PERFORMANCE EVALUATION ANALYSIS IN ORGANIZATION WORKFLOW MANAGEMENT SYSTEM

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Abstract

With the recent advances in web technology, there is rapid growth of internet applications. It also creates an ideal platform for Organization Workflow Management (OWM). OWM manages a number and order of tasks that need to be carried out during the lifetime of project. However, Web based Organization Management includes services that provides preferable conditions to distribute the work and established the cooperation among employees. It becomes the characteristic of the next-generation Organization Management.

The system proposed is a web- based application which can be accessed concurrently from many fields offices. Field offices are supposed to enter information of employee associated with respective offices. This information is assembled and used as base information for workflow management.The system is developed to fulfill the requirements of the employees working on their task.

The system developed is used to analyze the employee's performance, its behavior based on the task allocation. It is further used to monitor the progress of all projects, make the decisions about scheduling/ rescheduling of deadlines and other organizational parameters.

Key words: Workflow Management System (WMS), Organizational Management System (OMS), Performance analysis

1. Introduction

A workflow management system (WMS) [1][2] is an information system which is used for managing and sequencing of various business processes (tasks) in such a way that all tasks are completed with optimal efficiency. A workflow management system involves the creation of various tasks which hold data and automates a sequential path of tasks until it is fully completed. Tasks related to particular workflow may be created manually or by a system [3].

A typical information system (shown in figure 1) [6] [8] suggest a use of computer technology to maintain information about all users/employees in an organization. The basic data of all users is transformed into useful information; and a particular case is known as Human Resources Information System development. Such a system stores data of employees within an organization and generates the reports as per request. These systems can be expanded by integrating other information systems or modules like accounting Information System (AIS) – designed to transform financial data into information, or Management Information System (MIS) that provides decision-oriented information to managers, Workflow management system and so on [5] [9].

However, to create a Workflow management system, which involves automated task creation from workflows is difficult to develop. It needs to develop application program and database on mutual concerns [3] [4]. The application program is worked as a bridge between users of system and database, where the data is stored. Thus, there is a need of well-developed application program and database to achieve reliability, flexibility and proper functionality of the system. Such a systems can easily differentiate from others and their development comprises a great variety of tasks that has to be resolved and implemented [4].

Generally major management problems [5] include functional organization of the system. Functional organization divides and organizes the enterprise to product lines, geographical positioning parts, on the basis of production process, consumers type, and so on. In large companies, it can be organized in segments, doing it repeatedly according to different methods at different operative levels [6] [7]. As a potential source for the development fast increasing software industry is identified, that has a scope in developing big software applications by decomposing them into the series of comparative small software.

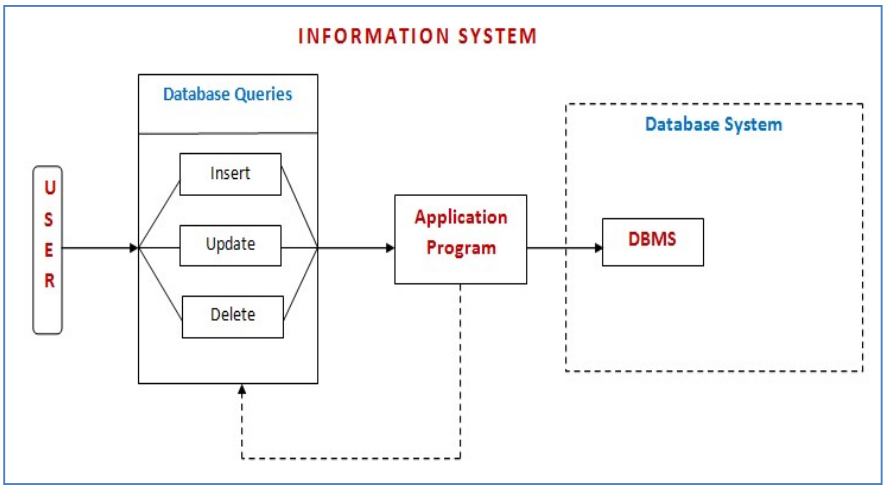

Figure1: Information System Diagram

Need for the workflow management system [1][2]:

- Employees and Managers can set goals and deadlines for assigned task. It further helps to keep track the work done by individual employee.
- Complete work status of an organization is generated on one click. This information can be used to spot various risks within organization. It also helps to identify under-utilized employees, high performing employees or low performing employees who are consistently below standards and so on.
- The system can be tailored to send automated messages/emails to remind, motivate and encourage employees about their assigned tasks, their accomplishments throughout the year. It will definitely improve bond between employees and management.
- Goal tracking throughout the year helps to improve overall productivity in the organization. Managers and employees can work more collaboratively ensuring expectations are set and met.

