

# **“OPERATION WORKFLOW MANAGEMENT”**

*Submitted in fulfillment for the award of the degree of*

**Bachelor of Engineering**

*By*

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## **Project Synopsis Report Approval for Bachelor of Engineering**

This project synopsis report entitled “**OPERATION WORKFLOW MANAGEMENT**” by “*Pratik Chakane(05)*”, “*Rahul Gavit (18)*”, “*Nitin Patil (48)*” is approved for the degree of Bachelor of Engineering in Computer Engineering.

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## Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. we also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. we understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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## **Abstract**

A Workflow Management System is a software application designed to manage and streamline business processes. It allows organizations to automate, manage, and optimize their workflows, reducing manual effort, increasing efficiency, and improving productivity. The system typically includes tools for creating and defining workflows, assigning tasks to users or groups, and tracking progress. It may also include features for data capture, integration with other systems, and monitoring of performance metrics. A WfMS typically consists of three main components: a workflow designer, an engine, and a user interface. WfMS can be used in a variety of industries, including healthcare, finance, manufacturing, and government, and can be customized to meet specific organizational needs. They are particularly useful for organizations that have complex, multi-step processes that require coordination across different departments or teams. Overall, a Workflow Management System can help organizations improve operational efficiency, reduce errors, and improve overall process quality. Workflow management has its origin in the office automation systems of the seventies, but it is not until recently that conceptual and technological breakthroughs have led to its widespread adoption. In fact, nowadays, process-awareness has become an accepted and integral part of various types of systems. Using process-aware information systems, workflows can be specified and enacted, thus providing automated support for business processes. A workflow explicitly represents control-flow dependencies between the various tasks of the business process, the information that is required and that can be produced by them, and the link between these tasks and the resources, be they human or not, which can execute them.

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## List of Abbreviations

| Symbol | Full Form                         |
|--------|-----------------------------------|
| WfMS   | Workflow Management System        |
| OWM    | Operation Workflow Management     |
| API    | Application Programming Interface |
| HTML   | Hypertext Markup Language         |
| CSS    | Cascading Style Sheets            |
| JS     | JavaScript                        |
| HTTP   | Hypertext Transfer Protocol       |
| URL    | Uniform Resource Locator          |
| JSON   | JavaScript Object Notation        |
| CRM    | Customer Relationship Management  |
| ERP    | Enterprise resource planning      |

# **CHAPTER-1**

## **INTRODUCTION**



## 1.1 Introduction

Workflow is a management process that can carry out activities automatically. It does so by adhering to a set of process rules, files, messages, or tasks that must be transported or carried out by various executors. To fulfill the goals of workflow management, the workflow's objective is to formally break down and evaluate works into tasks or characters, then implement them in a predetermined procedure and in compliance with predetermined regulations. We must find a solution to the issue of increasing productivity, reducing expenses, and improving competitiveness for the workflow system. A workflow management system is a piece of software that wraps up workflow definition and management and executes workflow instances in accordance with workflow logic previously established by the computer. Its main goals are to change the order of the steps in the company projects' processes, manage the project to raise its technical bar and competitiveness, and lessen its complexity. WMS typically offers a range of features, such as task scheduling, progress tracking, resource allocation, document management, and reporting. They may also include integrations with other tools and systems, such as project management software, CRM systems, or ERP solutions. One of the key benefits of a WMS is that it can help organizations standardize their processes and ensure that tasks are performed consistently and efficiently. This can lead to improved quality, reduced errors, and faster turnaround times. The workflow management system allowing enterprises to automate, monitor, and streamline their business operations is described in this paper. The user's interaction with the system is the web browser. The system is web-based because of the Internet's widespread use and reliable communications infrastructure. Users of any computing platform can use the system thanks to these.

capabilities without the need for additional hardware or specialized training. WfMS usually consists of three main components: workflow designer, engine, and user interface. The designer allows users to create and modify workflows, and the engine executes them according to predefined rules and conditions. The user interface provides end users with access to the system, enabling them to view and interact with workflows, tasks, and reports. All actions are written in JavaScript to make the system portable. This system provides easy access to your database management system (DBMS).[1]

capabilities without the need for additional hardware or specialized training. WfMS usually consists of three main components: workflow designer, engine, and user interface. The designer allows users to create and modify workflows, and the engine executes them according to predefined rules and conditions. The user interface provides end users with access to the system, enabling them to view and interact with workflows, tasks, and reports. All actions are written in JavaScript to make the system portable. This system provides easy access to your database management system (DBMS). Access to the database is supplied through calls to Flask for maximum flexibility since organizations may use a variety of DBMSs.

As a result, the system can incorporate a database management system (DBMS), such as Microsoft SQL Server.

The resource perspective is concerned with controlling the way resources become involved in the execution of tasks. Naturally, these perspectives are related, e.g., a missing data item may hold up the execution of a certain task or the resource selected for the execution of a certain task may be determined on the basis of the number of times they have performed this task in the past. Understanding the role of these perspectives is vital to understand what workflow management is about. In this chapter, we aim to provide the reader with an overview of concepts and technology that underlie modern workflow management. We will start by exploring the conceptual foundations of workflow management, which will inform the subsequent discussion of several approaches to workflow specification. More advanced topics follow, dealing with change and unexpected exceptions, simulation, verification, and configuration, after which we discuss an existing workflow management system that can be seen as a reference implementation for some state of-the-art concepts. The aim of presenting this system is to reinforce the understanding of concepts discussed. The chapter ends with a case study in the domain of screen business, followed by a brief overall conclusion.

The Workflow Management Coalition<sup>1</sup> has defined what the components of a workflow environment are and what interfaces these components should have to support interaction with each other and with external components (Fischer 2005). In a workflow management environment, there is typically a component that supports the specification of workflows and another that supports the execution of these workflows. There are also, usually, components that can deal with external applications or other workflow engines or that provide support for administration and monitoring.

## 1.2 Definition and Explanation

A workflow management system (WfMS) is a software tool that enables organizations to design, execute, monitor, and analyze their business processes. It automates and optimizes repetitive and time-consuming tasks, reducing the workload of employees and increasing productivity.

A WfMS typically consists of several components, including a workflow engine, a process modeling tool, a process designer, a process analyzer, and a process execution environment. The workflow engine is the heart of the system and controls the flow of tasks and data through the process. The process modeling tool enables users to design and visualize workflows, while the process designer allows them to create and modify workflows[1]. The process analyzer provides performance metrics and helps identify bottlenecks and inefficiencies in the process.

A WfMS can be used in a wide range of industries, including manufacturing, healthcare, finance, and government. It can be integrated with other software systems, such as enterprise resource planning (ERP) systems and customer relationship management (CRM).

### **What is Operation Workflow management?**

Workflow management refers to the identification, organization, and coordination of a particular set of tasks that produce a specific outcome. Workflow management is all about optimizing, improving, and automating workflows wherever possible to increase output, eliminate repetition, and reduce errors.

A workflow can include any number of steps, and may involve a combination of people, systems, or machines. Those who manage workflows search for opportunities to eliminate bottlenecks and improve visibility into the flow.

### **How does Operation Workflow management work?**

Operation Workflow Management (OWM) refers to the process of designing, implementing, and monitoring the flow of work within an organization to ensure that it runs smoothly and efficiently. The basic principle of OWM is to optimize and streamline the process by eliminating inefficiencies, bottlenecks, and redundancies.

Here are the key steps involved in OWM:

**Identify the process:** The first step in OWM is to identify the process that needs to be managed. This could be a manufacturing process, service delivery process, or any other type of process within the organization.

**Map the process:** Once the process is identified, the next step is to map out the workflow. This involves breaking down the process into individual tasks and identifying the inputs, outputs, and dependencies for each task.

Analyze the workflow: After the workflow is mapped out, it's time to analyze it for inefficiencies, bottlenecks, and redundancies. This can be done through process simulations, statistical analysis, and other methods.

Redesign the workflow: Based on the analysis, the workflow may need to be redesigned to eliminate inefficiencies, bottlenecks, and redundancies. This could involve reordering tasks, changing the way tasks are performed, or adding new tasks.

Implement the new workflow: Once the new workflow is designed, it's time to implement it. This may involve retraining employees, changing the physical layout of the workspace, or implementing new technology.

Monitor and refine the workflow: After the new workflow is implemented, it's important to monitor its performance and make refinements as needed. This involves collecting data on the process and using it to identify areas for improvement.

### **1.3 Proposed Problem**

In today's world, workflow management such as Process.st and Kiss flow have rooted their impact in our lives to a very huge extent. In fact, even during the pandemic these companies have managed to not only sustain but also to increase their revenue. Today we create workflow for everything from Leave request to Business card request on these workflow platforms. However, very few operational workflow systems are available, and they fulfil specific workflow requirements. We are unable to make a quick operation process and create a workflow. As a result, we must rely on the existing workflow instead.

Presently, the problem with existing systems is that Manual handling of the operation workflow poses a number of challenges. This is evident in procedures such as leave request where an employee is required to fill in a form which may take several weeks or months to be approved. The use of paperwork when handling some of these processes could lead to human error. Papers may end up in the wrong hands. Not forgetting the fact that this is time-consuming. A number of current systems lack operation management meaning employees have to connect to multiple parties involved in operations personally[3].

## 1.4 Aim and Scope

### ***Aim:***

The aim of a workflow management system (WfMS) is to automate and streamline business processes to improve efficiency, reduce errors, and increase productivity. The scope of a WfMS is broad, and it can be used in a wide range of industries and applications, including:

*Manufacturing:* A WfMS can automate production processes, manage inventory levels, and optimize supply chain management.

*Healthcare:* A WfMS can automate patient registration, appointment scheduling, and medical record management, leading to improved patient outcomes and reduced administrative costs.

*Finance:* A WfMS can automate financial processes, such as invoice processing and payment approvals, improving accuracy and reducing the risk of fraud.

*Government:* A WfMS can automate administrative tasks, such as permit approvals and licensing, leading to increased efficiency and reduced costs.

*Customer service:* A WfMS can automate customer service processes, such as ticket routing and resolution, leading to faster response times and improved customer satisfaction.

The scope of a WfMS can vary depending on the specific needs of an organization. It can be used to automate and manage simple or complex workflows, from simple approval processes to complex multi-step workflows involving multiple teams and systems.

In summary, the aim of a WfMS is to improve business processes, reduce errors, and increase productivity, while the scope of a WfMS is broad and can be applied to a wide range of industries and applications.

## **CHAPTER-2**

### **LITERATURE REVIEW**

## 2.1 Related Work

[1] Wenqi Yang, & Feng Li. (n.d.). Workflow modeling: a structured approach. 8th International Conference on Computer Supported Cooperative Work in Design. <https://doi.org/10.1109/cacwd.2004.1349060>. A well-defined, error free workflow model leads to the development of an effective workflow application. So, how to ensure the correctness and consistency of a workflow model is a core issue in workflow modeling. The first step in our approach is to identify the process or workflow to be modeled. This involves defining the boundaries of the process and determining the inputs, outputs, and resources required to complete it. Once the process has been identified, the next step is to gather data about it, including process metrics, performance indicators, and feedback from stakeholders. With this information in hand, the next step is to create a flowchart or diagram of the process. This involves identifying the steps involved in the process, the order in which they occur, and the inputs and outputs associated with each step. The flowchart should also identify decision points and branches in the process, as well as any loops or iterative steps. Once the flowchart has been created, the next step is to validate and refine it. This involves reviewing the flowchart with stakeholders to ensure that it accurately reflects the process and that all steps and decision points have been correctly identified. Any issues or areas for improvement that are identified during this review should be addressed before moving on to the next step. The final step in our approach is to implement the workflow model. This involves automating tasks, optimizing resource allocation, and tracking performance metrics to ensure that the process is functioning as intended. Regular review and updates to the model may be required to ensure that it remains relevant and effective over time. Overall, our structured approach to workflow modeling provides a clear and systematic process for creating accurate and useful process models. By following these steps, organizations can identify opportunities for improvement, optimize efficiency, and ultimately improve their bottom line.

[2] García, J. G., Vanderdonckt, J., Lemaige, C., & Calleros, J. M. G. (2008, July). How to Describe Workflow Information Systems to Support Business Process. 2008 10th IEEE Conference on E-Commerce Technology and the Fifth IEEE Conference on Enterprise Computing, E-Commerce and E-Services. <https://doi.org/10.1109/cecandeee.2008.128>. This paper addresses a methodology for developing the various user interfaces (UI) of a workflow information system (WIS), which are advocated to automate business processes, following a model-centric approach based on the requirements and processes of the organization. The first step in implementing a WIS is to identify the business process to be supported. This involves mapping out the process, identifying the inputs, outputs, and resources

required, and determining the workflow steps and decision points. Once the process has been mapped out, the next step is to design the WIS. This involves identifying the data that needs to be captured, stored, and shared, as well as the interfaces that will be used to access and manipulate that data. The WIS should also be designed to support collaboration and communication among stakeholders, as well as provide real-time alerts and notifications. Once the WIS has been designed, it can be implemented. This involves configuring the system, setting up access controls, and testing the system to ensure that it is functioning as intended. Training should also be provided to users to ensure that they are able to effectively use the system. Finally, the WIS should be regularly reviewed and updated to ensure that it continues to meet the needs of the business process. This may involve adding new features or functionality, modifying existing processes, or addressing any performance issues that arise. In summary, a WIS can be described as a system that supports business processes by automating tasks, providing real-time access to information, and facilitating collaboration and communication among stakeholders.

[3] Sayal, M., Casati, F., Dayal, U., & Ming-Chien Shan. (n.d.). Integrating workflow management systems with business-to-business interaction standards. *Proceedings 18th International Conference on Data Engineering*. <https://doi.org/10.1109/icde.2002.994737>. This paper summarizes how workflow technology can be extended in order to support B2B interactions and to link them with the internal workflows. The first step in integrating WfMS with B2B interaction standards is to identify the relevant standards for the specific business process. This may involve reviewing industry-specific standards, such as EDI or RosettaNet, or general standards, such as SOAP or REST. Once the relevant standards have been identified, the WfMS can be configured to support them. The next step is to define the workflows and process models that will be used to support the B2B interactions. This involves identifying the specific tasks and decision points that are required for each interaction, as well as the data that needs to be exchanged. The process model should also account for any exceptions or error handling that may arise during the interaction. Once the process model has been defined, the WfMS can be configured to manage the flow of information between the different systems involved in the B2B interaction. This may involve configuring the WfMS to automatically initiate the interaction, route data to the appropriate systems, and provide real-time status updates to stakeholders. Finally, the WfMS should be regularly reviewed and updated to ensure that it continues to meet the needs of the business process. This may involve modifying the process model to account for changes in the B2B interaction standards, updating the WfMS to support new data formats or communication protocols, or addressing any performance issues that arise. Overall, integrating WfMS with B2B interaction standards is a critical component of modern business process management. By following a structured approach to integration, organizations can improve collaboration, reduce errors, and increase efficiency, ultimately leading to better business outcomes.



