Techonauts Software Engineering Project Report

Bonnie Atelsek **Terrence Gaines** **Nathan Murzello** **Matthew Kabat**
Georgia State University

Abstract

In this present era, social media attracts people to present their views [1] has a lot of impact in our lives. We all are well aware of the fact that social media has a lot of influence over people's mental Health like depression, dementia, schizophrenia etc. Although the usage of social media platform like Facebook, Instagram , twitter and software engineering together is not well understood, these mechanisms influence the software development practices. Software developers use and integrate into a wide range of tools ranging from code editing web-based portals . In our research project we would like to discuss about software engineering practices implemented in our project "...give the name of your project..." . We used resourced data, "...front end..." and "...back end..." in our project. Using this data gives the way into utilizing the machine learning models and can be extended to deep learning methods such as CNN, AE [2] and in real live scenarios such as twitter analysis. We used the most compatible architectural model, which is "...architectural model..." for our project.

1 Introduction

Our scientific paper outlines an employee evaluation system targeted towards managers. This is an online tool made for monitoring employee job performance and determining the current bonus for individual workers. The design of the system is ideal for mid-sized organizations with numerous employees and multiple departments With the goal of broad marketing in mind, the system is designed for users of all levels of computer literacy, featuring an easy-to-use and flexible system. It was designed to be able to modify employee profiles as needed, but the core feature is a dynamically updating employee bonus percentage which is calculated based on the aggregated feedback received from all submitted evaluations for an employee. The system encompasses all the essential features of evaluation, management, and organizational development. An added feature is the system has authentication for given operations like edit and delete. The employee evaluation system is a tool for organization-focused development and specifically for monitoring job performance of employees in all departments. Almost all organizations feature some level of implementation of the process of employee evaluation. This process can encompass self-assessments, formalized assessments from employers, and assessments from colleagues. Accurate, accessible, and organized evaluations drive organizations both to form strategies in order to meet the goals of executive policy and to develop their employee environment and work culture.

This paper proposes a simple and effective method for implementing an evaluation system for an existing staff. The Techonauts Online Evaluation System was developed for organizations with numerous employees and complex systems to assist in controlling the quality of work, something that often becomes harder to manage as more employees are hired. The system is designed to be flexible and intuitive to account for managers with different levels of expertise; taking the focus off of learning a new system and allowing more concentration on the evaluations themselves. By using an integrated database, evaluations and calculations for bonuses can be stored, accessed, and calculated to fit a high standard of accuracy.

Employee engagement is an issue for companies at any level: our system allows executives to take an active role in developing their organization by directly linking evaluations to bonus pay. By taking the bonus calculation into the system, the possibility for unfair pay imbalances is eliminated and transparency is ensured.

Proceedings of the 24th International Conference on Artificial Intelligence and Statistics (AISTATS) 2021, San Diego, California, USA. PMLR: Volume 130. Copyright 2021 by the author(s).

2 User Implementation

Because of the system design, a representative of the team will work with a representative of the company using the system to fully adapt the system to their needs. This task should be completed by an executive in the organization, as through knowledge of the employment base and company structure is needed. The process for creating the final data set is comprised of four stages:

1. Collect the data
2. Integrate the data
3. Analyze the data
4. Process and display the data

While the first two stages have no easily-defined time estimate (the final amount of time will depend on the system previously employed by the company and the size of the organization), the time needed for analyzing, processing, and displaying the data can be completed near-instantaneously through the site itself. Once the system administrator has added all departments, employees, and appropriate assessments, the system will display all required information based simply on a search query.

2.1 Data Exploration

Once all data has been incorporated by the system administrator, any user can query the system to return employee evaluations, information, and bonuses. This functionality was based off a simple database query so that all employee information is linked to an ID number; when queried, this number will display all pertinent information to the user. Select users can are also allowed to modify information, such as deleting or modifying departments and employee information, but these capabilities are password protected to prevent tampering.

3 Visualization

The site interface was designed with the goal of an intuitive experience. All basic functionality is centralized on the initial page and presented clearly to the user, with separate pages for telescoped functions, such as modifying employees or departments. Each page clearly displays its purpose and is easily navigated; many pages also included a blurb explaining the various fields and their functions.