2. Development of system

The whole process of development of system is divided into two steps: development of database and development of application program. The first step is to create a database. The logical database model (tables, their content and the relationships between them) should respond to the given task and cover the basic requirements. The Interface of the program should be user-friendly, and easy to use. The application program should perform basic operations upon the database like addition, deletion, updation and retrieval required data [5]. In addition to these operations, the system must be able to provide functions like task creation, task submission, checking deadline, provide intimation about deadlines etc [6].

Controls and forms used to develop a system should logically and functionally be linked within the program and must respond to the structure of the database. It needs to established proper connection with the database so that it can respond to every query performed upon it. Exception-handling is also equally to handle various exceptions generated during implementation. The system proposed is implemented using software are ReactJs for front end development and Firebase as the back end tool.

The system developed is having following advantages:

- Increased collaboration and teamwork
- Access to reliable data and information in real time
- Reduced waste and reduced operating costs
- Promotion of continuous process improvement
- Assistance in decision-making and strategic planning from the company
- Increased profitability of the company

- Reduction of human failures

3. Methodology

Step 1: Registration and login:

Every employee in an organization has its own login account through which they can manage their assigned tasks. To get login account, employee should first register using sign up process. A set of rules and privileges can be automated after successful registration and as a response, reference login id and password is provided to all employees. In process of registration admin needs personal information of employee's like: name, date of birth, national identity no/ passport no, mobile, email, dependents, educational information may include: field of study, qualification, experience and other related information such as health problems, more responsibilities.

Step 2: Task creation and assignment:

Once the project has been finalized, manager identifies and creates various tasks into it. The tasks are further assigned to the appropriate employee according to the designated trigger. The assigned task is supplemented with specification of time and days of work. Manager can maintain data about employee's attendance as per the activity record of employee using login time and date. Manager can also view or update employee details or progress of assigned task. Let's consider P represents a project and Ts represents the set tasks belong to that project. The set of tasks Ts are also assigned to different employees (E) for its implementation. It can be represented mathematically as follows,

$$Pa = \sum_{i=0}^{n} Tsi \text{ Such that, } Ts \in \{PaTs1, PaTs2, \dots, PaTsn\}$$

$$E \in \{E1, E2, \dots, En\}$$

Step 3: Data Entry:

Employee can login to system every day and mark attendance. After task/workflow is assigned to particular employee, all the appropriate information like assigned date, start date, end date, particulars about tasks, hours utilized is provided along with it. Employee can also view/ update his/her own status about progress of assigned tasks. The employee have the rights view and manage all information through own login account.

Step 4: Update/Delete task:

For implementation of particular project, the complete project (P) is divided among number of tasks (Ts) and these task be further assigned to employee (E). These tasks can further verified for improvement or deleted, if no longer required.

Step 5: Performance Evaluations/ Analysis:

The performance analysis can be done at two levels: at employee level and at admin level. The performance of individual employee can be calculated based on the tasks assigned and tasks completed in given period. Further efficiency of an employee is also analyzed based on number of hours utilized, number tasks completed over the period of time. At Admin level, the manager can evaluate the percentage of work done related to a project, status of all projects in an organization.

The process performance analysis is simplified using checklist. It includes filling and submitting the necessary documents to Admin for record keeping. Figure 2 represents the task allocated to an individual employee.