[4] Becker, J., Uthmann, C., zur Muhlen, M., & Rosemann, M. (n.d.). Identifying the workflow potential of business processes. Proceedings of the 32nd Annual Hawaii International Conference on Systems Sciences. 1999. HICSS-32. Abstracts and CD-ROM of Full Papers. <https://doi.org/10.1109/hicss.1999.772962>. This paper summarizes a structured framework, which can serve as a guideline for the evaluation of processes during the selection and introduction of a workflow management system. The first step in integrating WfMS with B2B interaction standards is to identify the relevant standards for the specific business process. This may involve reviewing industry-specific standards, such as EDI or RosettaNet, or general standards, such as SOAP or REST. Once the relevant standards have been identified, the WfMS can be configured to support them. The next step is to define the workflows and process models that will be used to support the B2B interactions. This involves identifying the specific tasks and decision points that are required for each interaction, as well as the data that needs to be exchanged. The process model should also account for any exceptions or error handling that may arise during the interaction. Once the process model has been defined, the WfMS can be configured to manage the flow of information between the different systems involved in the B2B interaction. This may involve configuring the WfMS to automatically initiate the interaction, route data to the appropriate systems, and provide real-time status updates to stakeholders. Finally, the WfMS should be regularly reviewed and updated to ensure that it continues to meet the needs of the business process. This may involve modifying the process model to account for changes in the B2B interaction standards, updating the WfMS to support new data formats or communication protocols, or addressing any performance issues that arise. Overall, integrating WfMS with B2B interaction standards is a critical component of modern business process management. By following a structured approach to integration, organizations can improve collaboration, reduce errors, and increase efficiency, ultimately leading to better business outcomes.

[5] Fan, S., Hu, D., & Zhao, J. L. (2008, September). Integrating Workflow and Forum via Event Management. 2008 IEEE Symposium on Advanced Management of Information for Globalized Enterprises (AMIGE). <https://doi.org/10.1109/amige.2008.ecp.58>. This paper address a scalable middleware framework, namely event management system, which can support high-degree decoupling between workflow and groupware. The first step in integrating workflow and forum via event management is to identify the events that are relevant to the business process. This may involve identifying the specific workflows and forums that are involved, as well as the data that needs to be exchanged between them. Once the relevant events have been identified, an event management system can be configured to monitor and respond to them. The next step is to define the workflows and forum processes that will be used to respond to the events. This may involve defining specific tasks and decision

points, as well as the data that needs to be exchanged. The processes should also account for any exceptions or error handling that may arise during the interaction. Once the processes have been defined, the event management system can be configured to automate the responses to the events. This may involve automatically initiating workflows or forum posts, routing data to the appropriate systems, and providing real-time status updates to stakeholders. Finally, the integration should be regularly reviewed and updated to ensure that it continues to meet the needs of the business process. This may involve modifying the event management system to account for changes in the workflows or forum processes, updating the workflows or forum processes to account for changes in the event management system, or addressing any performance issues that arise. Overall, integrating workflow and forum via event management is a powerful approach to improving collaboration, communication, and productivity within organizations.

[6] Zhang, Y., & Chen, Y. (2011, August). The design and implementation of a workflow system for enterprise project management. Proceedings of 2011 International Conference on Electronic & Mechanical Engineering and Information Technology. <https://doi.org/10.1109/emeit.2011.6023582>. This paper summarizes designs and implements a workflow system for enterprise project management. The design and implementation technology of workflow system are described. The first step in designing a workflow system for enterprise project management is to identify the key business processes that need to be managed. This may involve identifying the project management methodology that will be used, as well as the specific tasks and workflows that are involved in each process. Once the key business processes have been identified, the next step is to design the workflows and business rules that will be used to manage them. This may involve defining the specific steps that need to be taken for each process, as well as any decision points or approval processes that are required. The design of the workflow system should also take into account the specific requirements of the enterprise project management system. This may include integration with existing systems, such as project management software or document management systems, as well as the need for reporting and analytics. Once the workflow system has been designed, the next step is to implement it. This may involve configuring the system to support the defined workflows and business rules, as well as providing training and support to employees who will be using the system. During the implementation phase, it is important to continuously monitor the system and make any necessary adjustments. This may involve modifying workflows or business rules, addressing any performance or scalability issues, or adding new features to the system. Finally, the success of the workflow system should be evaluated regularly to ensure that it continues to meet the needs of the enterprise project management system. This may involve gathering feedback from stakeholders,

analyzing performance metrics, and making any necessary adjustments to the system.

[7] Chengjun, W. (2009). The Research and Design of Workflow Management System Based on WEB. 2009 Pacific-Asia Conference on Knowledge Engineering and Software Engineering. <https://doi.org/10.1109/kese.2009.26>. This paper summarizes combines the Web technologies and XML, and provides a method of designing and implementing XML based process definition language and workflow engine. The first step in designing a web-based workflow management system is to identify the key business processes that need to be managed. This may involve identifying the specific workflows and tasks that are involved in each process, as well as the data that needs to be exchanged between systems. Once the key business processes have been identified, the next step is to design the workflows and business rules that will be used to manage them. This may involve defining the specific steps that need to be taken for each process, as well as any decision points or approval processes that are required. The design of the web-based workflow management system should also take into account the specific requirements of the web environment. This may include designing user interfaces that are easy to use and navigate, as well as ensuring that the system is secure and scalable. Once the design of the web-based workflow management system has been completed, the next step is to implement it. This may involve configuring the system to support the defined workflows and business rules, as well as providing training and support to employees who will be using the system. During the implementation phase, it is important to continuously monitor the system and make any necessary adjustments. This may involve modifying workflows or business rules, addressing any performance or scalability issues, or adding new features to the system. Finally, the success of the web-based workflow management system should be evaluated regularly to ensure that it continues to meet the needs of the organization. This may involve gathering feedback from stakeholders, analyzing performance metrics, and making any necessary adjustments to the system.

[8] Xinfeng Ye. (n.d.). A Web-based workflow management system. IEEE SMC'99 Conference Proceedings. 1999 IEEE International Conference on Systems, Man, and Cybernetics (Cat. No.99CH37028). <https://doi.org/10.1109/icsmc.1999.814213>. This paper address a World Wide Web-based workflow management system for a car rental company. Web browsers are the interface between the system and the users. In addition to automating workflows, web-based workflow management systems can also provide valuable insights and analytics into organizational performance. This can include tracking key performance indicators (KPIs) such as cycle time, task completion rates, and error rates, and providing real-time reports and dashboards to managers and stakeholders.

[9] Fanbo, M., Minli, J., & Wuliang, P. (2010, November). A Business Process Management System Based on Workflow Technologies. 2010 Third International Conference on Intelligent Networks and Intelligent Systems. <https://doi.org/10.1109/icinis.2010.182>. This paper summarizes business process management system is analyzed and designed. After giving the relative concepts, such as schema and instances, we also observed conceptual design by using the class diagram, and the control flow is analyzed. A BPM system based on workflow technologies typically includes a range of features, including process modeling, task management, notification and escalation, and reporting and analytics. These features are designed to provide end-to-end process management capabilities, enabling organizations to improve process efficiency, reduce costs, and enhance customer satisfaction. Process modeling is a key feature of a BPM system, allowing organizations to map out their processes and identify opportunities for optimization and automation. BPM systems typically provide visual modeling tools that enable process designers to create process diagrams that show the flow of tasks, decisions, and events. Task management is another important feature of a BPM system, allowing organizations to manage tasks and activities in a structured and consistent manner. Tasks can be assigned to specific users or groups, with deadlines and priorities set to ensure that tasks are completed on time. Notification and escalation features in a BPM system ensure that users are kept informed of important events and deadlines. Notifications can be sent by email or SMS, and alerts can be triggered when tasks are overdue or require urgent attention. Reporting and analytics features in a BPM system provide valuable insights into process performance, enabling organizations to identify bottlenecks, track KPIs, and optimize processes for improved efficiency and customer satisfaction.

[10] Shi Meilin, Yang Guangxin, Xiang Yong, & Wu Shangguang. (n.d.). Workflow management systems: a survey. ICCT'98. 1998 International Conference on Communication Technology. Proceedings (IEEE Cat. No.98EX243). <https://doi.org/10.1109/icct.1998.740974>. This paper summarizes the state of art in WfMS research, detailing some workflow-related concepts and its typologies, the WfMS reference model proposed by WfMS, and some of the current research trends and hotspots. The survey typically covers a wide range of topics, including workflow modeling, process design and implementation, task management, process monitoring and control, and reporting and analytics. It may also cover specific types of WfMSs, such as cloud-based systems or mobile-enabled systems. Overall, a survey of WfMSs provides valuable insights into the current state of the art in this field, identifying key trends and features that are shaping the design, implementation, and use of these systems. This information can be used by organizations to select and implement WfMSs that meet their specific needs and improve their workflow processes.

| Sr.No | Author   | Title  | Published date   | observations   |
|-------|--|--|--|--|
| 1     | Wenqi Yang, & Feng Li. (n.d.)                                      | Workflow modelling: a structured approach.   | 8th International Conference<br>Date: Jun 2004                     | A well defined, error free workflow model leads to the development of an effective workflow application. S, how to ensure the correctness and consistency of a workflow model is a core issue in workflow modeling.  |
| 2     | García, J. G., Vanderdonckt, J., Lemaige, C., & Calleros, J. M. G. | How to Describe Workflow Information Systems to Support Business Process.                | 10th IEEE Conference on E-Commerce Technology<br>Date: Jul 2008    | This paper addresses a methodology for developing the various user interfaces (UI) of a workflow information system (WIS), which are advocated to automate business processes, following a model-centric approach based on the requirements and processes of the organization. |
| 3     | Sayal, M., Casati, F., Dayal, U., & Ming-Chien Shan. (n.d.)        | Integrating workflow management systems with business-to-business interaction standards. | Proceedings 18th International Conference<br>Date: 07 August 2002. | This paper summarizes how workflow technology can be extended in order to support B2B interactions and to link them with the internal workflows.   |
| 4     | Becker, J., Uthmann, C., zur Muhlen, M.,                           | Identifying the workflow potential of  | Proceedings of the 32nd Annual Hawaii                              | This paper summarizes a structured   |

|   |  |  |  |  |
|---|--|--|--|--|
|   | & Rosemann, M. (n.d.)  | business processes.  | International Conference<br>Date : 06 August 2002              | framework, which can serve as a guideline for the evaluation of processes during the selection and introduction of a workflow management system.                             |
| 5 | <u>Shaokun Fan</u> ; <u>Danling Hu</u> ; <u>J. Leon Zhao</u> | Integrating Workflow and Forum via Event Management                                  | 2008 IEEE International Conference<br>Date: Sep 2008           | This paper address a scalable middleware framework, namely event management system, which can support high-degree decoupling between workflow and groupware.                 |
| 6 | Yun Zhang, Yi Chen   | The Design and Implementation of a Workflow System for Enterprise Project Management | Proceedings of 2011 International Conference<br>Date: Sep 2011 | This paper summarizes designs and implements a workflow system for enterprise project management. The design and implementation technology of workflow system are described. |
| 7 | Chengjun, W.   | The Research and Design of Workflow Management System Based on WEB                   | 2009 Pacific-Asia Conference<br>Date: Dec 2009                 | This paper summarizes combines the Web technologies and XML, and provides a method of designing and implementing XML based process definition language and workflow engine.  |
| 8 | Xinfeng Ye. (n.d.)   | A Web-based workflow management system   | 1999 IEEE International Conference<br>Date: Aug 2002           | This paper address a World Wide Web-based workflow   |

|    |  |   |  |   |
|----|--|---|--|---|
|    |  |   |  | management system for a car rental company. Web browsers are the interface between the system and the users.  |
| 9  | Fanbo, M.,<br>Minli, J. &<br>Wuliang. P                                    | A Business Process Management System Based on Workflow Technologies | 2010 Third International Conference<br>Date: Nov 2010    | This paper summarizes business process management system is analyzed and designed. After giving the relative concepts, such as schema and instances, we also observed conceptual design by using the class diagram, and the control flow is analyzed. |
| 10 | Shi Meilin,<br>Yang Guangxin,<br>Xiang Yong, &<br>Wu Shangguang.<br>(n.d.) | Workflow management systems: a survey                               | ICCT'98. 1998 International Conference<br>Date: Aug 2002 | This paper summarizes the state of art in WfMS research, detailing some workflow-related concepts and its typologies, the WfMS reference model proposed by WfMS, and some of the current research trends and hotspots.                                |

### 2.1.1 Literature Review Comparison

## 2.2 Summary

Altogether, this research demonstrates the significance of Operation workflow management system for improving the functionality and availability of process, as well as the possibility of various strategies for creating and developed workflow.

## **CHAPTER-3**

### **METHODOLOGY**

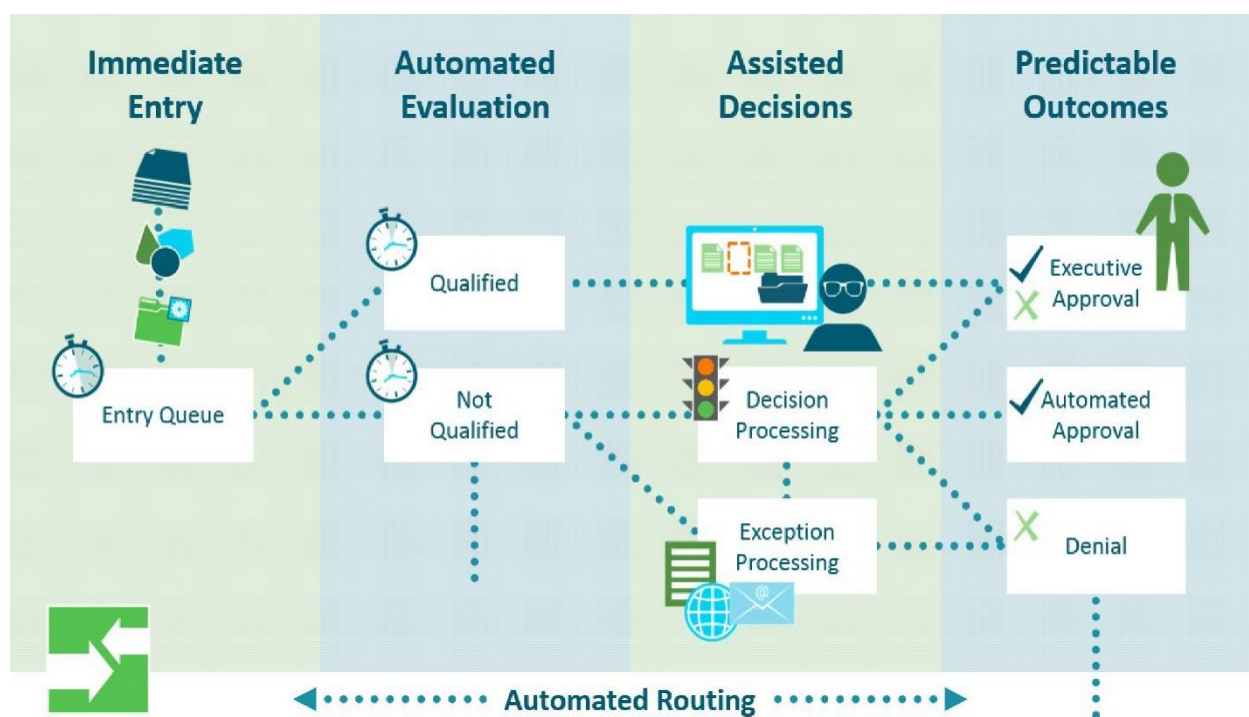


### 3.1 System Design

1. Start the execution of the operation workflow system.

2. login done by multiple roles and start the execution

3. Click on Create operation click on button to start the



**Figure 3.1.1 OWMS System design**

4. Submit the workflow request.

5. Decision making happens after request getting.

6. Final stage execute the operation request approve or reject the request.

### Fig 3.1.1 System Design for workflow control

Designing a workflow management system (WfMS) requires careful consideration of the requirements, architecture, and implementation details. Here are some key factors to consider when designing a WfMS:

**Requirements analysis:** The first step in designing a WfMS is to identify the functional and non-functional requirements. This involves understanding the workflows that need to be managed, the roles and responsibilities of users, and the performance and scalability requirements.

