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DOCUMENT TRACKING SYSTEM REPORT PROPOSAL

### A WEB BASED DOCUMENT TRACKER FOR PWANI UNIVERSITY

### What is a document tracker

### History

### Pwani university

### Background

### A document tracker is a tool or system used to monitor and manage the movement and progress of documents within an organization or between different parties. It ensures that documents are handled efficiently and securely, keeping track of their status at each stage of their journey. A document tracker provides real-time updates about where a document is, who is responsible for it, and what actions need to be taken next. It often includes features like search functionality to locate documents easily, notifications to alert users about pending tasks or deadlines, and logs that record all activities performed on a document. By using a document tracker, organizations can improve accountability, streamline workflows, and reduce the chances of documents being misplaced or delayed.

The history of document tracking systems is deeply tied to the evolution of document management and technology. Traditional methods of document tracking involved manual processes, where physical files were moved between desks, departments, or even buildings. Over time, organizations sought more efficient ways to manage and monitor the movement of documents. A notable example of this evolution is the use of **DocuSign**, one of the world's leading document tracking and management systems

Initially, document tracking relied on paper-based systems. For instance, in an office environment, employees would keep handwritten logs to record when a document was created, who handled it, and its status. This system was labor-intensive, prone to human error, and inefficient, particularly in large organizations with high volumes of paperwork. Physical files could easily be misplaced, damaged, or delayed, resulting in operational inefficiencies.

To address these issues, businesses began implementing **file numbering systems**. Each document was assigned a unique identifier, allowing employees to track files more easily. While this was a step forward, it still depended heavily on human effort and was not immune to mistakes.

The introduction of computers in the late 20th century marked a significant shift in document management. Digital file systems replaced many paper-based workflows, enabling employees to create, store, and retrieve documents electronically. During this period, **early database management systems** like Microsoft Access were used to create rudimentary document tracking tools. These systems allowed organizations to log document details, track updates, and generate reports, but they still lacked automation and real-time updates.

The document movement process at Pwani University begins with the creation and preparation of the document in the originating office or department. This involves drafting the document, reviewing its content, and printing it along with any supporting attachments. Once ready, the document is marked or labeled with essential details, such as the recipient's department or its intended purpose. Often, a cover letter is included to provide context.

For delivery, the document is handed over to a designated messenger or staff member responsible for transporting it to the intended office. Internal deliveries within the same building are usually handled by walking the document to the appropriate office.Upon reaching the receiving office, the document’s arrival is acknowledged, often through an entry in a logbook, creating a record of its delivery.

Once received, the document is reviewed and processed by the receiving office. Depending on its purpose, this may involve further forwarding to other departments for additional approvals, archiving for record-keeping, or acting on it to complete the intended task. If forwarding is necessary, the document is relabeled and transmitted through the same physical process, with each office maintaining a record of its handover and receipt.

While this process ensures that documents eventually reach their intended destinations, it faces several challenges. Delays often occur, particularly during busy periods or when messengers are unavailable. Additionally, the manual nature of the process increases the risk of documents being misplaced or lost. Another significant limitation is the lack of transparency, as there are no real-time updates to track the document's location or status during its movement.

* 1. **Problem Statement**

At Pwani University, the use of manual paperwork creates many problems and slows things down. Physical documents are often heavy, can get damaged, or might be misplaced. Keeping track of them by writing, storing, and finding them by hand leads to mistakes and delays. This makes managing documents harder and less reliable.

The process of moving and approving these physical documents also takes a lot of time. Files have to go from one department to another, which is slow. People often waste time searching for missing papers or fixing mistakes, which reduces productivity and frustrates everyone involved.

Another issue is the lack of a system to track documents in real-time. Employees and students can’t easily find out if a document has been received, reviewed, or approved. This causes confusion and leads to frequent follow-ups, which slow things down even more.

Lastly, the staff managing these documents have to deal with repetitive tasks like logging, filing, and answering questions about the documents. This extra workload leaves them with less time to focus on more important tasks. As a result, work gets delayed, and mistakes are more likely to happen.

### 1.3 Main Objective

The main objective of this project is to design and develop a **Document Tracking System (DTS)** that facilitates the efficient management, real-time tracking, and secure handling of documents within an organization.

