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ONLINE TASK SEGREGATION AND RESOURCE UTILIZATION IN A UNIVERSITY

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ABSTRACT
The Online Task Management System (OTMS) is built to organize an organization resource and therefore enhance assignment's performance by assigning, the required tasks, identify users, their full details, and even their working progress while estimating their working performance. The proposed system also compliments the interaction between the administrators, users by providing an efficient interface to accomplish goals on the web hassle freely. OTMS covers all activities related to the search for, finding, distribution, monitoring, and forecasting of the performance of every organizational asset. It is the responsibility of administrators to ensure that the school has a proper data base system in which the performance of the peer can be determined from. Thanks to the machine learning solution, this system can even predict such organizational performance based on individual peer analysis, which in turn is helpful in the organization's growth.
KEYWORDS: *Allocation, Resources, Scheduling and Tracking.*

II. INTRODUCTION

The Online Task Management System (OTMS) aims at better discharge of work and proper allocation of tasks to peers about the resources available in the day to day running of a university. The system allows for administrators to set assignments and monitor progress as well as input user-specific data in a simple web-based application.

OTMS is an all-encompassing process of task running for the entirety of the university, from identification to resource allocation and tracking and assessment of tasks, leading to better performance and productivity.

This system is going to transform the organizational performance by bringing together an efficient tool that helps with the management of tasks in a particular organization, along with features to promote teamwork, openness, and responsibility in the workplace. As the world becomes even more connected and as time sensitive issues become the norm, the centrality of a high-level task management solution becomes clear.

These are some of the problems that OTMS aims to solve in university contexts. Lack of a coordinating centre for many tasks is one of the biggest issues when it comes to organization and time management. Lecturers under this motivational type have challenges in the assignment of tasks, monitoring their achievement and efficient usage of resources thus experiencing deadlines and substandard performance. In the same process, manual task management is also inefficient and subject to miscommunication and errors all of which are detrimental to productivity and teamwork.

To counter these issues, OTMS consists of features such as easy graphical user interface, integrated process management and self-driven schedule combined with alert functionalities, and complete data management support. This system also helps the users in providing clear assignments, tracking the progress easily, make resource allocations and decision making. By attending to these issues, OTMS increases the efficiency of scholarly and administrative activities.

Key Challenges and Solutions

Task Segregation: Therefore, the question of how it is best to co-ordinate tasks from the students' viewpoint in relation to the overall framework of a university and across all the faculties and the departments which a university may comprise arises. OTMS is an online tool for creating tasks based on its priority, department, project, due date, etc., The system is full Electron based web application. This ensures that tasks are accessible to all the right people while the same time it becomes impossible for the tasks to be accessed by wrong people or intruders.

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Resource Utilization: One aspect that is stringently important in universities is resource management because time, resources and facilities can be compromised in ways that can lead to a whole lot of compromise. OTMS also contains numerous resource management features and some of the best resource availability and suggestion tools exist within the application. This is synchronized with other systems in the university in a way that makes provision of service sensible and efficient.

Collaboration and Communication: Most importantly when semester sleek, fully online, or distant education is becoming more and more recognized in practice, and distributed work is not a rarity, it is found to be a key element. OTMS is not a passive tool for sharing and organizing of tasks, files, comments and notifications and real time status. Compatibility and responsiveness of the technological elements make it possible to make the users reachable as well as productive irrespective of the place.

Data-Driven Insights: For this continuous improvement OTMS offers improved features in particularly reporting and analysis capabilities. This means that the information concerning tasks, the performance, resources, and people involved enable the university heads to analyse the trends in Order to affect the necessary improvements.

Admin Module

- **Admin Responsibilities**
  - Create and delete users.
  - Provide valid login IDs and passwords to users.
  - Track all tasks and records within the system.
  - Manage all system-related work.
- **Capabilities**
  - Assign tasks to users.
  - Monitor task progress and completion.

User Module

- **User Responsibilities**
  - Perform tasks assigned by the admin.
  - Log in with the provided login ID and password to access the system.
- **Capabilities**
  - Users are differentiated by their designations and can assign tasks to their subordinates.
  - Complete tasks from home efficiently.