**Architecture design:** The architecture of a WfMS should be modular, scalable, and extensible. The key components of the architecture include the workflow engine, process modeling tool, process designer, process analyzer, and process execution environment. **Data model design:** The data model for a WfMS should be designed to support the storage and retrieval of workflow-related data. This includes information about tasks, users, processes, and workflows. **User interface design:** The user interface of a WfMS should be intuitive and user-friendly. It should enable users to create and modify workflows, monitor task assignments, and progress, and receive notifications and alerts.[2]

**Integration design:** A WfMS should be designed to integrate with other systems, such as ERP, CRM, and HR systems. This requires careful consideration of the data formats, protocols, and interfaces used by these systems.

**Security design:** Security is a critical aspect of a WfMS design. The system should be designed to protect data, ensure privacy, and prevent unauthorized access. This includes implementing authentication, authorization, and encryption mechanisms. **Testing and validation:** The WfMS should be thoroughly tested and validated before deployment. This includes unit testing, integration testing, and user acceptance testing. Overall, designing a WfMS requires a comprehensive understanding of the requirements, architecture, and implementation details. It is essential to involve stakeholders, including end-users, in the design process to ensure that the system meets their needs and expectations.

### BACK-END WORK

In Flask and MySQL, the backend works by creating a connection between the Flask application and the MySQL database, and then using SQL queries to retrieve or manipulate data.

Connect Flask to MySQL:

In the Flask application, create a MySQL connection using a library like `mysql-connector-python` or `pymysql`. Set the MySQL database credentials (host, user, password, database name) as configuration variables in Flask.

Define a database schema:

Define the tables and columns you want to use in your MySQL database.

Define API endpoints:

Define API endpoints in your Flask application that correspond to the operations you want to perform on your MySQL database (e.g. retrieving data, adding data, updating data).

In the endpoint functions, use SQL queries to interact with the database.

You can use a library like `Flask-MySQLdb` to simplify the process of executing SQL queries.

Return data to the frontend:

Once you've retrieved or manipulated data in your MySQL database using Flask, return it to the frontend using Flask's built-in templating engine or a frontend framework like React.

Overall, Flask and MySQL provide a powerful combination for building web applications with a robust backend. By connecting Flask to MySQL and defining database schemas and API endpoints, you can create a dynamic web application that can handle a wide range of data-driven tasks.

## PROCESS OF GETTING WORKFLOW

Identify the process or task: Start by identifying the process or task that you want to create a workflow for. This could be anything from a simple task like onboarding a new employee, to a complex process like product development. Break down the process: Once you have identified the process, break it down into smaller steps or tasks. This will help you understand the flow of the process and identify any potential bottlenecks or areas for improvement. Map out the workflow: Use a flowchart or diagramming tool to map out the workflow, including the steps, decision points, and any loops or feedback loops. This will help you visualize the process and identify any areas that need further refinement [7]. Define roles and responsibilities: Determine who will be responsible for each step in the workflow. This may involve assigning roles or responsibilities to specific individuals or teams, or it may involve creating a set of guidelines or procedures that everyone can follow. Test the workflow: Once you have defined the workflow, test it to ensure that it is effective and efficient. This may involve running simulations or conducting a trial run to identify any areas for improvement. Implement the workflow: Once you are satisfied with the workflow, implement it across your organization. This may involve training team members on the new process, updating existing procedures or documentation, and monitoring the workflow to ensure that it is being followed correctly.

## WORKFLOW SUMMARIZATION

Define the process: The first step in any workflow process is to define what needs to be done. This involves identifying the goal or outcome that you want to achieve and breaking down the process into a series of smaller steps. Assign roles and responsibilities: Once you have defined the process, assign roles

and responsibilities to team members. This helps ensure that everyone knows what they need to do and who is responsible for each step. Design the workflow: Next, design the workflow by outlining the steps that need to be taken in a specific order. This can be done using a flowchart or a visual diagram that shows the process step-by-step. Automate the workflow: To streamline the process and improve efficiency, consider automating the workflow using software tools. This can help reduce errors and save time by automating repetitive tasks. Test the workflow: Before implementing the workflow, test it to make sure that it is effective and efficient. This may involve running simulations or conducting a trial run to identify any areas that need improvement. Implement the workflow: Once you are satisfied with the workflow, implement it across your organization. This may involve training team members on the new process, updating existing procedures or documentation, and monitoring the workflow to ensure that it is being followed correctly[4]. Monitor and optimize the workflow: Finally, monitor the workflow over time to identify any areas that need improvement. This may involve analyzing performance metrics, soliciting feedback from team members, and adjusting the workflow as needed.

### REST API ENDPOINT

A workflow management system typically involves a set of processes or tasks that need to be completed in a specific order. REST endpoints can be used to interact with the workflow management system, such as to initiate or complete a task or to retrieve information about the status of a workflow. Here are some examples of REST endpoints that could be used in a workflow management system:

Initiate a workflow: A POST request can be used to initiate a workflow, passing any necessary parameters in the request body.

- 1.Retrieve the status of a workflow: A GET request can be used to retrieve the status of a workflow, including information about any tasks that have been completed or are currently in progress.
- 2.Assign a task: A PUT request can be used to assign a task to a specific user or team, updating the status of the workflow accordingly.
- 3.Complete a task: A PUT request can be used to mark a task as completed, updating the status of the workflow accordingly.
- 4.Cancel a workflow: A DELETE request can be used to cancel a workflow, aborting any remaining tasks and updating the status of the workflow accordingly.

These REST endpoints can be implemented using a variety of programming languages and frameworks, depending on the specific workflow management system and the requirements of the application. By providing a set of standardized REST endpoints, the workflow management system can be easily integrated with other systems or applications, allowing for greater flexibility and automation in the workflow process.

## USER INTERFACE FOR EXTENSION POPUP

When selecting the enhanced version icon in the computer toolbar, one of the many different types of user display that a Browser extension could provide is to frequently display pop-up windows. This ensures that the customer can interact with the pop-up windows. The frontend for a window is accessible through a phrase underneath the webpage activity in the manifest file. The popup.html file includes the same popup.css and popup.js files to enable individual behavior interaction and behavior with HTML elements, as well as to make designs available to HTML elements. Add the button element. Summarize after that so that when it is clicked, a hit event is transmitted that can be seen by an action client and managed. Add the button element. Summarize after that so that when it is clicked, a click action goes out that is accessible to an action viewer and handled.

## DISPLAY WORKFLOW

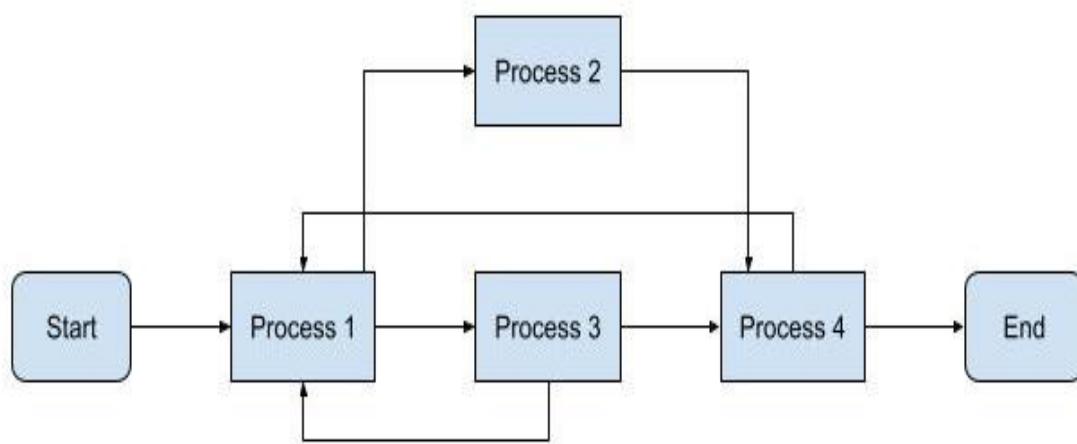
The user experience that is used to communicate with people and provide the condensed content has a few holes that need to be plugged. At this point, we'll add functions that will allow the application to communicate with the backend via HTTP REST Requests. In popup.js, the second parameter is supplied as an anonymous callback function, and the event client with both the event type and the action of "click" has been attached to that same summary button. To instruct contentScript.js to begin producing summaries, we generate an action communication in the anonymous function and then send this to it through the chrome.runtime.sendMessage method.[9]

To actually listen to message results via contentScript.js, which will execute the output Summarize callback code, add the event listener chrome.runtime.onMessage. We use JavaScript in the callback function to programmatically present the report in the div element. Add the following line to the content scripts section of the manifest file to declaratively inject contentScript.js and have it execute automatically on a particular page. To listen for messages, we add the event listener chrome.runtime.onMessage to the contentScript.js file and execute the produce Summarize callback method from there. Extract the current tab's URL from the callback function and send a GET HTTP request to the backend using the XML HTTP Request Web API to get the condensed content as a response. Use chrome.runtime.sendMessage to send event message results with a summary payload, notifying popup.js to display the condensed text.

Layout: The layout of a website or application determines how elements are arranged on the screen. This includes the placement of menus, buttons, forms, and other interactive elements. Color scheme: Color is

used to create a visual hierarchy, draw attention to important elements, and create a cohesive visual experience.

A well-designed color scheme can enhance the user experience and create a strong brand identity. Typography: The typography (fonts and text styles) used on a website or application can impact the readability, accessibility, and overall visual appeal of the interface. Graphics and images: Graphics and images are used to create a visual identity and enhance the user experience. They can be used to illustrate concepts, create a visual hierarchy, and add personality to the interface.



**Figure 3.1.2 Workflow Model**

From Fig. 3.1.2 A workflow model is a graphical representation of the sequence of steps, tasks, and activities required to complete a business process or a specific task within a business process. It provides a visual representation of the flow of work through a system or organization, enabling authorities and to better understand the steps involved and identify areas for improvement. The workflow execution process starts at the start node, executes processes 1, 3, and 4, and concludes at the end node. The approach can be used for tasks when the condition is straightforward and there is just one execution. Cost control is encouraged in process management. manner of parallel execution. Beginning with the first node, process 1 runs, followed by concurrent executions of processes 2 and 3, leading up to process 4. The technique

may be used to execute multi-task processes, increasing organizational effectiveness. Way of executing loops. Workflow operations begin at the beginning node and loop through Process 1, Process 2, Process 3, and Process 4. Activity is allowed to continue once the criterion is met.

## 3.2 Technology Used

### A) OWMS front-end technology:

- **HTML:** Hyper Text Markup Language (HTML) is the set of markup symbols or codes inserted into a file intended for display on the Internet. The markup tells web browsers how to display a web page's words and images.

Each individual piece markup code (which would fall between "<" and ">" characters) is referred to as an element, though many people also refer to it as a tag. Some elements come in pairs that indicate when some display effect is to begin and when it is to end. Hyper Text Markup Language is the computer language that facilitates website creation. The language, which has code words and syntax just like any other language, is relatively easy to comprehend and, as time goes on, increasingly powerful in what it allows someone to create. HTML continues to evolve to meet the demands and requirements of the Internet under the guise of the World Wide Web Consortium, the organization that designs and maintains the language; for instance, with the transition to Web 2.0.

Hyper Text is the method by which Internet users navigate the web. By clicking on special text called hyperlinks, users are brought to new pages. The use of hyper means it is not linear, so users can go anywhere on the Internet simply by clicking on the available links. Markup is what HTML tags do to the text inside of them; they mark it as a specific type of text. For example, markup text could come in the form of boldface or italicized type to draw specific attention to a word or phrase.

- **CSS:** CSS stands for Cascading Style Sheets. It is a style sheet language which is used to describe the look and formatting of a document written in markup language. It provides an additional feature to HTML. It is generally used with HTML to change the style of web pages and user interfaces. It can also be used with any kind of XML documents including plain XML, SVG and XUL.

CSS is used along with HTML and JavaScript in most websites to create user interfaces for web applications and user interfaces for many mobile applications.

These are the three major benefits of CSS:

1) Solves a big problem.

Before CSS, tags like font, color, background style, element alignments, border and size had to be repeated on every web page. This was a very long process. For example: If you are developing a large website where fonts and color information are added on every single page, it will become a long and expensive process. CSS was created to solve this problem. It was a W3C recommendation.

2) Saves a lot of time

CSS style definitions are saved in external CSS files so it is possible to change the entire website by changing just one file.

3) Provide more attributes.

CSS provides more detailed attributes than plain HTML to define the look and feel of the website.

- **JavaScript**: JavaScript is a dynamic programming language that's used for web development, in web applications, for game development, and lots more. It allows you to implement dynamic features on webpages that cannot be done with only HTML and CSS.

Many browsers use JavaScript as a scripting language for doing dynamic things on the web. Any time you see a click-to-show dropdown menu, extra content added to a page, and dynamically changing element colors on a page, to name a few features, you're seeing the effects of JavaScript.

- **Bootstrap** : Bootstrap is a free, open source front-end development framework for the creation of websites and web apps. Designed to enable responsive development of mobile-first websites, Bootstrap provides a collection of syntax for template designs.

As a framework, Bootstrap includes the basics for responsive web development, so developers only need to insert the code into a pre-defined grid system. The Bootstrap framework is built on Hypertext Markup Language (HTML), cascading style sheets (CSS) and JavaScript. Web developers using Bootstrap can build websites much faster without spending time worrying about basic commands and functions.

- **Material Ui**: Material UI is a popular React UI framework that provides pre-built components and



styles based on Google's Material Design guidelines. It allows developers to create beautiful and responsive web applications quickly and easily with a consistent look and feel. Material UI includes a wide range of components such as buttons, icons, forms, grids, and more, that can be easily customized to fit the needs of your application. It also provides built-in theming support and supports server-side rendering, making it a powerful choice for building scalable and maintainable web applications.

- **React:** React.js: react is a popular JavaScript library for building user interfaces. It was developed by Facebook and is widely used in web development to create complex and interactive UI components. Here are some key features of React.js:

Component-based architecture: React.js is based on a component-based architecture that enables developers to create reusable UI components. This makes it easy to build complex UIs and maintain code consistency. Virtual DOM: React.js uses a virtual DOM, which is a lightweight representation of the actual DOM. This makes it possible to update the UI efficiently without actually changing the DOM, which improves performance's: React.js uses JSX, a syntax extension that enables developers to write HTML-like code inside JavaScript. This makes it easy to create and manipulate UI elements in a familiar way. Unidirectional data flow: React.js uses a unidirectional data flow, where data flows from parent components to child components. This makes it easier to manage data and maintain code consistency.

