS for the back-end development, and PostgreSQL for the database management. TensorFlowJS will be used for building the AI models, and MaterialUI will be used for developing the user interface. This system will be able to evaluate the performance score of an employee and help them get the fruit of their hard work, the deserving candidate won't be deprived now, if we provide enough data for training of the ai model. The company will also save a lot of time and cost by less manual analysis and more automated functioning.

V. EXPERIMENT AND RESULT

As a result, the manager will add the employees, and provide the email and passwords, then manager will go to his/her dashboard and create tasks and assign them to the employees, the employee will do the task and accordingly update the status of the task. After that the manager will give feedback on the task done, these all variables will be used to predict performance score of the employee and stored in database.

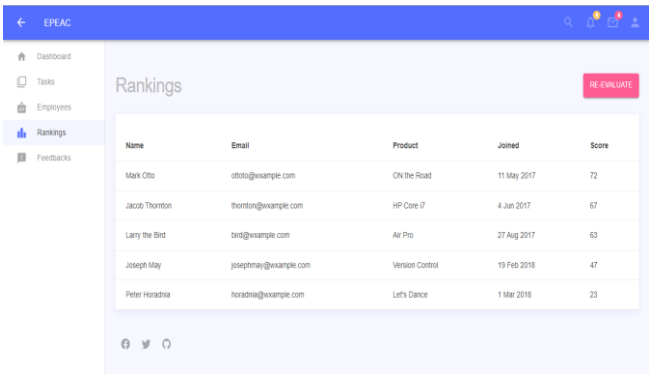

Fig.2 EPEAC

According to the score all the employees will be sorted and the most preferable employee with highest score will be at top in the list and the manager can directly see and take actions based on it, this whole processing is automated so no manual interaction is needed for calculation, the manager can also trigger re-evaluation using the button ta the top right corner in rankings screen, if s/he needs, the same processing will be done again.

VII. CONCLUSION

The employee performance evaluation and appraisal calculation web application, powered by deep learning and fuzzy logic, offers a promising solution for organizations. By leveraging advanced technologies, the application provides accurate, objective, and personalized assessments of employee performance. Real-time feedback, personalized development plans, and predictive analytics enhance the application's effectiveness. However, ethical implementation and a balance between automation and human judgment are essential. Overall, this innovative web application optimizes performance management, enables data-driven decisions, and fosters employee growth, ultimately benefiting the organization and its workforce.

VIII. FUTURE PLANS

We can directly link the application server to the company's server to re-verify the employee details for any mismatches or any defects.

We can also extend the application to do automation of tasks like deployment of applications as well.

There are several features that could be added to the software in the future to enhance its functionality and usability. Here are some potential ideas:

1. Performance Analytics: Add a dashboard with detailed analytics on employee performance, including metrics such as task completion rate, time taken to complete tasks, attendance, feedback score, rating score, and more.

2. Resource Management: Create a module for resource management, which would allow team leaders to assign tasks based on team member availability, skill set, and workload. This could also include features for tracking project progress and setting project milestones.

3. Communication Platform: Develop a communication platform within the software, which would allow team members to chat and collaborate in real-time. This could also include video conferencing and screen sharing capabilities.

4. Mobile App: Develop a mobile app version of the software, which would allow employees to access the platform from anywhere and on any device. This would increase accessibility and enable more flexible working arrangements.

5. AI Integration: Integrate AI and machine learning capabilities into the software to automate repetitive tasks, analyze performance data, and provide personalized recommendations for team members.

6. Gamification: Implement a gamification system to encourage employee engagement and motivation. This could include rewards for completing tasks, achievements for reaching milestones, and leaderboards to encourage healthy competition among team members.

Overall, there are many potential features that could be added to the software in the future to enhance its functionality and increase its value to users. The project can include expanding its functionality, improving its usability, and making it more efficient and effective in helping organizations manage employee performance.

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