### 1.4 Specific Objectives

 **Analyze the Current System**: Review the existing document handling processes to identify challenges like delays, heavy paperwork reliance, and lack of transparency, and gather user feedback to understand their needs.

 **Design the New System**: Create a detailed plan for a digital document tracking system with features like real-time tracking, notifications, and secure access, ensuring an easy-to-use interface for all users.

 **Develop the System**: Build the digital document tracking system according to the design specifications, addressing the identified issues and incorporating user requirements.

 **Test and Implement**: Thoroughly test the system for usability, performance, and security before launching it to ensure smooth operation and reliability.

### 1.5 Problem justification.

The current document management system at Pwani University relies heavily on manual processes, which are inefficient and prone to errors. Physical documents are bulky, can be easily misplaced or damaged, and require significant time and effort to handle, store, and retrieve. This reliance on paperwork leads to delays in document movement, approval, and processing, affecting productivity for both employees and students.

Additionally, the absence of a real-time tracking system creates a lack of transparency, as users are unable to monitor the status or location of documents. This results in frequent follow-ups and miscommunication, further slowing down workflows. The repetitive and labor-intensive tasks associated with manual document management also strain employees, reducing their ability to focus on other critical responsibilities.

A digital document tracking system is essential to address these challenges, streamline processes, and enhance overall efficiency at the university.

### 1.6 Scope of the Project

The Document Tracking System (DTS) will be developed to serve a wide range of users involved in document management processes at Pwani University. Administrative staff, who are primarily responsible for creating, filing, and moving documents within departments, will rely on the system to streamline their workflows and ensure efficient handling of various document types such as reports, contracts, emails, and memos. Managers and decision-makers will utilize the DTS to review, approve, or escalate documents, enabling timely decision-making and improved coordination across departments. Additionally, other stakeholders, including departmental heads and external collaborators, will have controlled access to the system based on their specific roles. This role-based access will allow them to contribute to or review documents as needed, ensuring that all users can interact with the system securely and effectively to meet their responsibilities.

### 1.7 Significance of the Project

The development of a **Document Tracking System (DTS)** holds significant value for organizations aiming to enhance their document management processes. This project is particularly important because:

1. **Improved Efficiency and Workflow**
   * The DTS will streamline document handling by automating tracking, routing, and notification processes, thereby reducing delays and minimizing human error.
2. **Enhanced Accountability and Transparency**
   * By providing real-time tracking and detailed logs of document movement, the system ensures that every action taken on a document is recorded, fostering transparency and accountability among users.
3. **Secure Document Management**
   * The system incorporates robust security features, such as encryption and role-based access, to protect sensitive information from unauthorized access or breaches.
4. **Time and Cost Savings**
   * By digitizing and automating document workflows, the organization can save on costs associated with manual processes, such as paper, printing, and physical storage, while reducing the time spent searching for misplaced or inaccessible documents.
5. **Integration and Interoperability**
   * The DTS will integrate seamlessly with existing organizational tools and platforms, allowing for efficient workflows and reducing redundancies.
   * With an intuitive interface, the system ensures ease of adoption by users, reducing the learning curve and enabling employees to focus on core tasks rather than administrative hurdles.

### Literature Review

#### 2.1.1 Introduction

A Document Tracking System (DTS) is a software-based application designed to manage, monitor, and track the movement of documents within an organization. The system ensures accountability, security, and accessibility of documents, thus improving efficiency and minimizing the risks of document loss or mishandling. With the increasing reliance on digital technologies, modern document tracking systems have evolved to include features such as real-time tracking, user authentication, cloud storage integration, and automated notifications.

#### 2.1.2 Definition and Purpose

A Document Tracking System is defined as a tool that facilitates the electronic monitoring of documents throughout their lifecycle, from creation to storage and retrieval. The primary purpose of a DTS is to enhance document visibility, streamline workflows, and ensure compliance with organizational policies and regulatory requirements. By digitizing document handling processes, organizations can reduce paperwork, improve audit trails, and increase productivity.

The concept of document tracking dates back to the era of paper-based filing systems where physical records were stored in cabinets and tracked manually. As businesses grew, the inefficiencies and risks associated with manual processes became apparent. This led to the development of computerized systems in the 1980s and 1990s that utilized databases for storing and retrieving records.