Performance: React.js is known for its high performance and efficiency. It uses a virtual DOM and only updates the parts of the UI that have changed, which minimizes the number of DOM manipulations and improves performance. Large community: React.js has a large and active community of developers, which makes it easy to find support and resources. There are many open-source libraries and tools available for React.js, which makes it easy to extend and customize.

Overall, React.js is a popular and powerful library for building user interfaces. It is well-suited for building complex and interactive web applications, and its component-based architecture makes it easy to maintain code consistency and reusability.

## *B) OWMS back-end technology*

- **Python:** Python is an interpreted, object-oriented, high-level programming language with dynamic semantics developed by Guido van Rossum. It was originally released in 1991. Designed to be easy as well as fun, the

name "Python" is a nod to the British comedy group Monty Python. Python has a reputation as a beginner-friendly language, replacing Java as the most widely used introductory language because it handles much of the complexity for the user, allowing beginners to focus on fully grasping programming concepts rather than minute details. Python is used for server-side web development, software development, mathematics, and system scripting, and is popular for Rapid Application Development and as a scripting or glue language to tie existing components because of its high-level, built-in data structures, dynamic typing, and dynamic binding. Program maintenance costs are reduced with Python due to the easily learned syntax and emphasis on readability. Additionally, Python's support of modules and packages facilitates modular programs and reuse of code. Python is an open source community language, so numerous independent programmers are continually building libraries and functionality for it.

- **MYSQL:** MySQL is a popular open-source relational database management system (RDBMS) that uses structured query language (SQL) for managing data. It is one of the most widely used databases in the world, known for its scalability, reliability, and ease of use. Here are some key features of MySQL:

**Relational Database:** MySQL is a relational database, which means it stores data in tables with rows and columns. It is ideal for storing structured data, such as financial records, customer information, and product catalogs.

**Open Source:** MySQL is an open-source database, meaning it is free to use and distribute. This makes it an ideal choice for startups and small businesses with limited budgets.

**Scalability:** MySQL is highly scalable and can handle large amounts of data and concurrent users. It supports sharding, clustering, and replication, which makes it possible to scale horizontally or vertically.

**High Performance:** MySQL is known for its high performance and low latency. It can handle thousands of transactions per second and supports indexing, caching, and query optimization to speed up queries.

**Security:** MySQL supports various security features, such as encryption, access control, and auditing. It also provides backup and recovery features to ensure data integrity and availability.

**Compatibility:** MySQL is compatible with various programming languages, including PHP, Java, Python, and .NET. It supports popular platforms like Linux, Windows, and macOS, making it a versatile database system.

Overall, MySQL is a reliable and powerful database management system that is ideal for building scalable and high-performance applications. It is widely used in web development, e-commerce, finance, and other industries that require secure and scalable data management.

- **POSTMAN:** Postman is a popular API testing and development tool that allows developers to create, test, and share HTTP requests and responses with ease. It provides a user-friendly interface that makes it easy to create and test RESTful APIs, SOAP services, and more. With Postman, you can test different API endpoints and methods, set headers and parameters, and view the response data in a formatted and easy-to-read manner.

In addition to testing APIs, Postman also offers features such as automated testing, collaboration, and API documentation generation. You can use Postman's test scripting feature to automate your API tests, ensuring that your APIs are always functioning as intended. Collaboration features such as sharing collections with team members, and the ability to create and participate in discussions within the app make it easier to work on API development as a team.

Overall, Postman is a powerful tool that can help streamline API development and testing, making it easier to create high-quality APIs that meet your business needs.

- **Flask:** Flask is the best web framework. It is a Python module that allows us to easily create web applications. The proposed system exposes the summarization service to the client over a Flask backend REST API and displays summarized text to the user. Flask is a micro web framework written in Python. It is classified as a micro framework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools. Applications that use the Flask framework include Pinterest and LinkedIn.

Features-

- ✓ Development server and debugger
- ✓ Integrated support for unit testing
- ✓ RESTful request dispatching
- ✓ Uses Jinja templating

- ✓ Support for secure cookies (client side sessions)
  - ✓ 100% WSGI 1.0 compliant
  - ✓ Unicode-based
  - ✓ Complete documentation
  - ✓ Google App Engine compatibility
  - ✓ Extensions available to extend functionality
- 
- **REQUEST**: Requests is a HTTP library for the Python programming language. The HTTP request returns a Response Object with all the response data (content, encoding, status, etc.). The proposed system returned the summarized transcript with HTTP Status OK and handle HTTP exceptions if applicable. With the help of this we can also download the summarized text file. Python requests is a library for making HTTP requests. It provides an easy-to-use interface that makes working with HTTP very simple, which means it simplifies the process of sending and receiving data from websites by providing a uniform interface for both GET and POST methods. Some of the benefits of using python requests are that they're fast, support multiple languages, and can be piped into other programs to make processing tasks easier. There are many reasons to learn the Python requests module, and here are some:
    - ✓ The requests module allows you to send HTTP requests in Python, which is useful for interacting with web APIs or web scraping.
    - ✓ The requests module is easy to use and well-documented, making it a good choice for beginners.
    - ✓ And the Python module request is one of the most popular Python modules, so learning it will give you a valuable skill that is in demand by employers.
    - ✓ The request module provides access to the various HTTP methods (GET, POST, PUT, DELETE) as well as many other popular request headers and parameters. This access makes it easy to handle common tasks, such as retrieving data from a server or creating customized responses in response to user actions.
  - **NODE JS**: Node.js is a popular open-source JavaScript runtime environment that allows developers to run JavaScript code on the server-side. It was developed by Ryan Dahl in 2009 and has since

become a widely used platform for building web applications. Here are some key features of Node.js:

**Asynchronous I/O:** Node.js is built on an asynchronous I/O model, which means it can handle many connections at the same time without blocking other requests. This makes it highly scalable and efficient for building real-time applications.

**Single-threaded event loop:** Node.js uses a single-threaded event loop to handle I/O operations, which makes it highly performant and efficient. It can handle thousands of concurrent connections with low latency and high throughput.

**JavaScript:** Node.js uses JavaScript as its programming language, which makes it easy for developers to switch between front-end and back-end development. This also makes it easy to share code between the client-side and server-side.

**Large ecosystem:** Node.js has a large and growing ecosystem of packages and libraries that can be used to build web applications. The Node Package Manager (NPM) has over one million packages available for download, making it easy to find and use third-party tools and libraries.

**Cross-platform:** Node.js is cross-platform and can be run on Windows, Linux, and macOS. This makes it easy to develop and deploy applications on multiple platforms.

**Real-time applications:** Node.js is well-suited for building real-time applications such as chat applications, online gaming, and collaboration tools. Its asynchronous I/O model and event-driven architecture make it highly performant and efficient for handling real-time data.[5]

Overall, Node.js is a powerful platform for building server-side web applications. Its asynchronous I/O model, event-driven architecture, and large ecosystem of packages and libraries make it highly performant, efficient, and scalable. Together, these technologies provide a full-stack solution for building web applications. MySQL provides a flexible and scalable database solution, while Express.js and Node.js enable developers to build a robust and scalable back end. React.js provides a modern and efficient front-end solution, enabling developers to build responsive and dynamic user interfaces. Overall, the tack is a popular choice for web developers due to its flexibility, scalability, and efficiency.

### *C) OWMS Software technology*

- **VISUAL STUDIO:** Visual Studio Code: Visual Studio is an integrated development environment (IDE) created by Microsoft for building applications for Windows, Android, iOS, and other platforms. It includes a code editor, debugging tools, and other features to help developers build high-quality software. Visual Studio supports many programming languages such as C#, C++, Visual Basic, JavaScript, Python, and many others.

The IDE provides a range of features, including code editing, debugging, testing, profiling, and deployment. It also supports version control, including Git and Subversion, and has built-in support for Azure services and cloud development.

Visual Studio also provides various extensions and add-ons, such as code snippets, templates, and plugins, which can help developers speed up their development processes and improve their productivity. The software is available in both paid and free versions, with the paid version offering more advanced features and capabilities.

- **ANACONDA:** Anaconda comes with an integrated development environment (IDE) called Anaconda Navigator, which provides a graphical user interface (GUI) for managing packages and environments, as well as launching Jupiter notebooks and other applications. Anaconda Navigator includes popular data science packages like NumPy, Pandas, Matplotlib, Scikit-learn, and many others.

While Anaconda Navigator provides an interface for managing packages and environments, many developers also use integrated development environments like Visual Studio Code, PyCharm, or Spyder to write and execute Python code using the Anaconda distribution. The Anaconda distribution is widely used in data science and machine learning, making it a popular choice for developers in these fields.

- **POSTMAN:** Anaconda: Anaconda comes with an integrated development environment (IDE) called Anaconda Navigator, which provides a graphical user interface (GUI) for managing packages and environments, as well as launching Jupiter notebooks and other applications. Anaconda Navigator includes popular data science packages like NumPy, Pandas, Matplotlib, Scikit-learn, and many others.

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- **SPYDER:** that support scientific computing, data analysis, and visualization. Spyder is designed specifically for data scientists, engineers, and researchers who work with scientific libraries and need a powerful IDE to support their workflows.

Spyder comes with many useful features, such as a powerful code editor with syntax highlighting,

code introspection, and code completion. It also includes an Python console and a variable explorer that allows developers to inspect data structures and variables. Spyder has a built-in debugger that makes it easy to debug code and find and fix errors quickly.

Overall, Spyder is a powerful IDE that is designed specifically for scientific programming in Python. Its features make it an ideal choice for developers who need a powerful IDE to support their scientific computing workflows.

- **SQLYOG:** SQLyog is a popular graphical user interface (GUI) tool for managing MySQL databases. It provides a range of features that make it easy for developers and database administrators to work with MySQL databases, including data management, schema design, and query building.

SQLyog provides a user-friendly interface that allows developers to perform tasks such as creating, editing, and deleting databases, tables, and views. It also allows developers to execute SQL queries and manage data, including inserting, updating, and deleting records. SQLyog provides a visual query builder that allows developers to build complex SQL queries easily.

In addition to these features, SQLyog provides tools for database synchronization, backup and restore, and schema comparison. It also supports version control systems, including Git, making it easy for developers to work collaboratively on databases.

SQLyog is available in both free and paid versions. The free version provides a limited set of features, while the paid version includes advanced features such as SSH and HTTP tunneling, database schema synchronization, and more. Overall, SQLyog is a powerful and user-friendly tool that makes it easy for developers to manage MySQL databases.

#### *d) OWMS hardware technology*

- **Hardware Software Requirement:**

Operating System: Windows, macOS, or Linux

Processor: 64-bit processor with at least 2 cores

RAM: At least 4 GB of RAM

HARD DISK: 100GB

## **CHAPTER-4**

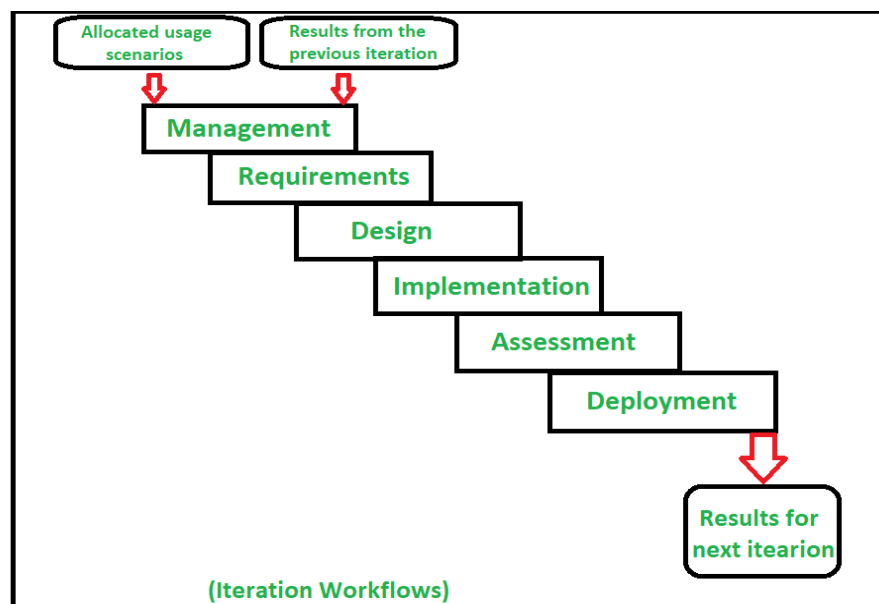
### **IMPLEMENTATION**



## 4.1 Architecture

A workflow management system typically consists of several architectural components that work together to manage the flow of work within an organization. Here are the typical architectural components of a workflow management system and how they work. This is the core component of the system, responsible for executing and managing workflows. It typically provides features such as task management, resource allocation, error handling, and monitoring. Workflow Designer This component is used to design and configure workflows. It typically provides a graphical interface for users to create workflows using drag-and-drop tools or by defining workflows using a scripting language. Workflow Execution Environment: This is the environment in which workflows are executed. It typically includes the necessary hardware and software infrastructure, such as servers, databases, and middleware. Workflow Monitor This component is responsible for monitoring the progress of workflows and providing real-time feedback to users. It typically provides features such as task tracking, status reporting, and exception handling.

Workflow Analytics This component is used to gather data on workflow performance, such as the time taken to complete tasks and the frequency of errors. It is used to identify areas where workflows can be improved and to optimize workflow performance. the architecture of a workflow management system is designed to be modular and scalable, allowing organizations to easily customize and extend the system to meet their specific needs.[6]



**Figure 4.1.1 Steps of OWMS**

Fig. 4.1.1 Workflow management is the process of designing, executing, and monitoring a series of tasks or processes within an organization to achieve a specific goal. A workflow consists of a sequence of tasks that are completed by people, systems, or machines, and each task is dependent on the completion of the previous task. Workflow management involves creating a visual representation of the workflow, which is often called a process flow diagram. This diagram shows the flow of tasks and the dependencies between them. The workflow is then executed using a workflow management system, which automates the flow of tasks and ensures that each task is completed in the correct order. The benefits of workflow management include increased efficiency, improved productivity, and reduced errors. Workflow management systems can help organizations streamline their processes, reduce the time required to complete tasks, and provide real-time visibility into the status of workflows. This can help managers make better decisions and allocate resources more effectively. Workflow management also helps to ensure that tasks are completed in a consistent manner, reducing the risk of errors and improving the quality of work. By automating routine tasks, workflow management systems can also free up staff to focus on more strategic activities. Overall, workflow management is a critical component of modern business operations. By streamlining processes and improving the flow of work, organizations can increase efficiency, reduce costs, and improve the quality of their products and services.

Workflow management systems are designed to help organizations streamline their processes, reduce the time required to complete tasks, and improve productivity. In order to successfully implement a workflow management system, several requirements must be met. Here are some of the key requirements for workflow management:

- Clear Business Processes:** Organizations must have a clear understanding of their business processes and how workflows flow through their organization. This includes understanding the sequence of tasks, dependencies, and the roles and responsibilities of team members involved in the process.
- Standardization of Processes:** Workflow management requires standardization of processes across the organization. This ensures that tasks are completed in a consistent manner, reducing the risk of errors, and improving the quality of work.
- Well-defined Business Rules:** Business rules must be clearly defined in the workflow management system to ensure that tasks are executed correctly and in the proper order. This includes defining decision points, actions to be taken based on specific conditions, and approval processes.
- Integration with Existing Systems:** Workflow management systems must be integrated with existing systems and applications, such as CRMs, ERPs, and project management tools, to ensure that data is accurate and up to date.