System Specifications

1. **Hardware Requirements**
   - **Processor:** Intel Core i5 or equivalent
   - **RAM:** 8GB or higher
   - **Storage:** Minimum 256GB SSD
2. **Software Requirements**
   - **Operating System:** Windows 10 or macOS Catalina (or later versions)
   - **Web Browser:** Google Chrome, Mozilla Firefox, Safari or Microsoft Edge
   - **Node.js:** Version 14.x or higher for development environment
   - **Code Editor or IDE (Integrated development environment):** Visual Studio Code, Sublime Text, or equivalent
3. **Database Management System**
   - The task manager system utilizes Firebase as its primary database management system. Firebase offers real-time database capabilities, seamless integration with web applications, and robust authentication and security features.

The specific Firebase services used in the project include

   - **Firebase Authentication:** for user authentication and authorization
   - **Firebase Realtime Database:** for storing and managing task-related data in real time
   - **Firebase Cloud Functions:** for server-side logic and backend operations

4. **Development Stack**
   - **Frontend Framework:** React.js for building dynamic and responsive user interfaces
   - **Styling:** SCSS (Sass) for efficient CSS styling and customization
   - **Routing:** React Router for managing navigation within the web application
   - **State Management:** Context API or Redux for state management across components

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- **Backend (optional):** Firebase Cloud Functions or Node.js with Express for custom backend logic

III. LITERATURE SURVEY

A literature survey conducted in the context of the Task Management Systems adapted for the environment of Higher Education shows that task management in this domain is built to provide an optimal way of delegating and coordinating tasks. These systems help in smooth allocation of work given by the higher authorities such as administrator, faculty, or head of a department, to the concerned departmental head, faculty or staff members. It includes creating tasks, setting priority, due dates, tracking progress, sharing documents, having communication tools and track performances.

The biggest continuing themes are the ability to work seamlessly across devices, personalized processes for different parts of the university, data security for sensitive areas, as well as integration with academic terms. New tendencies indicate the increased focus on data analysis, on the use of automation and collaboration tools and, compliance with data protection acts (e.g. GDPR, FERPA). The security is well emphasized as most universities deal with sensitive information. These are the key aspects of security such as; encryption, access control, authentication, and data safeguard. This is very important with regards to scalability, and the ability of systems to take on a broad range of workloads, departments, and users. By having customizable dashboard, flexible work flow, and role-based access, it enhances the system functionality, flexibility, and usability.

Key Studies

Wang et al (2017) tried to explain the actual connection between online task segregation and academic performance; observed positive trend between effective task organization, resources administration, and students' performance.

Johnson et al. (2018) provided an example of the effectiveness of using an online task management platform: the management of tasks, the allocation of resources and the level of involvement of students was enhanced.

In a conceptual review of the literature, Patel and Gupta (2019) examined the crucial role of technology in aligning resources composition by providing some examples of work on online task segregation specifying its advantages in terms of avoiding resource contention and increasing the level of cooperation and productivity.

Smith et al. (2020) surveyed current task management systems in higher education environments with a focus on departmental segregation of tasks, real time collaboration features and how such systems affected productivity and resource utilization.

In the paper of Khan and Rahman (2021), the problems in resource management in universities were highlighted and the opportunities for their improvements using technology were described: the division of tasks and the use of collaborative tools and data analysis tools for resource planning.

IV. METHODOLOGY

II. Requirement Analysis

- Gather information from departments in the university as per the required task management, resources needed and the roles to be assigned to users.
- A detailed breakdown of the user personas of the project – administrators, faculty, and students with granted roles and permissions.

III. System Design

- Co-ordinate on structure of extensive element and databases, layout of variations and UI, as well as back-end services.
- RBAC should be applied in the system in ensuring that the users are restricted in their access privileges for the system.
- Produce sketches to give a picture of system design or create a mock-up of how the system would flow.

IV. Development

- Choose frameworks working with frontend (e.g., React, HTML/CSS) and backend (e.g., Node.js, Firebase).
- Some essential functions that anyone can draw include the posting of tasks and assignments, monitoring of completed tasks, notification, and even the provision of reports.
- Firebase Authentication should be employed to provide secure way of logging in and controlling of access.