Modern DTSs leverage advanced technologies such as cloud computing, artificial intelligence (AI), and the Internet of Things (IoT) to provide more robust and scalable solutions. Real-time tracking using RFID tags and barcode scanning has further enhanced the accuracy and speed of document management processes.

#### 2.1.4 Features and Functionalities

Modern Document Tracking Systems are equipped with various features, including:

1. **Document Indexing:** Allows categorization and tagging of documents for easy search and retrieval.
2. **Version Control:** Tracks changes made to documents and maintains multiple versions for auditing purposes.
3. **User Access Management:** Ensures only authorized personnel can access sensitive information.
4. **Audit Trails:** Maintains logs of all actions performed on a document for accountability and compliance.
5. **Real-Time Tracking:** Monitors the status and location of documents as they move through different departments.
6. **Notifications and Alerts:** Sends reminders for pending tasks or approvals.
7. **Integration with Other Systems:** Supports compatibility with email platforms, cloud storage, and enterprise resource planning (ERP) systems.

Document Tracking Systems are widely used across various industries. In the **government sector**, DTSs streamline workflows and ensure compliance with legal and regulatory frameworks. In **healthcare**, they help manage patient records, prescriptions, and billing information securely. **Financial institutions** use DTSs to monitor loan applications, contracts, and transaction records. Similarly, **educational institutions** leverage DTSs to track student files, transcripts, and examination results

Implementing a DTS offers numerous benefits such as efficiency by reducing the time spent spent on searching for documents. It ensures accuracy by minimizing error through automated tracking . it also provide security by preventing unauthorized access and ensures data protection. Transparency is also an important issue addressed by DTS and it ensures that provide visibility status of document and the movement. DTS lowers administration cost associated with the manual handling of the document .

The evolution of Document Tracking Systems has revolutionized document management, making it more efficient, secure, and transparent. While challenges remain, continuous advancements in technology are addressing these issues, paving the way for more innovative and reliable systems. Organizations that adopt DTSs can improve operational efficiency and maintain compliance, ultimately contributing to better service delivery and productivity.

#### 2.2 Theoretical Review

A document tracking system (DTS) is a critical tool designed to manage and monitor the movement of documents within an organization efficiently. The theoretical foundation of a DTS draws heavily from various frameworks, including information systems theory, workflow management theory, communication theory, real-time systems theory, human-computer interaction (HCI), and security and privacy models. Information systems theory emphasizes the integration of technology, processes, and people to achieve organizational goals, focusing on data management, automation, and feedback mechanisms. However, this theory often overlooks user-centric aspects that are crucial for system adoption and usability. Workflow management theory complements this by optimizing and coordinating tasks within processes, enabling systems to model document lifecycles, assign tasks, and monitor compliance. Despite its utility, traditional workflow management models often assume static processes, which can be limiting in dynamic and complex organizational contexts.

Communication theory, particularly Shannon and Weaver's Model, also underpins DTS development by addressing how information is transferred between senders and receivers. Encoding, noise reduction, and feedback loops are essential for ensuring that document tracking systems minimize errors and enhance clarity. Yet, communication theories typically focus on human interaction and do not fully address the integration of automated systems with human processes. Real-time systems theory highlights the importance of immediate responses in critical processes, such as tracking document status, integrating with organizational systems, and resolving bottlenecks swiftly. While valuable, ensuring scalability and performance in real-time scenarios presents significant challenges.

Human-computer interaction (HCI) theory offers insights into designing intuitive and accessible interfaces for DTS users, emphasizing usability, accessibility, and effective feedback. However, HCI theories often fail to consider organizational policies and security requirements, which are essential for document handling. Security and privacy models play a crucial role in ensuring that sensitive documents are managed securely through access controls, encryption, and authentication. These models also emphasize the importance of audit trails for accountability and compliance. Nevertheless, balancing robust security measures with user convenience remains a persistent challenge.

Several systems function similarly to a Document Tracking System (DTS) by managing, organizing, and tracking the flow of documents. Enterprise Content Management (ECM) platforms, such as Microsoft SharePoint and OpenText, facilitate the creation, editing, sharing, and tracking of documents throughout their lifecycle, with features like version control and automated workflows. Document Management Systems (DMS), including DocuWare, M-Files, and FileHold, also support document storage, retrieval, and audit trails while automating workflows to enhance efficiency. Customer Relationship Management (CRM) systems like Salesforce and HubSpot integrate document tracking for customer-related files, such as contracts and proposals, ensuring seamless accessibility and organization. Similarly, case management systems such as ServiceNow and Zendesk are used to monitor and track support tickets or case files, akin to the functionality of a DTS.