**User-friendly Interface:**

Workflow management systems must have a user-friendly interface that is easy to use and understand. This includes features such as drag-and-drop design tools, task lists, and notifications. Scalability Workflow management systems must be scalable to accommodate growing business needs. This includes the ability to add new processes, users, and resources as the organization expands. Security Workflow management systems must be secure to protect sensitive business data. This includes features such as user authentication, data encryption, and access controls. Successful implementation of a workflow management system requires clear business processes, standardization of processes, well-defined business rules, integration with existing systems, a user-friendly interface, scalability, and security. By meeting these requirements, organizations can streamline their processes, reduce errors, and improve productivity.

**Process automation:**

Once the workflow is designed, the system automates the process by executing tasks in the defined sequence and triggering events or notifications when specific conditions are met. The system can also integrate with other software systems to access data and perform actions, such as sending emails, creating documents, or updating databases.

**Process monitoring:**

The workflow management system allows users to monitor the progress of workflows in real-time, providing visibility into the status of each task, identifying bottlenecks or delays, and notifying users of any issues or exceptions. Users can also track performance metrics, such as cycle time, throughput, and error rates, to optimize the process and improve efficiency.

**Process optimization:**

Based on the data collected during the monitoring phase, the workflow management system enables users to identify areas for improvement and make changes to the workflow design or automation rules. Users can also simulate the impact of changes before implementing them to ensure that they achieve the desired results.

**Reporting and analysis:**

The workflow management system provides reporting and analytics tools that allow users to generate custom reports, dashboards, and charts to visualize process performance, identify trends, and measure the impact of process improvements. Users can also export data for further analysis or integration with other systems. A workflow management system can help organizations to streamline their business processes, reduce errors and delays, increase productivity and efficiency, and achieve their goals faster and with greater accuracy.

**Process design:**

The workflow management system provides a graphical interface for designing processes, allowing users to create workflows by dragging and dropping tasks, adding decision points and conditions, defining rules and business logic, and assigning roles and responsibilities. Workflow management design is the process of designing a system that can manage and automate the flow of work within an organization. A well-designed workflow management system helps organizations to streamline their processes, reduce errors, and improve productivity. Here are some key elements of workflow management design

**Process Mapping** The first step in workflow management design is to map out the existing business processes. This involves identifying the sequence of tasks, dependencies, and decision points in each process. Process mapping helps to identify inefficiencies and opportunities for optimization.

**Process Improvement** Once the processes have been mapped, the next step is to identify areas for improvement. This may involve simplifying processes, removing bottlenecks, or automating routine tasks.

**Workflow Design** Based on the improved processes, the next step is to design the workflow[9]. This involves creating a visual representation of the workflow, including the sequence of tasks, decision points, and dependencies. The workflow should be designed in a way that is easy to understand and can be easily modified as needed.

**Workflow Automation** The workflow should be automated using a workflow management system. This involves defining the rules and logic that determine how work is routed through the system. The workflow management system should be able to handle exceptions and ensure that tasks are completed in the correct order.

**User Interface** The user interface of the workflow management system should be designed with the end user in mind. It should be easy to use and understand, with clear instructions and visual cues to guide users through the workflow.

**Integration** The workflow management system should be integrated with other systems and

applications, such as CRMs, ERPs, and project management tools. This ensures that data is accurate and up-to-date, and that tasks are completed in a timely and efficient manner.

**Testing and Optimization** Once the workflow management system has been designed and implemented, it should be tested and optimized. This involves monitoring the system to identify bottlenecks and areas for improvement, and making changes as needed to optimize the workflow. Workflow management design is a critical component of successful workflow management. By mapping out processes, identifying areas for improvement, designing workflows, automating tasks, designing a user-friendly interface, integrating with other systems, and testing and optimizing the system, organizations can streamline their processes, reduce errors, and improve productivity.

### **Implementation Formation**

Workflow management implementation is the process of putting into action a workflow management system within an organization. A well-planned and executed implementation can help organizations streamline their processes, reduce errors, and improve productivity. Here are some key elements of workflow management implementation.

**Define Objectives** The first step in workflow management implementation is to define the objectives of the system. This involves identifying the specific goals the organization hopes to achieve through the implementation, such as reducing turnaround time or improving quality.

**Plan Implementation** Once the objectives are defined, the next step is to plan the implementation. This involves identifying the tasks that need to be completed, assigning responsibilities, and creating a timeline for completion. A project manager should be appointed to oversee the implementation process.

**Prepare Data** Before implementing the workflow management system, the organization should ensure that its data is accurate and up-to-date. This may involve cleaning data, removing duplicates, and ensuring that data is formatted correctly.

**Configure the System** The workflow management system should be configured to meet the specific needs of the organization. This involves defining workflows, designing forms and templates, setting up user accounts and permissions, and integrating with other systems and applications.

**Training** Once the system is configured, the organization should provide training to its employees. This includes training on how to use the system, how to complete tasks, and how to troubleshoot common problems.

**Launch and Monitor** The system should be launched, and its performance should be monitored closely. This involves monitoring workflows, tracking performance metrics, and identifying areas for improvement. Any issues that arise should be addressed promptly to ensure that the system is functioning properly.

**Continuous Improvement** Workflow management implementation is an ongoing process. The organization should continuously monitor the system and identify opportunities for improvement[10]. This may involve

adding new workflows, automating additional tasks, or making changes to existing workflows. Successful workflow management implementation involves defining objectives, planning the implementation, preparing data, configuring the system, training employees, launching and monitoring the system, and continuously improving the system. By following these steps, organizations can streamline their processes, reduce errors, and improve productivity.

### **Initialization of Assessment**

Workflow management assessment is the process of evaluating the effectiveness of an organization's workflow management system. It involves identifying strengths, weaknesses, opportunities for improvement, and potential risks associated with the system. Here are some key elements of workflow management assessment

**Evaluate Workflow Processes:** The first step in workflow management assessment is to evaluate the organization's workflow processes. This involves analyzing the sequence of tasks, decision points, and dependencies within each process to identify potential inefficiencies or areas for improvement.

**Assess Workflow Automation** Once the workflow processes have been evaluated, the next step is to assess the effectiveness of workflow automation. This involves analyzing how tasks are routed through the system, the rules and logic that determine task assignments, and the overall efficiency of the system.

**Review User Experience** Workflow management assessment also involves reviewing the user experience of the system. This includes evaluating the ease of use of the system, the quality of training and support provided to users, and the level of satisfaction among users.

**Identify Integration Opportunities** Workflow management assessment also involves identifying opportunities for integrating the workflow management system with other systems and applications. This may involve evaluating how data is shared between systems and identifying potential opportunities for automating tasks.

**Analyze Performance Metrics:** Workflow management assessment also involves analyzing performance metrics to evaluate the effectiveness of the system. This may involve analyzing data such as task completion times, error rates, and resource utilization to identify potential areas for improvement[6].

**Assess Risks and Compliance:** Finally, workflow management assessment involves assessing potential risks associated with the system and ensuring that the system is compliant with relevant regulations and industry standards. This may involve reviewing security protocols, data privacy policies, and other compliance requirements.

Workflow management assessment is an important step in ensuring the effectiveness of a workflow management system. By evaluating workflow processes, assessing workflow automation, reviewing the user experience, identifying integration opportunities, analyzing performance metrics, and assessing risks and compliance, organizations can identify areas for improvement and optimize their workflow management system.

## **Workflow Deployment**

The Workflow management deployment is the process of implementing a workflow management system in an organization's environment, making it available for use by end-users. This involves setting up the infrastructure, installing the software, configuring the system, and providing training and support to end-users. Here are some key elements of workflow management deployment

**Infrastructure Setup** The first step in workflow management deployment is to set up the infrastructure. This involves identifying the hardware and software requirements for the workflow management system and ensuring that they are in place. This may involve setting up servers, databases, and other necessary components.

**Software Installation** Once the infrastructure is in place, the next step is to install the workflow management software. This involves downloading the software, running the installation process, and configuring the system for the organization's specific needs.

**Configuration** After the software is installed, the workflow management system must be configured to meet the specific needs of the organization. This may involve setting up workflows, designing forms and templates, setting user accounts and permissions, and integrating with other systems and applications.

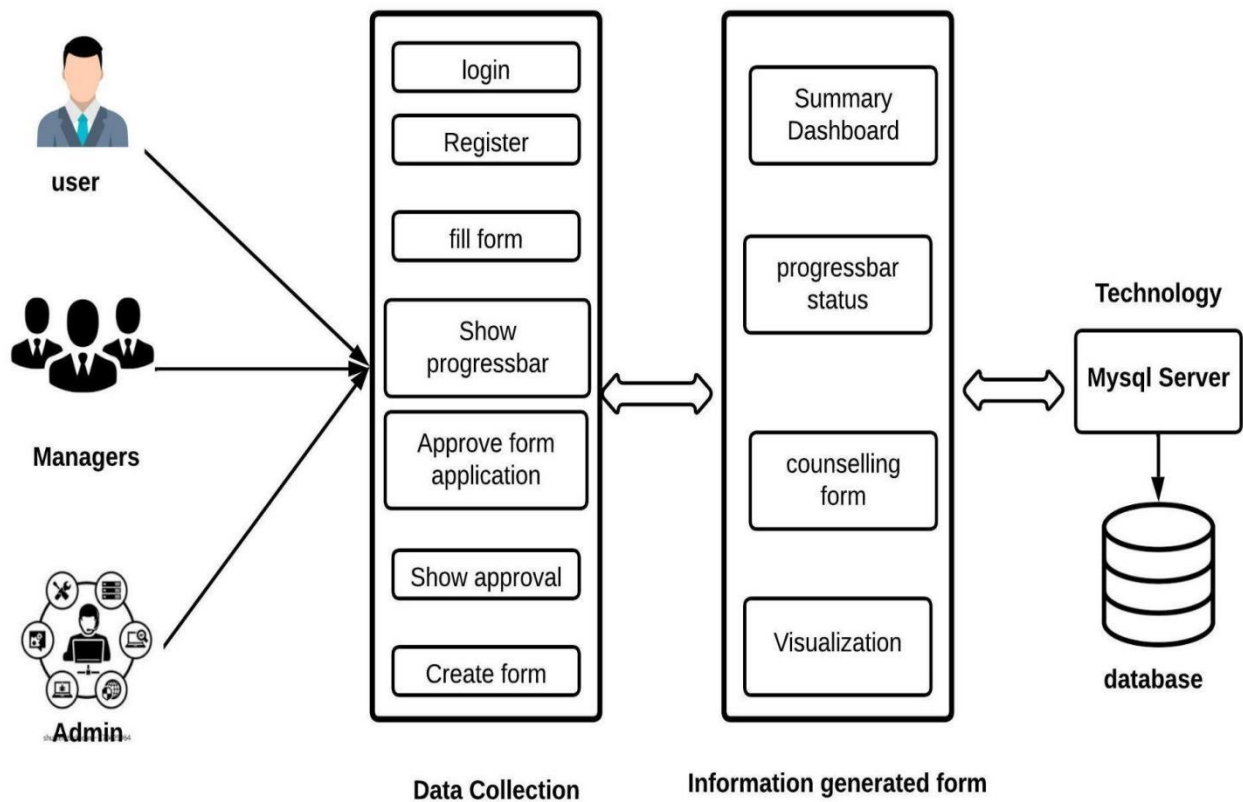
**Training** Once the system is configured, the organization should provide training to its end-users. This includes training on how to use the system, how to complete tasks, and how to troubleshoot common problems. Training may be provided through classroom sessions, online tutorials, or other methods.

**Testing** Before deploying the system to end-users, should be thoroughly tested to ensure that it is functioning properly. This may involve conducting unit tests, integration tests, and system tests to identify any issues and ensure that the system is reliable and stable.

**Deployment** After testing is complete, the workflow management system can be deployed to end-users. This involves making the system available to all authorized users and ensuring that it is accessible from all necessary devices.

**Support** Once the system is deployed, ongoing support should be provided to end-users. This may involve providing technical support, addressing issues and bugs, and providing training and education on new features and functionality.

Successful workflow management deployment involves setting up the infrastructure, installing and configuring the software, providing training to end-users, testing the system, deploying the system, and providing ongoing support to end-users. By following these steps, organizations can ensure that their workflow management system is properly implemented, effectively deployed, and efficiently used to support their business processes.



**Figure 4.1.2 Architecture Diagram**

### Multiple User

There are several types of users who can participate in a workflow. Here are some examples:

**Initiator:** The initiator is the user who starts the workflow by submitting a request or triggering a process. They may provide input or data required for the workflow and may be involved in subsequent steps.

**Task Performer:** The task performer is the user who is responsible for performing a specific task within the workflow. They may receive notifications or alerts when a task is assigned to them and may be required to provide outputs or updates to the workflow.

**Approver:** The approver is the user who is responsible for reviewing and approving tasks or outputs within the workflow. They may be required to provide feedback or input on tasks and may have the ability to reject or request changes to tasks.



**Manager:** The manager is the user who is responsible for overseeing the workflow and ensuring that it progresses as planned. They may be responsible for assigning tasks, monitoring progress, resolving issues, and making decisions related to the workflow.

**Stakeholder:** The stakeholder is any user who has an interest in the outcome of the workflow. This may include customers, partners, or other external users who may be impacted by the workflow.

**System Administrator:** The system administrator is the user who is responsible for managing the workflow management system itself. They may be responsible for configuring the system, managing users and permissions, and ensuring that the system is functioning correctly.

**Auditor:** The auditor is the user who is responsible for reviewing the workflow for compliance or quality assurance purposes. They may be responsible for ensuring that the workflow is following regulatory or organizational guidelines and may provide feedback or recommendations for improvement.

the types of users in a workflow may vary depending on the specific workflow and the organization's structure and requirements. However, by identifying and defining the roles and responsibilities of each user, organizations can optimize their workflows and achieve their business objectives more effectively.

## **Data Collection**

Data collection is a crucial aspect of many workflow systems, as it provides the inputs and outputs necessary for the workflow to progress. Here is an overview of how data collection works in a workflow system:

**Input Collection:** At the beginning of a workflow, the system may collect input data from various sources. This may include data entered by a user, data from a database or API, or data generated by other systems or devices. The input data may be required for subsequent steps in the workflow, and the system may validate and preprocess the data as necessary.

**Task Outputs:** As tasks are performed within the workflow, they may generate outputs or updates to the input data. For example, a task performer may update a database record, generate a report, or send a notification to another user. These outputs may be collected by the system and used as inputs for subsequent steps in the workflow.

**Data Storage:** The system may store the input and output data in a database or other storage mechanism, to be used for subsequent steps in the workflow or for reporting and analysis purposes.

**Data Processing:** The system may perform various data processing tasks, such as filtering, sorting, aggregating, or transforming the data, depending on the requirements of the workflow. This processing may be performed automatically by the system or may require user input or intervention.[8]

**Output Delivery:** Once the workflow is completed, the system may generate various types of output or

reports, based on the input and output data collected throughout the workflow. This may include generating reports, sending notifications, or updating other systems or databases.