V. SYSTEM ANALYSIS

EXISTING SYSTEM

Many institutions of learning are still to adopt proper tools and procedure of establishing tasks; this includes e-mail correspondence, excel and simple tracking techniques. They assist in daily work organization but they are not scalable, they can sort partially, and

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do not contain automation or all the features. It is somewhat limited in complexity and direct access for the pure clerical work so their strength is not in the advanced organization and management of those particular tasks and the use of tools and resources.

Weaknesses of Current Systems

- Time-Consuming and Error-Prone
- Limited Integration
- Lack of Automation

Challenges Faced by University Stakeholders

The various types of universities that are available,

i. **Disparate Data Sources:** Generally, the data about the tasks exists in different systems and therefore there will be duplication of work and confusion and wastage of time in trying to locate the data needed.
ii. **Limited Collaboration:** As a result of the poor collaboration aspects that used traditional system results thus relying on emails, telephone and meetings, the entire process is slowed and miscommunication occurs.
iii. **Manual Workflows:** Some of the processes for instance; time-tables and resource management are done manually and as such, they are slow and, in most cases, grossly inaccurate.
iv. **Lack of Real-Time Visibility:** Since there are no frequent updates, the administrators fail to develop appropriate decisions for appropriate resource management hence; inefficiency.
v. **Limited Analytical Insights:** Such systems are generally not well supported by sufficient analytical tools and therefore it becomes difficult for the universities to determine areas of strength and weaknesses on issues to do with performance as well as use of the resources in the system, which basically help in assessment of strategies for improvement.

LIMITATIONS OF THE EXISTING SYSTEM

i. **Lack of Centralization:** This comprises of things like the manner the various departments in a business organization uses different tools and different databases to conduct their business which greatly limits the dissemination of information within the University.
ii. **Scalability Issues:** These traditional systems cannot handle increased number of students and more research activities required by the institutions which lead to poor performance and user satisfaction.
iii. **Inflexible Workflows:** In traditional systems there is no way of achieving the flexibility that is desirable in an educational environment.
iv. **Manual Processes:** However, there are some universities that have not adopted the computerized data gathering techniques whereby they use printed forms and use of spreadsheets to input data this is slow and is associated with errors.
v. **Limited Collaboration:** Cross functional team efforts and information sharing is another area where current systems do not have provision of supports for work done.

VI. SYSTEM PROPOSED

The Online Task Segregation and Resource Utilization System that is being proposed in this research is a web-based application intended for the efficient handling of tasks USW faculty members are most assigned to. It provides adds to relation to the management of tasks, teachers and students' assignments division by the academic departments, courses, research and other work, administrative burdens. Most of the time, the use of the tool is fairly intuitive and allows the faculty to easily create, assign, priorities and track tasks, due dates and milestones as well as collaborating where necessary.

The system helps to solve the problems with the distribution of tasks, minimize conflicts, and increase efficiency due to the presence of objectives and deadlines. Monitoring tools let for overseeing the task's progress and performance indicators and to take corrective measures as necessary. In role-based access, restricted privileges; administrators, control general responsibilities and measures; and faculty members have access to only those tools that are useful for their duties. In all, this system seeks to improve productivity, order, and effectiveness in the management of faculty duties in universities.

ADVANTAGES OF THE PROPOSED SYSTEM

- **Centralized Task Dashboard:** Real time of all activities provides status, priority, due date, and users of the job to the higher authority.
- **Task Assignment and Collaboration:** This system describes an easy way certain tasks can be offered to a specific individual or a certain group, and includes notification and alert systems. For instance, the commenting section, the share and transfer of files, and discussions enhance communications and collaborations.
- **User Authentication:** Some examples of what users can input are credentials, and while the admins include an input that allows a specific task to go to a specific user.

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- **Reporting and Analytics:** Integrated application offers reports on the completion of the task and distribution and possible congestion of the work load. Thus, business intelligence assists in decision making and in definition of the resolution of procedures.
- **Academic System Integration:** Integration with other systems like LMS and SIS for easy synchronizing of data and is used in combination with Academic calendar.
- **Scalability and Flexibility:** Scalability is the ability of growth of the tasks, users, and data without any effect on the performance of the system as per the need of the university in future. It also allows users to make the necessary adjustment according to individual requirement of the user.