In healthcare, Electronic Health Record (EHR) systems like Epic and Cerner track sensitive patient records and medical documentation, ensuring secure access for authorized personnel while adhering to privacy regulations like HIPAA. Logistics and supply chain systems, such as SAP Logistics and Oracle Transportation Management, track shipping-related documents like invoices and customs forms, ensuring availability at the appropriate stages in the supply chain. Legal case management software, including Clio and MyCase, helps manage legal documents such as contracts and briefs, offering tracking and versioning capabilities. Project management tools like Asana, Trello, and Jira also include document tracking features, allowing teams to access the latest updates and versions for seamless collaboration.

Additionally, Learning Management Systems (LMS), such as Moodle and Blackboard, track educational documents, including assignments and course materials, ensuring proper submission, review, and archival. These systems demonstrate the versatility of DTS-like functionalities across industries, highlighting their importance in ensuring efficient document flow, security, and accessibility in various organizational contexts.

Several document tracking systems exist across various industries, each offering unique features tailored to specific needs. For instance, **DocuSign** focuses on electronic signatures and tracks the status of agreements, while **Adobe Document Cloud** offers document editing, tracking, and e-signature capabilities. Cloud-based platforms like **Zoho WorkDrive**, **Box**, and **Dropbox Business** provide document sharing and tracking, complete with version histories and activity logs. Collaborative tools like **Google Workspace** allow users to track file changes and access history in real-time, enhancing team productivity. Enterprise solutions, such as **SAP Document Management** and **OnBase by Hyland**, integrate document tracking with broader workflows and analytics to streamline operations.

Legal and compliance-driven systems, such as **NetDocuments**, **FileTrail**, and **Worldox**, emphasize document accessibility, security, and audit trails to meet strict industry standards. Similarly, systems like **Alfresco** and **Laserfiche** automate document tracking within workflows, providing real-time updates and compliance tools. **ShareFile by Citrix** ensures secure document sharing and tracking, while platforms like **eFileCabinet** and **Alfresco** combine document storage, tracking, and version control for efficient management. Specialized tools like **OnBase** focus on enterprise content management, offering advanced reporting and lifecycle tracking features.

These systems demonstrate the versatility of document tracking solutions across domains such as legal, finance, healthcare, and general enterprise operations. Their capabilities, including real-time tracking, workflow automation, and secure access management, make them indispensable for organizations aiming to enhance efficiency and compliance

CHAPTER 3

RESEARCH METHODOLOGY

3.1.1. System development methodology

System development methodology refers to the structured approach used in the creation of software systems, guiding the processes from initial planning through to deployment and maintenance. There are several methodologies available, each suited to different types of projects, team structures, and organizational needs. These methodologies provide frameworks for organizing tasks, managing resources, and ensuring that software is developed in an efficient, predictable, and quality-assured manner.

One of the most widely known methodologies is the **Waterfall Model**, which follows a linear and sequential approach. In this model, each phase of the development process—such as requirements gathering, system design, implementation, testing, deployment, and maintenance—must be completed before moving to the next phase. While it is easy to understand and implement, it often lacks flexibility and is not ideal for projects where requirements evolve over time.

In contrast, **Agile Methodology** emphasizes flexibility, collaboration, and customer feedback. Agile is iterative and incremental, with small functional releases being developed and deployed throughout the project. This allows for continuous improvements and quick adjustments based on stakeholder input. Popular Agile frameworks include **Scrum**, which divides work into short sprints and relies on daily stand-up meetings, and **Kanban**, which visualizes workflows to improve efficiency and productivity.

The **Spiral Model** is another approach that combines elements of both the Waterfall and Agile models. It involves iterative cycles (or spirals) that focus on risk analysis and the development of prototypes, allowing teams to refine the system progressively. This model is well-suited for large, complex, and high-risk projects, but it can be time-consuming and resource-intensive.

The **V-Model**, also known as the **Validation and Verification Model**, is an extension of the Waterfall Model. It emphasizes the verification and validation of each development stage. The development phases are closely associated with corresponding testing phases, making it useful for projects that require high reliability, such as safety-critical systems.