Overall, data collection is a critical aspect of many workflow systems, as it provides the inputs and outputs necessary for the workflow to progress and for organizations to make data-driven decisions. By designing workflows that optimize data collection and processing, organizations can improve efficiency, reduce errors, and achieve their business objectives more effectively.

### **Information Gather**

Information gathering is an important part of many workflow systems, as it enables organizations to collect and process data more efficiently and accurately. Here's an overview of how information gathering works in a workflow system

**Data Entry Forms** The workflow system may provide data entry forms to users, allowing them to input data into the system. These forms may be designed to capture specific types of information and may include validation rules to ensure data accuracy and completeness.

**Automated Data Capture** The workflow system may also capture data automatically from other systems or sources, such as databases, APIs, or sensors. This data may be used as inputs for subsequent steps in the workflow.

**Document Upload** Users may also be able to upload documents or files into the workflow system. These documents may be used as inputs for subsequent steps in the workflow or for reporting and analysis purposes.

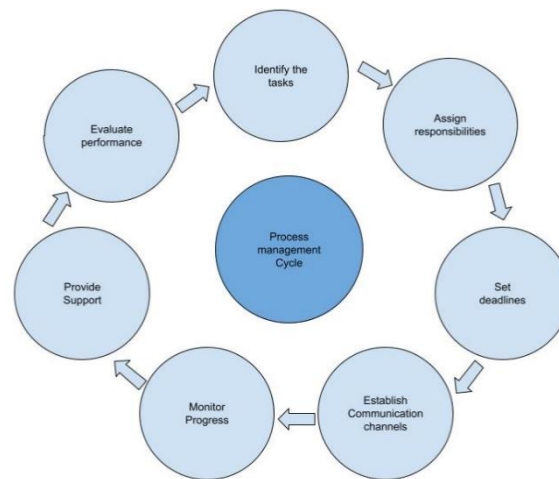
**Data Processing** Once the data is collected, the workflow system may process the data in various ways, such as filtering, sorting, aggregating, or transforming the data. This processing may be performed automatically by the system or may require user input or intervention.

**Output Delivery** Once the data has been processed, the workflow system may generate various types of output or reports based on the input data. These reports may be used for monitoring, analysis, or decision-making purposes.

Information gathering is a crucial aspect of many workflow systems, as it enables organizations to collect and process data more efficiently and accurately. By designing workflows that optimize information gathering and processing, organizations can improve efficiency, reduce errors, and achieve their business objectives more effectively.

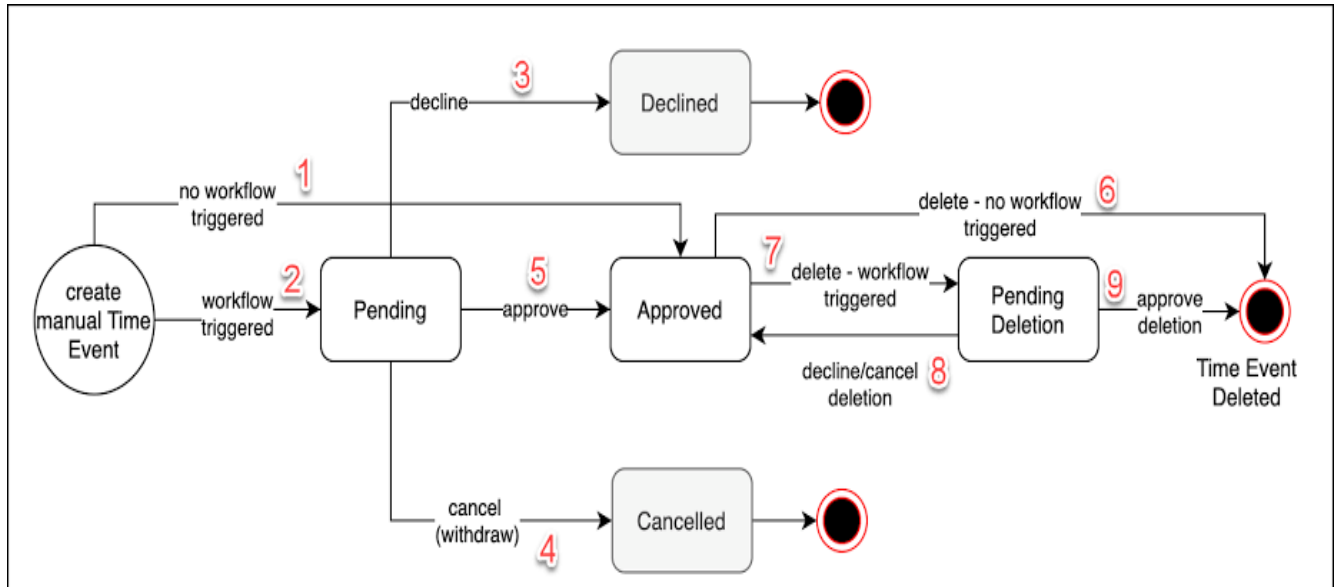
## **4.2 Workflow**

Workflow refers to the series of steps involved in a business process, from initiation to completion. It involves the movement of information, documents, or tasks between people or systems in a predetermined sequence to achieve a specific goal. Workflows can be simple or complex, involving multiple steps and decision points. A workflow typically involves the following elements Initiation.



**Figure 4.2.1 Process Cycle Diagram**

This is the starting point of the workflow, where a request or trigger is received that initiates the process. Tasks These are the individual steps that make up the workflow. Each task may involve different people, systems, or resources, and may require specific inputs or outputs. Rules These are the criteria that determine the flow of the workflow, including the decision points and branching logic. Rules may be based on data, time, user input, or other factors. Participants These are the people or systems involved in the workflow, including the initiator, task performers, and stakeholders. Each participant may have specific roles, permissions, or responsibilities. Notifications These are the alerts or messages that are sent to participants to inform them of tasks, deadlines, or other important information. Completion This is the end point of the workflow, where the final task is completed, and the process is considered finished. Workflows can be manual, automated, or a combination of both. Manual workflows rely on human intervention to move tasks between participants, while automated workflows use software or other tools to automate the movement of tasks and information[2]. Combination workflows use a mix of manual and automated steps to achieve the desired outcome. Workflows are an important tool for improving business processes, increasing efficiency, and reducing errors. By defining and optimizing workflows, organizations can improve their performance, enhance their customer service, and achieve their business objectives more effectively.



**Figure 4.2.2 Workflow of Operation Management System**

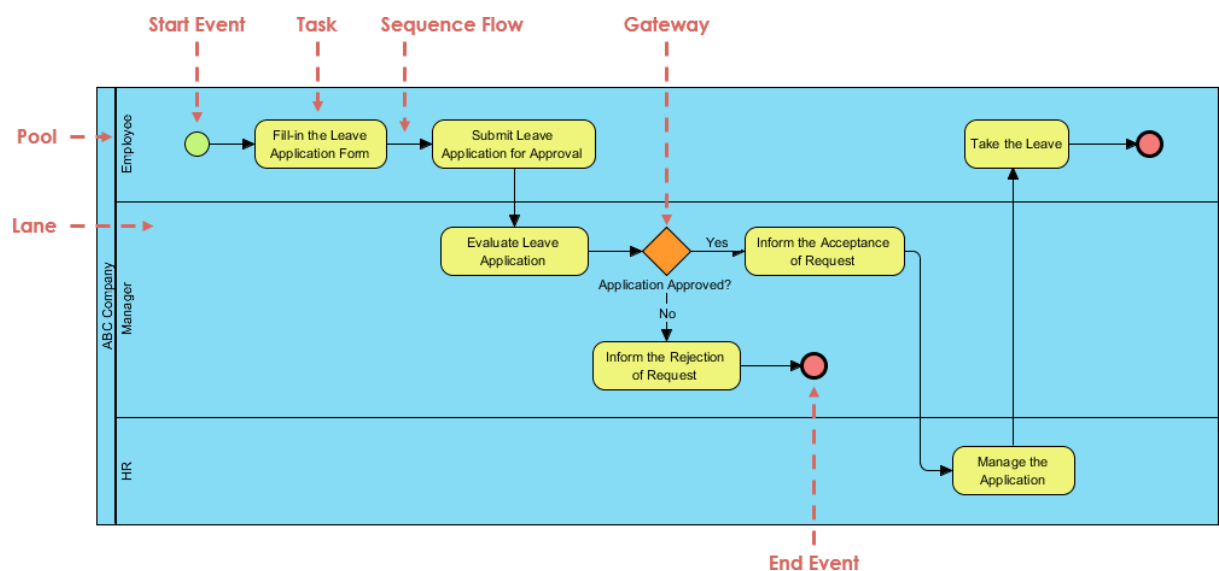
The steps involved in performing a task in a workflow management system depend on the specific workflow and the task being performed. However, here are some common steps that may be involved in task performance within a workflow management system:

- 1.Task Notification:** The system sends a notification to the assigned task performer(s) that a new task has been assigned to them, along with any relevant information or instructions.
- 2.Task Details:** The task performer(s) review the details of the task, including any inputs or outputs required, any dependencies or rules that need to be followed, and any deadlines or other constraints.
- 3.Task Completion:** The task performer(s) complete the task as specified, following any rules or procedures required. This may involve interacting with other participants, accessing or updating data, or performing specific actions.
- 4.Task Validation:** The system validates the completion of the task, checking for any errors or issues. If the task is completed successfully, the workflow moves on to the next step.
- 5.Exception Handling:** If there are errors or issues with the task, the system may trigger an exception handling process to resolve the issue. This may involve assigning the task to a different performer, providing additional information or resources, or escalating the issue to a manager or other stakeholder.
- 6.Workflow Progression:** Once the task is completed and validated, the workflow progresses to the next step. This may involve triggering new tasks or processes, updating data or information, or generating reports or alerts.

**7.Task Monitoring:** Throughout the task performance and workflow progression, the system may provide ongoing monitoring and tracking of progress, performance, and compliance. This may include generating reports, dashboards, or alerts to inform stakeholders of progress and issues.

task performance in a workflow management system involves a series of steps, from task notification to completion and validation, followed by workflow progression and ongoing monitoring. By following these steps and optimizing workflows, organizations can improve efficiency, reduce errors, and achieve their business objectives more effectively.

### 4.3 OWMS outcome



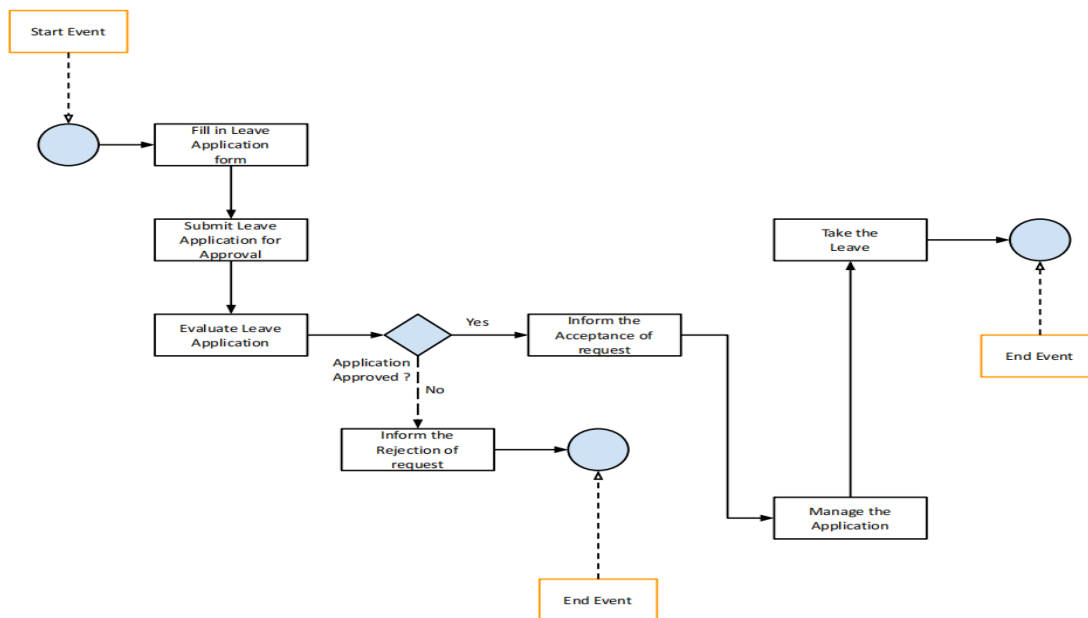
**Figure 4.3.1 Leave Application of Operation Management System**

The outcomes of a workflow system can vary depending on the specific goals and objectives of the organization. However, here are some common outcomes that workflow systems can achieve:

**1.Improved Efficiency:** One of the main outcomes of a workflow system is improved efficiency. By automating repetitive tasks, streamlining processes, and reducing manual errors, organizations can save time and reduce costs associated with labor and errors.

**2.Increased Productivity:** Workflow systems can also increase productivity by allowing employees to focus on higher-value tasks rather than administrative or repetitive work. This can lead to better job satisfaction, improved morale, and higher levels of engagement.[4]

**3.Improved Collaboration:** Workflow systems can improve collaboration between team members by providing visibility into the progress of tasks and enabling easier communication and coordination between team members. This can lead to better teamwork, improved decision-making, and more efficient use of resources.



**Figure 4.3.1 Workflow Diagram of Leave Application**

**4.Enhanced Transparency:** Workflow systems can also enhance transparency by providing a clear view of the status of tasks and processes. This can help managers and other stakeholders make informed decisions based on real-time data and reduce the risk of delays or mistakes.

The outcomes of a workflow system can be significant and varied and depend on the specific needs and goals of the organization. By implementing a workflow system, organizations can improve efficiency.

## **CHAPTER-5**

### **CONCLUSION**

## 5.1 Conclusion

The workflow system for corporate process management was created and put into place in this article. Collaboration, contract approval, and the execution of many tasks are all functions that may be provided through the workflow. The system is capable of managing the process on its own and supports various workflow designs, task plans, approvals for job allocation, and task reminders. Using this method, decisions are made more quickly, with fewer mistakes and delays. A WfMS can save time and money by automating repetitive operations and optimizing workflows so that they can be used for more strategic endeavors.

A WfMS is an essential tool for organizations looking to optimize their business processes and improve their overall efficiency. It enables them to create and manage workflows that are tailored to their specific needs and to monitor and analyze those workflows to identify areas for improvement. By leveraging the power of automation, a WfMS can help organizations achieve their goals more quickly and effectively, while also improving the quality of their products or services. The workflow system and design model may accommodate the requirements of various businesses. The goal of future study is to identify the workflow system's parallel co-processing mechanism, create a generic model that will enable various users to alter the workflow, and create a workflow system that is suited to their requirements. workflow management system can help us to manage the task flow to be more easily and transparent. It can identify the business process, the task allocated to members and the goal of the projects.

As you can see, workflow management is crucial when it comes to an effective workplace environment, yet not extremely challenging to get a grasp of. It helps automate various tasks and steps, streamline new workflow practices, and adopt new ones much more efficiently. In conclusion, using Workflow Process Management helps companies achieve their goals faster, better, cheaper, and more efficiently. It provides a systematic approach to achieving these benefits.