4 System Modeling

4.1 Use Case Diagram and Architectural Models

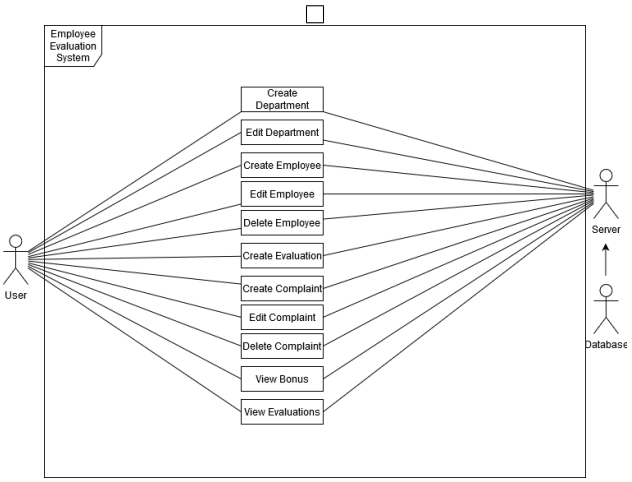

Figure 1: System Use Case Diagram

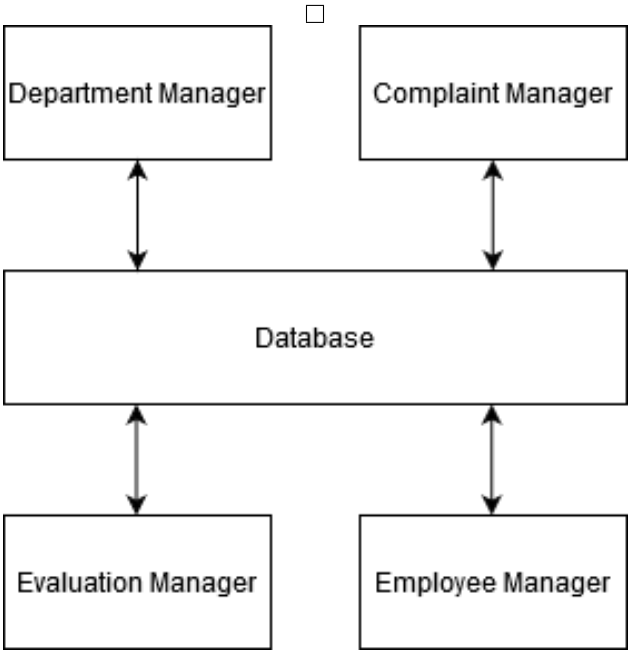

Figure 2: System Modeling Diagram

5 System Outline

5.1 Problem Statement

Our product provides an easy, streamlined way to create and store employee evaluations and automatically use employees' evaluation statistics to calculate standardized salary bonuses.

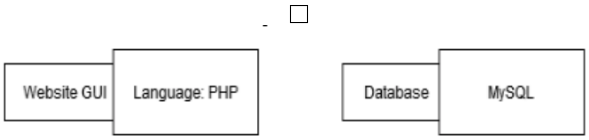

Figure 3: Development View Diagram

Our product is designed for companies with multiple employees and a regular evaluating system, for example, quarterly or biannually. Since the system can store a range of employees and automatically calculate their bonuses, this makes it ideal for growing companies who might not have preexisting digitized evaluation systems who are looking to standardize their bonus system and streamline the evaluation process.

Our product addresses the problem of standardizing bonuses. The system evaluates all employees on the same criteria and automatically generates their bonus amount based on their cumulative evaluation statistics, thus achieving the goal of a truly equitable compensation system, removed from mistakes or discrimination. The simplicity not only makes it easier for managers to monitor and evaluate their employees, but assures that all employees will receive fair treatment.

5.2 Competitors

Small companies often opt for hard copies of employee files and evaluations, but this management system is not efficiently scalable. Outsourcing employee evaluations to external HR management companies is another common solution, but is often costly and lacks the responsiveness that today's companies require. There are also online HR software vendors, like BambooHR, Lattice, or ClearCompany, but these systems can be confusing and non-transparent to the wide variety of companies that need this technology.