The **Rapid Application Development (RAD)** model focuses on quick prototyping and fast delivery of functional systems. It is ideal for projects with tight timelines, where the goal is to quickly deliver a working system that can be improved and adjusted over time. RAD relies heavily on user feedback and collaboration between developers and end-users throughout the process.

**DevOps** is a methodology that integrates development and operations teams to ensure continuous integration and continuous delivery (CI/CD). The focus is on automating repetitive tasks, speeding up the development lifecycle, and ensuring that software can be rapidly deployed and maintained in production environments. DevOps encourages collaboration, consistency, and constant improvements to systems after deployment.

Finally, **Prototyping** involves developing a prototype—a preliminary version of the system—to gather user feedback and refine requirements. This methodology is beneficial when the final system requirements are unclear or are expected to evolve significantly. Users interact with the prototype, helping developers fine-tune the system before full development begins.

3.1.1 . WATERFALL METHODOLOGY.

For the development of the Document Tracking System (DTS), the **Waterfall methodology** has been chosen. This methodology follows a sequential, structured approach to system development, ensuring that each phase is completed before proceeding to the next. The Waterfall model is ideal for this project, as it allows for thorough documentation, clear project milestones, and predictable outcomes.

#### 3.1.1.1 **Requirements Gathering and Analysis**

In this first phase, all the requirements for the Document Tracking System will be gathered. This includes understanding the key functionalities such as document upload, tracking, access control, and real-time updates. The requirements will be documented and validated with stakeholders to ensure that the system will meet the needs of end users. Additionally, database requirements, including tables, relationships, and necessary queries, will be defined using MySQL.

#### 3.1.1.2 **System Design**

Once the requirements are fully understood, the design phase will begin. The system's overall architecture, user interface, and database structure will be designed. For the front-end, HTML will be used to create a simple and user-friendly interface, ensuring ease of navigation and document interaction. The MySQL database design will include defining tables, setting up relationships between data entities (such as documents, users, and document status), and creating efficient queries to retrieve and update data. Security features like user authentication and encryption will also be designed at this stage to ensure data integrity and privacy.

#### 3.1.1.3 **Implementation**

In the implementation phase, the development of the Document Tracking System will begin. The HTML front-end will be coded, focusing on providing a clean, intuitive user interface for document management. At the same time, the MySQL database will be set up and integrated with the front-end. The system will be built to enable efficient document tracking, including the creation, storage, retrieval, and updating of document records. The system will also be designed to handle multiple users with different levels of access rights, ensuring secure interactions.

#### 3.1.1.4 **Integration and Testing**

Once the coding is complete, the integration phase will begin. The HTML front-end will be integrated with the MySQL database to ensure smooth data flow and real-time updates for document tracking. Testing will be conducted to identify and resolve any issues related to functionality, database connectivity, security, and user interface. Both functional testing (to ensure that all features work as intended) and non-functional testing (such as performance and security testing) will be performed. User Acceptance Testing (UAT) will also be carried out to ensure that the system meets the needs and expectations of stakeholders.

#### 3.1.1.5 **Deployment**

Following successful testing, the Document Tracking System will be deployed in a live environment. During deployment, the system will be installed and configured on production servers, and all data will be migrated to the live database. The system will be made available for use by end-users, with appropriate documentation and training provided to ensure smooth adoption.

#### 3.1.1.6 **Maintenance**

After deployment, the system will enter the maintenance phase. This phase includes providing ongoing support, fixing any post-launch issues, and making updates or improvements based on user feedback. The system will be monitored for performance, and necessary patches will be applied to ensure its continued functionality and security

3.2 Fact finding

**fact finding** is the process of gathering, analyzing, and documenting information to gain a clear understanding of the existing situation, needs, and requirements of a project.

In system development, fact finding helps define the scope of the project, uncover the problems or inefficiencies with current systems, and determine the needs and expectations of stakeholders. This phase is crucial for ensuring that the solution being developed will address the right issues and meet the users' requirements.

3.2.1 Research design

The research design for the development of the Document Tracking System (DTS) is structured to ensure that all aspects of the system’s functionality, usability, and effectiveness are thoroughly investigated. The primary goal of this research is to gather insights that will inform the design, development, and implementation of the system, ensuring it meets the needs of its users and stakeholders.