## 5.2 Future scope

*The Integration with other cloud apps:*

Integration used to be a nice-to-have feature for workflow management. Now it's essential. Workflows don't operate independently from other processes. Documents, sales reports, cash-flows, calendars, and contact details should all flow smoothly from your workflow tool to your CMS, calendar, email, financial software and more. If your workflow management system isn't incredibly easy to set up to integrate with other tools out there, it's already outdated.

*Notifications of when and where you need them:*

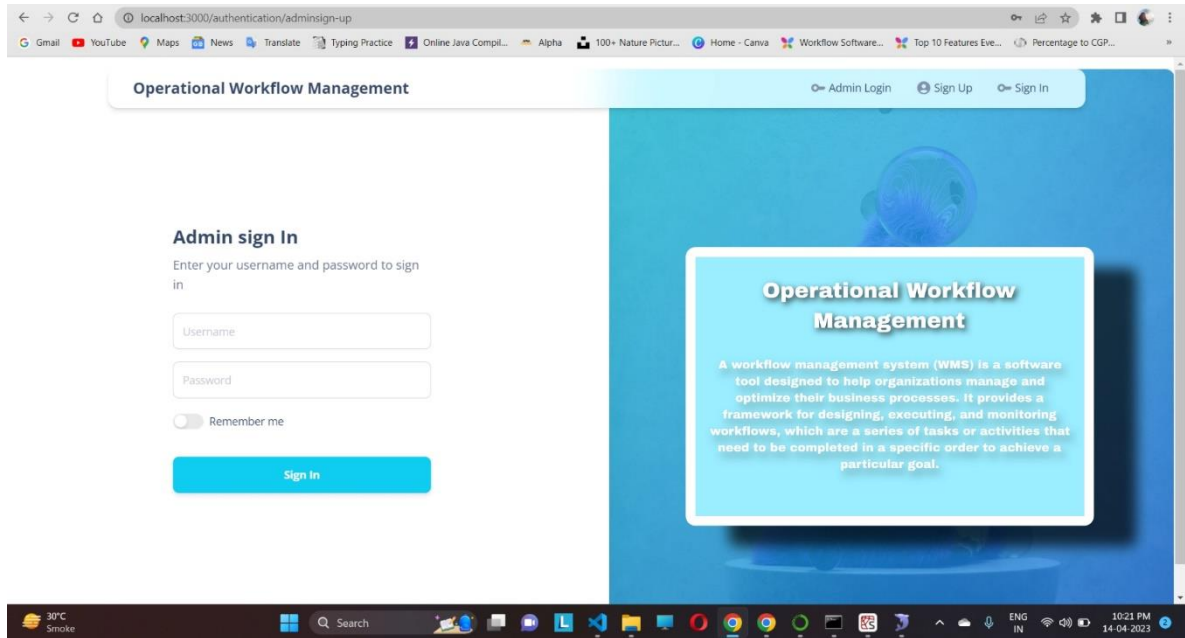
The key to automated workflows is that you never need to push them. Like a pinewood derby car, as soon as you start a new process, it should keep going until it finishes without anyone needing to follow up.

The key to this kind of flow is notifications. An effective business Workflow Management System will send notifications via email or push notifications on your mobile to remind you of upcoming approvals.

**CHAPTER-6**  
**APPENDICES**

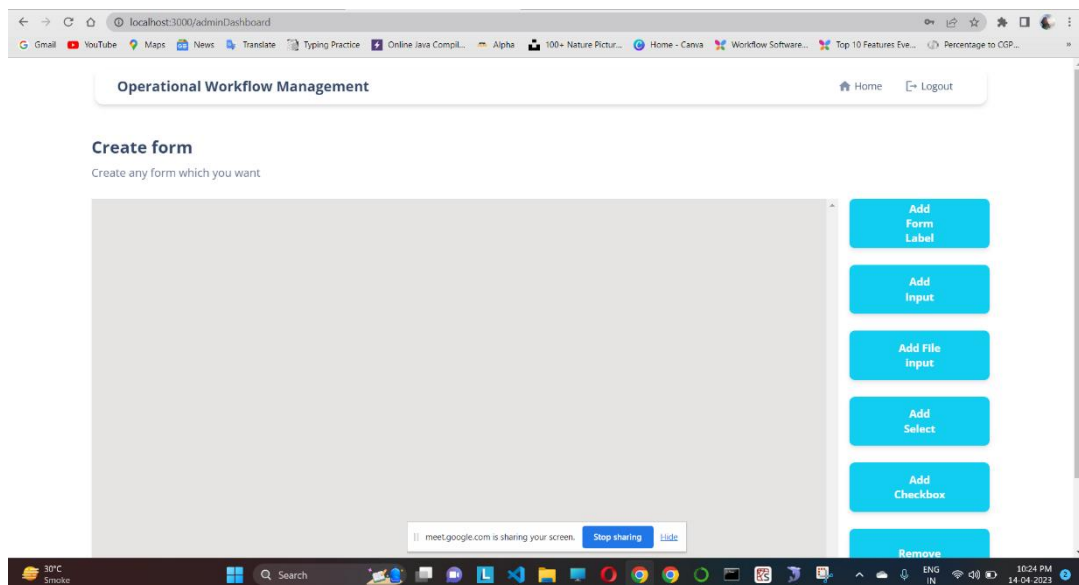
## 6.1 Application screenshots

Summarized transcript generation: In Fig. 6.1 the main page and user interface of our OWMS. The sign in button will be present, and when clicking it, the URL will be sent to the backend using flask.



**Figure 6.1: Main page and Admin page user interface for login.**

In Fig. 6.2 the summarized text or content is created at the backend and shown to the user after clicking the summarize button.



**Figure 6.2: Showing the create form option box.**

In fig 6.3 The user is given multiple choices to create the application and fill the form user can create multiple operation to create a flow application form Figures 6.3 and 6.4 illustrate the workflow execution.

The screenshot displays a web application interface for 'Operational Workflow Management'. The main heading is 'Create form', with a subtext 'Create any form which you want'. The form itself is titled 'Leave request' and consists of seven text input fields: 'Enter first name', 'Enter middle name', 'enter last name', 'Enter department', 'Enter phone number', 'Enter Employee id', and 'Enter email'. To the right of the form, there is a vertical stack of blue buttons: 'Add Form Label', 'Add Input', 'Add File Input', 'Add Select', 'Add Checkbox', and 'Remove'. At the top right of the dashboard, there are links for 'Home' and 'Logout'. The browser's address bar indicates the URL is 'localhost:3000/adminDashboard'.

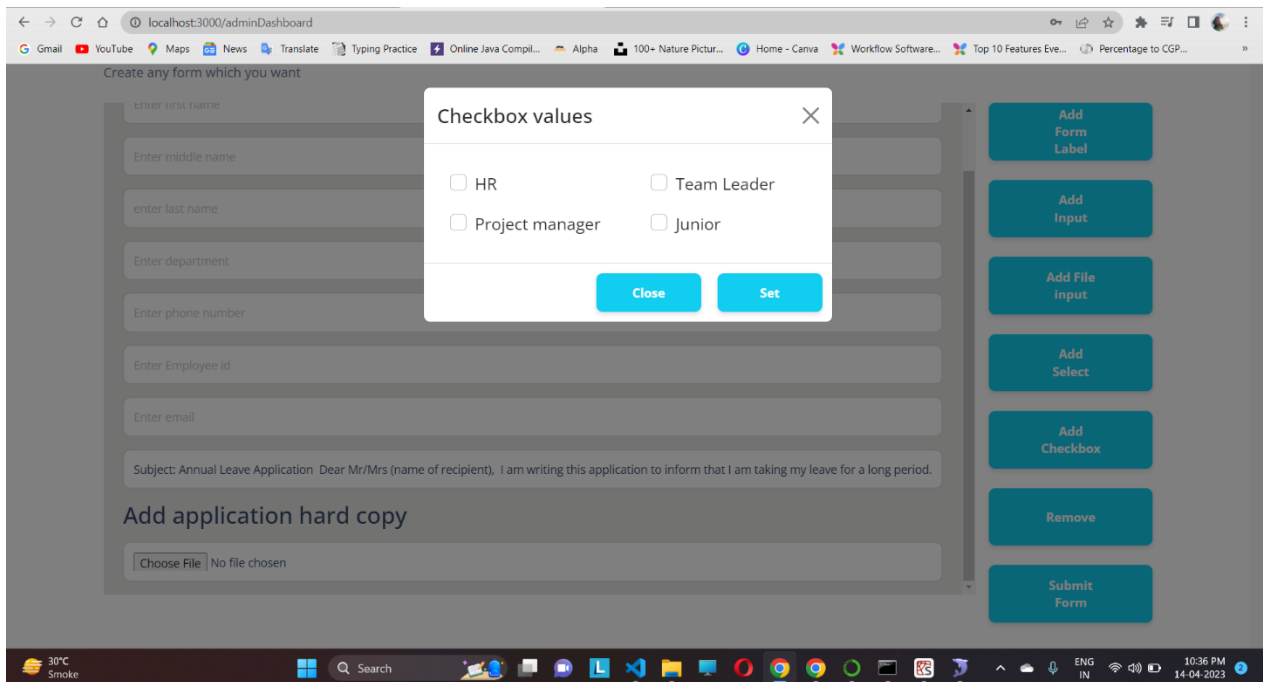
**Figure 6.3: Creating leave application.**

In fig 6.4 After half form filling deal with full form assign input.

This screenshot shows the same 'Operational Workflow Management' dashboard as Figure 6.3, but with additional elements. The 'Leave request' form now includes a text area for a subject line, which contains the text: 'Subject: Annual Leave Application Dear Mr/Mrs (name of recipient), I am writing this application to inform that I am taking my leave for a long period.' Below this text area is a section titled 'Add application hard copy' featuring a 'Choose File' button and the text 'No file chosen'. The stack of blue buttons on the right now includes an additional 'Submit Form' button at the bottom. The rest of the interface, including the input fields and the top navigation, remains the same.

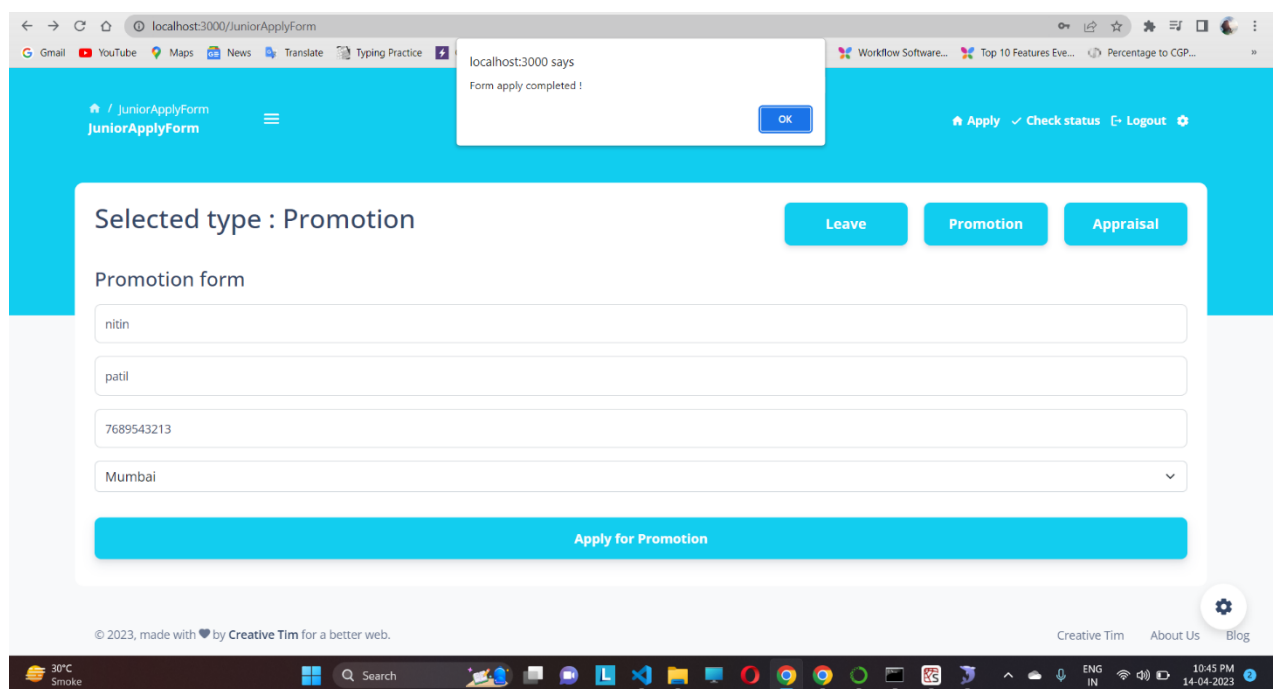
**Figure 6.4: Add multiple input in leave application.**

In fig 6.5. Add checkbox values to assign the flow sequence of workflow.



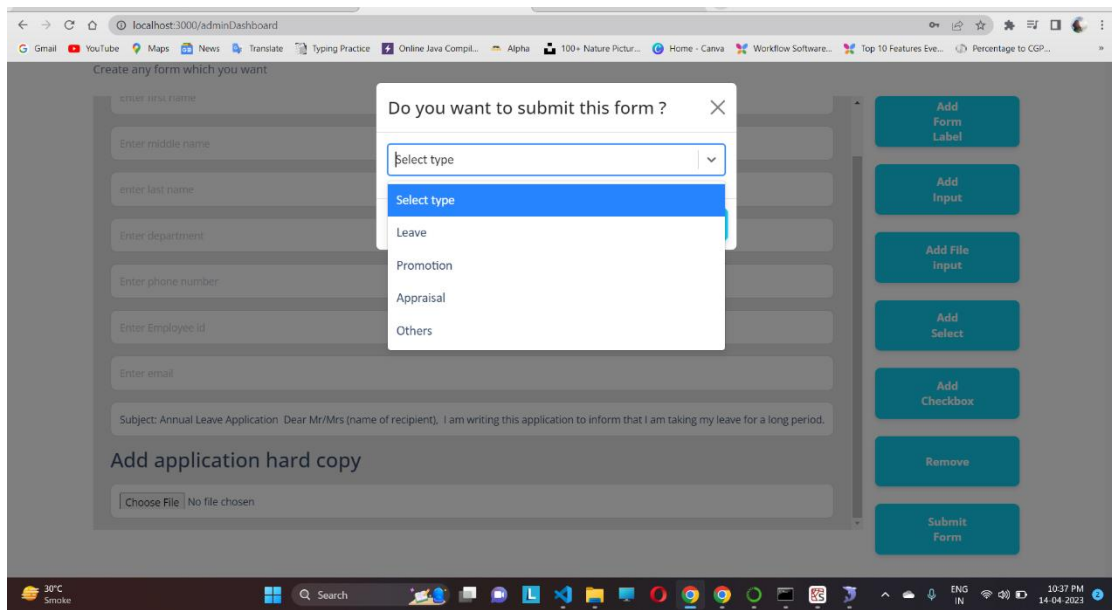
**Figure 6.5: Add checkbox values.**

In fig 6.6 OWMS leave application done completely.