While our system does have competitors, such as Lattice and Clear Company, we are concerned largely with the idea of workplace equity. By taking the actual calculation of the bonuses out of the hands of the user, we assure that all employees will receive the same treatment. This makes our system easier for the employer and fairer to the employees. We allow access to all past evaluations, meaning that our system is entirely transparent, which removes the potential for discrimination accusations, and even more importantly, drastically reduces the likelihood of monetary discrimination.

5.3 Mission Statement

Workplace culture surrounding salary and bonuses is often fraught with social stigma and the potential for discrimination. Our system removes those roadblocks and allows for a workplace that can operate on transparency and equality. It simplifies the experience for all users involved, and will thus allow for greater productivity and communication.

Our top level objectives were to create a system which allows employers to create, store, and view employee evaluations for each registered employee, and automatically calculates and displays employee bonuses on their profiles based on their past evaluation statistics.

Our product is differentiated by its aim and its design. Unlike many other available systems, we seek to provide a streamlined and entirely fair evaluation experience. By automatically calculating bonuses, we both take that responsibility off of the shoulders of the managers we are marketing towards, and assure impartiality for the associated employees. Our system, unlike most alternatives, is a guarantee of equality and ease of use.

5.4 Target and Scope

Our target customers are mid-size and growing companies looking to standardize and digitize their evaluation system.

The scope of our project outlines a database to store employee profiles and their past evaluations, a website to both allow the entry of new evaluations (giving prompted numerical rankings on aspects of job performance, ex. punctuality, work ethic, etc.) and to calculate and display salary bonuses based on the aggregated employee evaluation statistics.

5.5 Justification

Free database technology is easily available and usable, as are free website development tools and web hosting, which means that our website was feasibly buildable for a team of five. We used MongoDB for our database.

We were tasked with designing an algorithm weighing the different aspects of the evaluation, and making sure that it could be effectively applied universally, regardless of employee differences such as the length of their tenure at the company. We also needed to ensure that our system is secure in order to maintain our mission statement of providing discrimination/tamper free evaluations.

6 Implementation

Our team initially developed a database system with MS SQL Server. During installation, we attempted to connect the system to our GUI and encountered some

connection issues that we were unable to resolve. As a result, we decided to switch to a more user-friendly DBMS called MongoDB.

As there is billing information tied to the individual account for the cloud hosted MongoDB our team does not feel comfortable sharing the login, but if desired we can invite members to have access, which will allow other to view the database.

The site is hosted and accessible online at "https://technosystem.herokuapp.com." It is being deployed through a GitHub repository where the team can push and test changes.

7 System Testing

The main functionality of our application revolves around being able to add and retrieve information to and from a database. In order to achieve this, we created several similar classes to handle these tasks. The main components of information that our application can be used to manage are employees, departments, and evaluations. Each of these has two classes, one to upload information and one to retrieve information.

We used PHP Unit to create tests for these classes. The tests checked whether the classes handled information passed to them correctly by attempting to pass incorrect or incomplete information. In addition, when testing the retrieval classes they attempted to pass non-existent IDs to be retrieved. This enabled us to ensure that the database and the system as a whole maintained its integrity by not allowing incorrectly created records into the system.

Conclusion

A employee evaluation system is a systematic way to examine how well an employee is performing their job. The word systematic is carefully chosen, and implies that the performance evaluation process should be a planned system that allows feedback to be given in a formal—as opposed to informal—sense. Employee evaluations can also be called performance appraisals, performance assessments, or employee appraisals.

There are three main reasons why a systematic performance evaluation system should be implemented. First, the evaluation process should encourage positive performance and behavior. Second, it is a way to satisfy employee curiosity as to how well they are performing in their job. Lastly, it can provide a basis for bonuses, and legal disciplinary actions.

References

[1] S. T. Sadasivuni and Y. Zhang, "Using gradient methods to predict twitter users' mental health with both covid-19 growth patterns and tweets," *second IEEE International Conference on Humanized Computing and Communication with Artificial Intelligence (HCCAI 2020) September 21-23, 2020 Irvine, CA, USA*.

[2] J. K. Mandivarapu, B. Camp, and R. J. Estrada, "Self-net: Lifelong learning via continual self-modeling," *Frontiers in Artificial Intelligence*, vol. 3, p. 19, 2020.