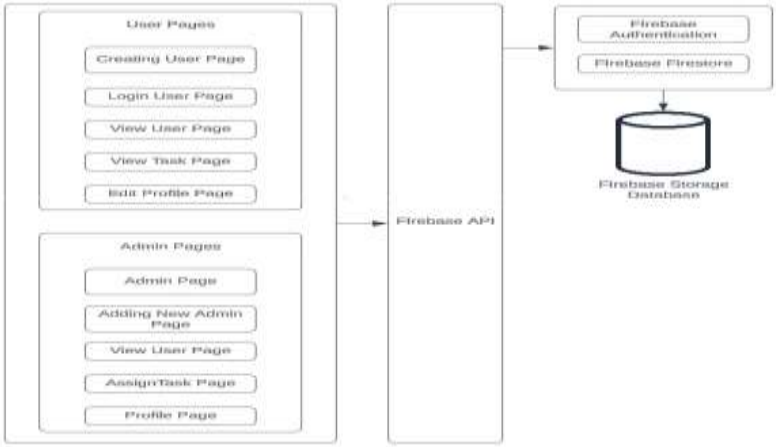
VII. SYSTEM DESIGN

The employed task management system intakes information about tasks and presents the information in various forms of visualizations. Tabular form is supplemented by means of bar charts, pie charts as well as line graphs providing a clear description of the state of tasks, progress, priority, and figures. For example, bar graph may be used to display distribution of tasks by category, pie chart displays the relative sizes of the completed and the pending tasks and; line graph may be used to display task

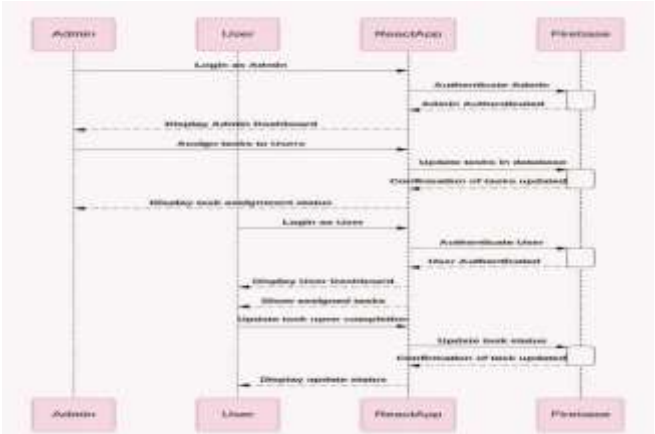
Key Visualizations Include:

- **Task Completion Rate:** A line graph of the tasks that were performed pointing to history to help the administrators in plotting performances.
- **Task Category Distribution:** Specifically, task distribution by type can be acted as a pie chart to help management the resources intensively.
- **Priority Matrix:** An effective method of selecting and choosing with the assistance of graphic division of the tasks by the degree of their importance.

HIGH LEVEL DESIGN (System Architecture diagram)

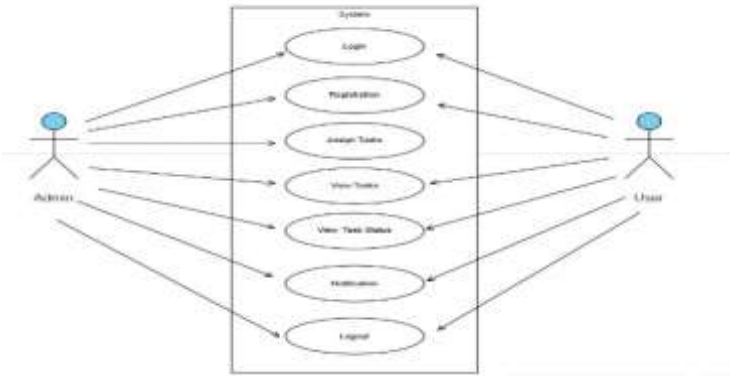


SEQUENCE DIAGRAM



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USECASE DIAGRAM



ACTIVITY DIAGRAM



VIII. DATA COLLECTION AND PREPARATION

1. DATA SOURCES

In the task management system, information is collected from various sources to allow the correct tracking and monitoring of activities. This is data obtained from 'form' sources including task creation forms, update and user forms; as well as 'data extracted from the system database' that comprises data on tasking, users, categories, due dates, priority and status.