**Figure 6.6: Successfully create a workflow.**

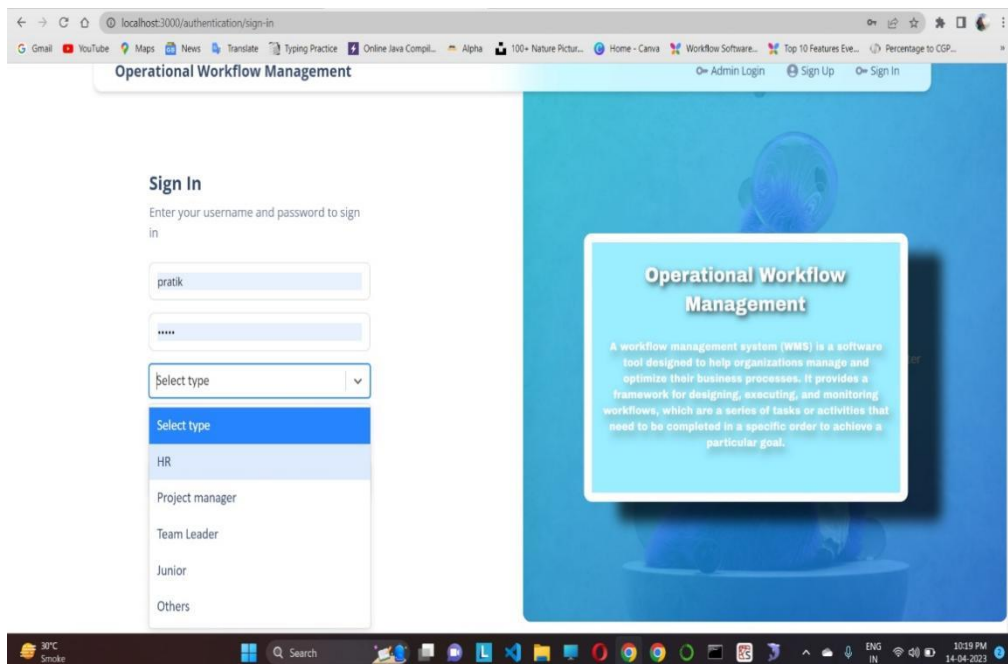
In Fig 6.7 submitting form with choosing category.



The screenshot shows a web browser window with the address bar displaying 'localhost:3000/adminDashboard'. The main content area is titled 'Create any form which you want' and contains several input fields: 'Enter middle name', 'Enter last name', 'Enter department', 'Enter phone number', 'Enter Employee id', and 'Enter email'. Below these fields is a text area with the placeholder text 'Subject: Annual Leave Application Dear Mr/Mrs (name of recipient), I am writing this application to inform that I am taking my leave for a long period.' and a file upload section with a 'Choose File' button and the text 'No file chosen'. A modal dialog box is open in the center, titled 'Do you want to submit this form ?'. It contains a dropdown menu labeled 'Select type' with a list of options: 'Select type', 'Leave', 'Promotion', 'Appraisal', and 'Others'. The 'Select type' option is currently selected. On the right side of the form, there is a vertical stack of buttons: 'Add Form Label', 'Add Input', 'Add File Input', 'Add Select', 'Add Checkbox', 'Remove', and 'Submit Form'.

**Figure 6.7: submit the form according to category.**

In Fig 6.8 sign-in page.



The screenshot shows a web browser window with the address bar displaying 'localhost:3000/authentication/sign-in'. The main content area is titled 'Operational Workflow Management' and features a 'Sign In' section. The 'Sign In' section has a heading 'Sign In' and a subheading 'Enter your username and password to sign in'. Below this, there are three input fields: a text field containing 'pratik', a password field with masked characters '\*\*\*\*', and a dropdown menu labeled 'Select type' with a list of options: 'Select type', 'HR', 'Project manager', 'Team Leader', 'Junior', and 'Others'. The 'Select type' option is currently selected. To the right of the sign-in form, there is a large blue banner with a white box containing the text 'Operational Workflow Management' and a description: 'A workflow management system (WMS) is a software tool designed to help organizations manage and optimize their business processes. It provides a framework for designing, executing, and monitoring workflows, which are a series of tasks or activities that need to be completed in a specific order to achieve a particular goal.'

**Figure 6.8: sign-in page.**

In Fig 6.9 sign-in page.

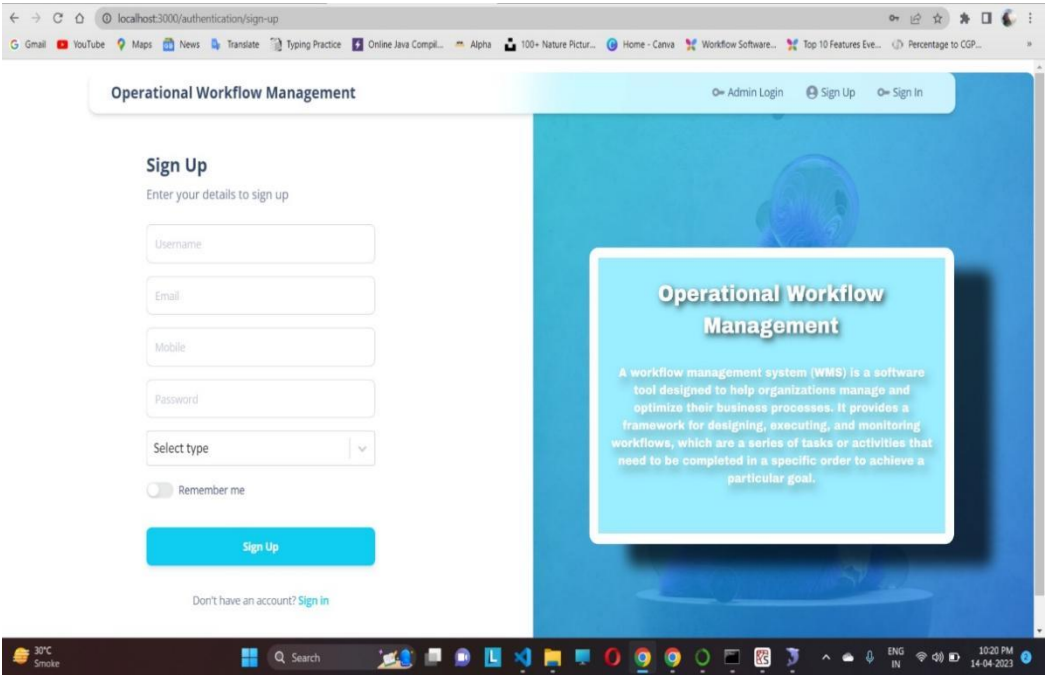


Figure 6.9: sign in page

In Fig 6.10 Filling form by user.

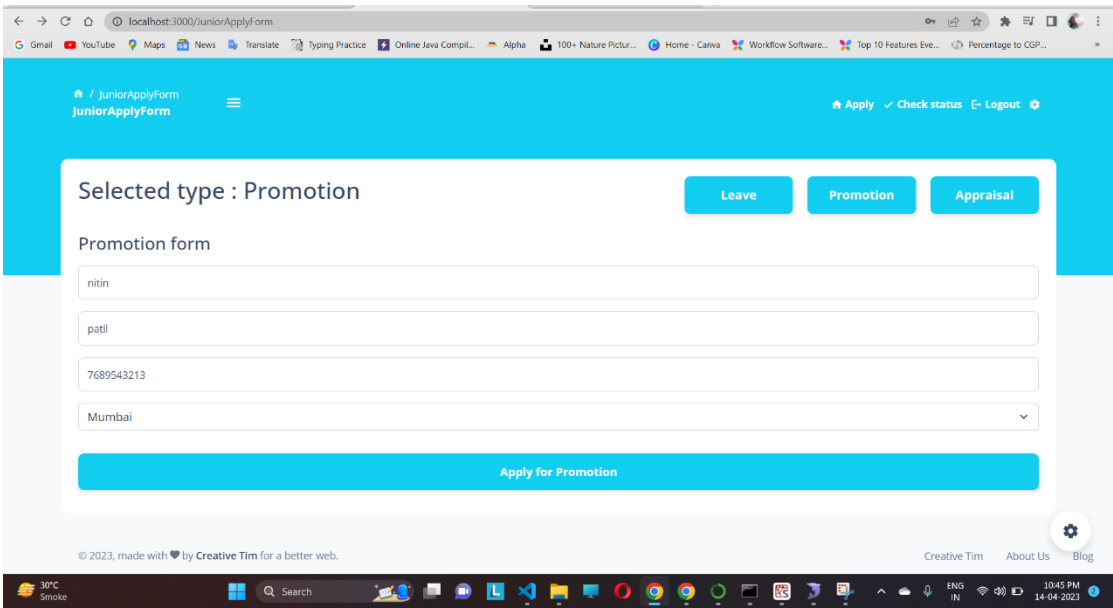


Figure 6.10: Filling form by user.

In Fig 6.11 Progress status.

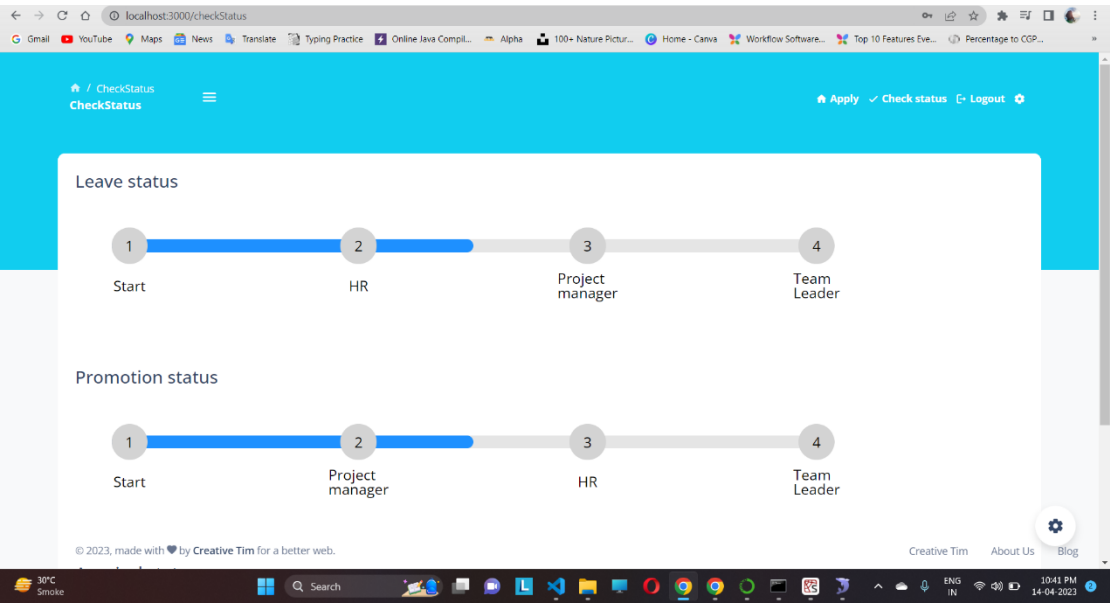


Figure 6.11: Progress status.

In Fig 6.12 Request status.

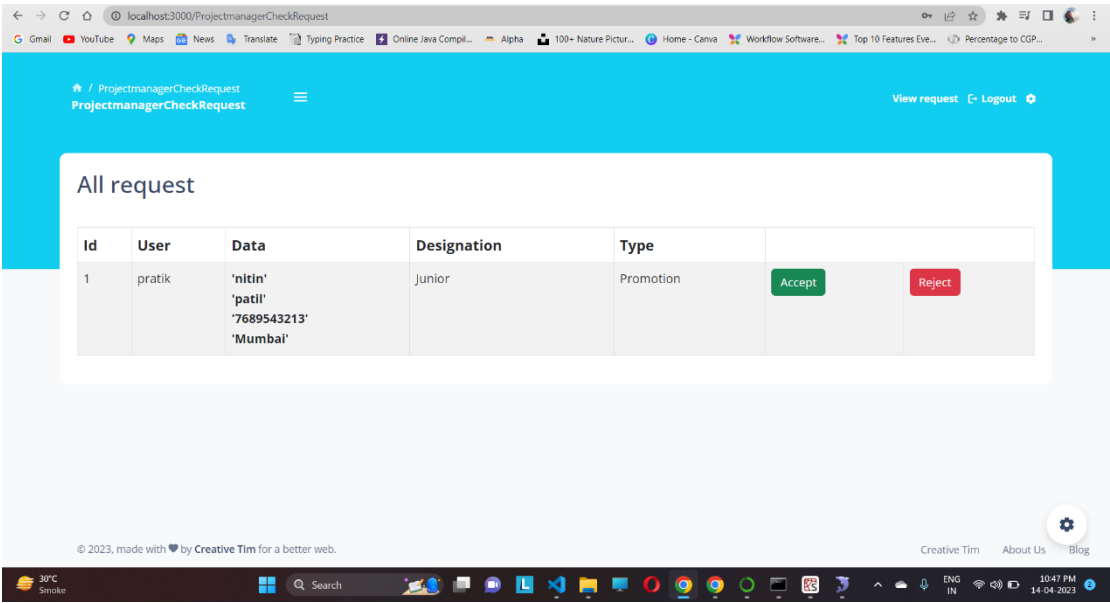


Figure 6.12: Request status.



In Fig 6.13 Accept reject feedback.

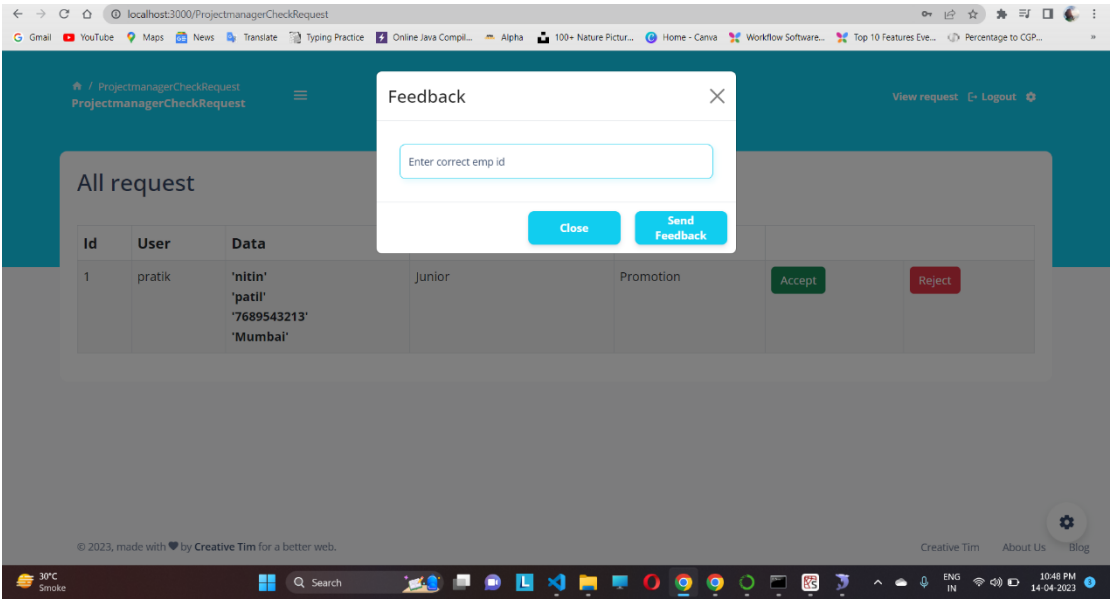


Figure 6.13: Accept Reject Request status.

**CHAPTER-7**  
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**CHAPTER-8**  
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