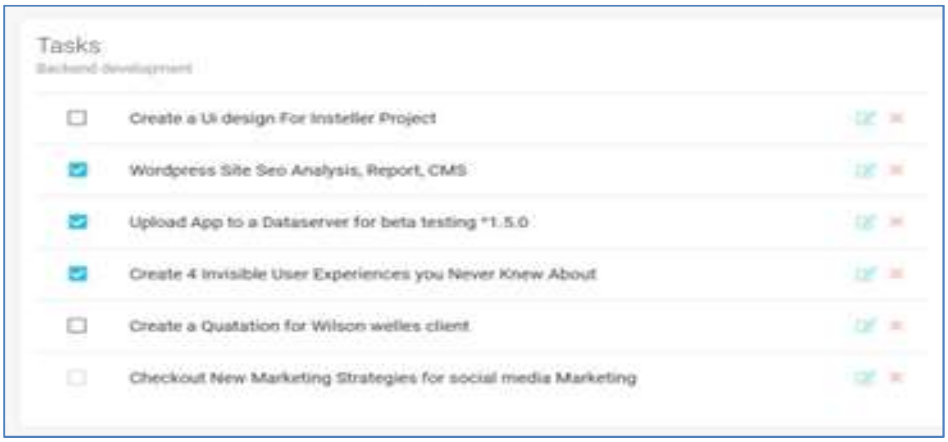

Figure 2: Task assignment and checklist in employee account.

- Employee behavior (Eb) is calculated using work done (Wk) in hours (hr) at particular time (t). It is mathematically represented using equation 1. Figure 3 shows the behavior of an individual employee based on the work done with respect to time.

$$Eb = Wk(hr)/t \qquad \text{----(1)}$$

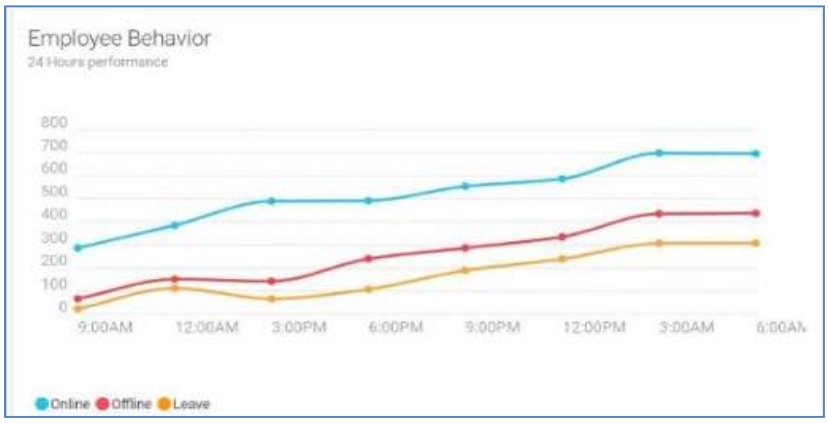

Figure 3: Employee behavior analysis (based on work done in hours)

- Employees performance (Ep) is the total number of task completed (Tsc) by total task assigned (Ts) to an individual employee. It is calculated using equation 2. The overall task completion status, percentage of pending and current working task of individual employee is calculated as shown in figure 4.

$$Ep = \frac{Tsc}{Ts} * 100 \qquad \text{-------(2)}$$

Figure 4: Employee behavior analysis (based on amount of task completed)

- Admin can use individual employee's performance parameters to calculate the overall status of individual project and all projects in an organization. For project (P) the status of project (Ps) is calculated using total tasks completed (Tsc) by individual employees (E) by total number of task in a project.

$$Ps = \frac{Ei(Tsc)}{Ts} \qquad \text{where, i= 1 to n} \quad \text{----- (3)}$$

Using above equation, Admin/ Manager can check the complete status of all the projects. The individual status of each project is shown in figure 5. It may help admin to take administrative decisions like scheduling/ rescheduling of task, deadlines, and human resource allocation.

Figure 5: Overall project status of all projects in an organization

4. Conclusion

This system explores an effective way to organize employee details in an organization. The combination of all processes of workflow management system (WMS) in one application will ensure the perfect platform to manage employee data and assigned work. The information to store can further use in the future for various analysis.

The system 'Organization Workflow Management' is designed and developed using ReactJs as front end and Firebase as a database to back end.The system involves basic features required like registered of employee, creation and assignment of tasks, calculating performance of employee. Employee can view information about login, assigned task, and working hours. Overall, the system designed proves beneficial for an organization to assigning and monitoring various business processes and employee performance evaluation. Organization can have overall control and record of all employees regarding; personnel data, efficiency and performance at all levels in its structure.

The scope system can further expand by using machine learning algorithms which will definitely proves beneficial in finalizing deadlines, making business decision about critical processes, deciding future plans of the organizations.

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