3.2.1.1 Qualitative

The **qualitative approach** in research is about understanding people’s experiences, opinions, and behaviors in a detailed and descriptive way. Unlike methods that focus on numbers and statistics, qualitative research looks at the "why" and "how" behind actions, helping to uncover deeper insights into a problem. In the context of developing a Document Tracking System (DTS), this approach helps to explore the needs and challenges of the people who will use the system.

The process typically starts with gathering information through methods like **interviews**, where you ask people open-ended questions to learn about their experiences with current document management systems and what they would like in the new system. **Focus groups** may also be used, where a small group of people discusses their ideas and experiences, providing different viewpoints on what the system should do. **Observations** are another useful method, where researchers watch how documents are currently managed to identify any inefficiencies or issues that need addressing. Lastly, **document reviews** help understand the existing system’s structure and how documents are processed.

The main advantage of using a qualitative approach is that it gives rich, detailed data that shows not just what is happening, but why it’s happening. This allows designers to create a system that truly fits users' needs, offering more than just basic functionality. It also helps identify features that may not be obvious but are essential for improving the document tracking process. However, while this approach provides valuable insights, it can be time-consuming and the results may not apply to every user since it focuses on specific groups or situations.

3.2.1.2 Quantitative approach

The **quantitative approach** in research focuses on collecting numerical data and analyzing it to identify patterns, trends, and relationships. Unlike qualitative research, which is more about understanding people's experiences and opinions, the quantitative approach aims to measure and quantify aspects of a problem. In the case of developing a Document Tracking System (DTS), the quantitative approach helps gather measurable data that can be used to make decisions and ensure that the system meets certain performance standards.

To gather quantitative data, researchers might use tools like **surveys** or **questionnaires** that ask users to rate their satisfaction with current document management systems, or to identify the most important features they want in the new system. For example, a survey could ask users to rate on a scale of 1 to 5 how easy it is to track documents with the current system or how often they experience issues like lost or delayed documents. This type of data helps researchers understand the scope of the problem and prioritize which features the new system should have.

The main advantage of the quantitative approach is that it provides clear, measurable data that can be used to compare different options or solutions. For example, researchers could use numerical data to determine the most common issues users face with existing systems or to evaluate how much time is saved with automated tracking versus manual processes. This allows for more objective decision-making and helps set benchmarks for the new system.

However, the quantitative approach can sometimes miss the **"why"** behind the data, which is something qualitative research can capture. For example, a survey might show that 80% of users are frustrated with document tracking, but it may not explain why they feel that way or what specific issues they face

3.2.2 Sample and Sampling Technology

Sampling.

**Sampling** is the process of selecting a smaller group or subset (called a **sample**) from a larger population to gather data or conduct research. This smaller group is chosen in a way that it represents the larger population, allowing researchers to draw conclusions or make generalizations about the entire population without needing to study everyone.

Sampling is used because studying an entire population can be time-consuming, expensive, and impractical. Instead, by carefully selecting a sample, researchers can save time and resources while still gaining valuable insights that can be applied to the whole population.

In order to capture diverse perspectives and ensure comprehensive feedback on the Document Tracking System, two primary sampling techniques—**probability sampling** and **non-probability sampling**—will be utilized. Each method will be applied strategically to address different research objectives, ensuring that both broad and in-depth insights are gathered.

### ****3.2.2.1 Probability Sampling****

**Probability sampling** will be used to ensure that the sample accurately represents the entire population of users of the Document Tracking System. This approach is essential for making generalizations about the user base and ensuring the research findings are applicable to all users.

#### **3.2.2.1.1 Simple Random Sampling**

This method will be employed to select a random group of users from the entire population. Each user will have an equal chance of being selected, ensuring that the sample is unbiased. This sampling method is ideal for obtaining a general overview of the DTS's functionality across various departments or job roles.

#### **3.2.2.1.2 Stratified Sampling**

Given the potential diversity of users within the organization (e.g., users from different departments, varying levels of technical expertise, and varying levels of DTS usage), **stratified sampling** will be employed. The population will be divided into different strata, based on characteristics such as department, user experience, and frequency of DTS usage. Random samples will then be selected from each stratum to ensure that all subgroups are adequately represented in the research.