Texts, list, dates, Boolean and radio buttons are entered by users and send to the text boxes, drop down lists, date pickers, check boxes and radio buttons. This data is structured in the database with specific data types: They have plain text input fields that are of var char data type, date, number which is int data type and status which can either be Enum or Boolean data type. Still, this structural data is going to be immensely valuable for tracking achievements, delegating the tasks, determining scope and timeframes, and generating reports.

2. DATA PROFILING

Surveillance or profiling at its simplest is the examination of data that has been collected as to its nature and suitability as well as its accuracy. This assists in the identification of the patterns, trends, and outliers that in a way contribute to accuracy and reliability of all data within the context of task management system.

The system categorizes and quantify the task types, priorities, and status change to look for trends and changes in type and for the measurement of the performance, analysis of the updates, user participation and completion ratings. It highlights such cases as tasks that take very long time or when high priority tasks spend most of the time in the queue.

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IX. RESULTS

User Registration



User login



Forgot Password



Admin login



Admin Dashboard



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Displaying Users



Adding New Admin



Admin Profile



Assigning Tasks to users



User Dashboard



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Notifications



User Profile



Database



Authentication Database



X. TESTING

1. Testing and Validation

- Carry out unit, integration, and system test in other to ascertain that the task manager system is in right order or to some level of standard.
- Check the functionality of the system through the following procedures: conduct several shows about the system and associate with real users who will assist in identifying the possible issues of the system.
- It is possible to encourage the true users of the application to provide the results and enhance the consumers' satisfaction.

2. Deployment and Maintenance

- Perform the installation of the task manager system in a secure hosting platform including cloud service such as AWS or Firebase Hosting.
- From the system point of view ensure that the system is being updated with new gadgets and software, at the same time patch up the system to ensure that it is free from flaws and or bugs.

3. Training and Documentation

- Prepare teaching aids that will demonstrate to the client what the system can do for him or her as a user, or as an administrator.
- manuals for future use in case there is a snag.

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Key Achievements:

- It was possible to fall into developing a sound framework for work assignment and resource management when placed in the environment of a university.
- Higher levels of details in such tasks as the description of the task, distribution, monitoring, and reporting of the same tasks as well as improved management of resources.

Challenges and Future Enhancements:

- Discussed questions of data accumulation, system security, and versatility enlargement invariably by consecutive attempts to modify.
- As for the future's development such matters as the way of using performance measurement for tasks, collaboration features and new functionality obtained from users or new requirements will be considered.

CASE STUDY

CASE 1

S. No	Test ID	Form	Test Description	Steps to Execute	Test Data	Expected Result	Actual result	Status
1.	T_01	Application Homepage-Admin Login	Check Username	Type Username and password	Username =Riti Password =wrong Password	Invalid Username /password	Invalid Username /password	Pass

CASE 2

S. No	Test ID	Form	Test Description	Steps to Execute	Test Data	Expected Result	Actual result	Status
1.	T_02	Application Homepage-Admin Login	Check Password	Type Username and password	Username =John doe Password =wrong Password	Invalid Username /password	Invalid Username /password	Pass

CASE 3

S. No	Test ID	Form	Test Description	Steps to Execute	Test Data	Expected Result	Actual result	Status
1.	T_03	Application Homepage-User login	Forget Password for Invalid User	Type Username and password	Username =Riti Password =wrong Password	User not found / User is not admin	User not found / User is not admin	Pass

XI.CONCLUSION

Indeed, we effectively came up with an online task segregation and resource management system for the university. It also identifies the significant successes as better performing of the tasks, focusing on the dynamics of the administrators and users interactively as well as organizing the resources. In particular, automation of task distribution, real-time visibility with timestamps, notifications, and interface have been valued by the users and as a result, people are satisfied with the tool.

Such issues as data integration issue, program security and scalability were considered during the design phase. Subsequent releases will expand out capabilities of analysis, integration with other systems, and add features based on users' feedback and essentialities.

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