#### **3.2.2.1.3 Systematic Sampling**

For larger populations or when time constraints exist, **systematic sampling** will be applied. This involves selecting every nth user from a pre-existing list of users who interact with the Document Tracking System. This method is practical for efficiently collecting data when there is a large user base.

### ****3.2.2.2 Non-Probability Sampling****

While **probability sampling** ensures that the sample is representative, **non-probability sampling** methods will be used to gain more detailed, targeted insights into specific user groups, particularly those who might be more experienced with the DTS or who have encountered issues that need addressing.

#### **3.2.2.2.1 Convenience Sampling**

For the initial stages of the research, **convenience sampling** will be used to gather quick feedback from users who are readily accessible, such as colleagues or staff members who frequently use the DTS. This method will be useful for collecting preliminary data to guide the development of survey questionnaires or interviews for larger samples.

#### **3.2.2.2.2 Purposive Sampling**

**Purposive sampling** will be employed to select participants who have specific knowledge or expertise regarding the Document Tracking System. This could include system administrators, project managers, or power users who have extensive experience with document management processes. These individuals can provide valuable insights into the system’s effectiveness, challenges, and potential improvements.

#### **3.2.2.2.3 Snowball Sampling**

In cases where access to certain users is difficult, such as specific departments or remote locations, **snowball sampling** may be utilized. In this method, initial participants will refer other potential participants. This approach is particularly helpful when researching specialized or hidden user groups that are not easily reachable through traditional sampling methods.

#### **3.2.2.2.4 Quota Sampling**

To ensure that specific subgroups of users (e.g., senior staff, junior staff, technical staff, and non-technical staff) are adequately represented, **quota sampling** will be used. This method will ensure that the research captures the diversity of user experiences with the DTS, allowing for a comprehensive understanding of its strengths and weaknesses across different roles.

### ****3.2.2.3 Justification for Sampling Methods****

The combination of **probability** and **non-probability sampling** methods is necessary to balance representativeness and depth. **Probability sampling** will provide a broad, generalizable view of how the Document Tracking System is perceived and used across the organization, while **non-probability sampling** will allow for in-depth analysis of specific user groups or issues that may not be captured through random sampling alone.

3.2.3 Data Collection Tools

**Data collection tools** are instruments or methods used to gather, measure, and record data for research or analysis purposes. These tools help researchers collect accurate, consistent, and reliable information from various sources, such as individuals, groups, systems, or documents. The choice of data collection tool depends on the type of data needed, the research objectives, and the research methodology.

**3.2.3.1 Primary Data Collection Tools**

**Primary data** refers to original data collected directly from individuals or sources that have direct involvement with the Document Tracking System. These data collection tools will provide firsthand insights into the experiences, opinions, and behaviors of users interacting with the DTS. The primary tools used in this research will include:

#### **3.2.3.1.1 Surveys/Questionnaires**

Surveys and questionnaires will be distributed to users of the Document Tracking System to gather structured responses related to their experiences with the system. The surveys will include a combination of closed and open-ended questions designed to collect both quantitative and qualitative data. Closed-ended questions will use Likert scales or multiple-choice formats to measure user satisfaction, system usability, and feature effectiveness, while open-ended questions will allow users to provide detailed feedback on their experience, challenges, and suggestions for improvement.

#### **3.2.3.1.2 Interviews**

Interviews will be conducted with selected users, including system administrators, department heads, and frequent DTS users, to gather in-depth qualitative data. The semi-structured format of the interview will allow for flexibility, ensuring that interviewees can express their views in detail. These interviews will help explore areas such as user satisfaction, system shortcomings, and any difficulties users encounter while navigating the DTS.

#### **3.2.3.1.3 Observations**

Observation will be another primary data collection method used to capture real-time interactions with the Document Tracking System. Researchers will observe how users interact with the system in their natural work environment, noting user behavior, system usage patterns, and any challenges faced during interactions. This method will provide contextual insights into the user experience that may not be captured through surveys or interviews.

#### **3.2.3.1.4 Focus Groups**

Focus groups will be organized with a small group of participants representing different user roles within the organization. These group discussions will focus on exploring collective opinions and feedback regarding the Document Tracking System. The discussions will center around specific topics such as system ease of use, functionality, and desired features. Focus groups provide a platform for participants to share their perspectives, which can uncover insights that might not arise from individual interviews.

**3.2.3.2 Secondary Data Collection Tools**

**Secondary data** refers to data that has already been collected, analyzed, and published by other sources, such as records, reports, or system logs. Secondary data collection tools will help provide background information, context, and additional insights into the Document Tracking System. These tools include:

#### **3.2.3.2.1 System Logs and Analytics**

The system logs and analytics from the Document Tracking System will provide valuable secondary data. This data will include information on system usage, such as the frequency of user interactions, common actions performed, system performance metrics (e.g., response times, error rates), and the flow of documents through the tracking system. By analyzing these logs, researchers will be able to identify patterns, such as which features are most used, and spot any potential issues related to system performance.

#### **3.2.3.2.2 Document Review**

Existing documentation, including user manuals, training guides, technical specifications, and previous feedback reports, will be reviewed to provide secondary data. This document review will help understand the design of the Document Tracking System, its intended functionality, and any previously identified challenges or areas for improvement. It will also help track how the system has evolved over time and whether previous issues have been addressed.

#### **3.2.3.2.3 Reports and Feedback**

Any formal reports, feedback forms, or evaluations previously generated about the Document Tracking System will be reviewed to provide secondary data. These reports may contain insights into system usage, user satisfaction, and any issues that have been raised in the past. They will complement the primary data gathered through surveys and interviews and provide a historical perspective on the system’s performance and user feedback.

### ****3.2.3.3 Justification for the Use of Primary and Secondary Data Collection Tools****

The combination of **primary** and **secondary data collection tools** is crucial for obtaining a holistic view of the Document Tracking System’s effectiveness. Primary data tools such as surveys, interviews, observations, and focus groups will provide firsthand insights into user experiences, satisfaction levels, and areas needing improvement. These tools are essential for gathering current, direct feedback from users who interact with the system daily.

**Data Analysis for Document Tracking System (DTS) Research Proposal**

**Introduction**

Data analysis is a crucial aspect of the research process, as it converts raw data into useful information. This process helps assess the functionality, usability, and performance of the Document Tracking System (DTS). The data gathered from both primary and secondary sources will be analyzed to identify trends, patterns, and insights. This section outlines the data to be collected and the analysis methods that will be employed.

**3.2.4 Data Collection and Analysis**

**3.2.4.1 Quantitative Data Collection and Analysis**

**3.2.4.1.1 Surveys/Questionnaires**

**Data Collected:**

* The surveys will mainly collect quantitative data, including user satisfaction ratings, usability scores, and feature effectiveness.
* The data will come from Likert scale questions (e.g., "Rate the system's ease of use from 1 to 5") and multiple-choice questions designed to capture users’ experiences and satisfaction with the DTS.

**Analysis Method:**

* **Descriptive Statistics**: Used to summarize data, such as calculating averages, medians, and modes to assess the general satisfaction with the system.
* **Frequency Distribution**: To examine how often specific responses occur, such as the most common satisfaction level.
* **Cross-tabulation**: This will compare responses from different user groups (e.g., administrators vs. regular users) to identify any differences in their perceptions of the system.
* **Graphs and Charts**: Bar graphs, pie charts, and histograms will be used to visually represent the data for easier interpretation.

**3.2.4.1.2 System Logs and Analytics**

**Data Collected:**

* System logs will capture quantitative data, such as usage frequency, document processing times, error rates, and user interactions with the system.

**Analysis Method:**

* **Trend Analysis**: Identify trends over time, such as performance changes or frequent issues.
* **Usage Patterns**: Assess which features are most commonly used and how frequently.
* **Statistical Analysis**: Use statistical methods to analyze system performance data and identify areas of improvement.

**3.2.4.2 Qualitative Data Collection and Analysis**

**3.2.4.2.1 Interviews**

**Data Collected:**

* Interviews will provide qualitative data, including users' opinions on the DTS's functionality, ease of use, and their overall experience.

**Analysis Method:**

* **Thematic Analysis**: Transcripts from interviews will be analyzed for common themes, such as recurring issues or frequent suggestions for system improvement.
* **Coding**: Responses will be categorized based on different topics or concerns raised by users.
* **Content Analysis**: Analyze the narrative content to identify key insights into user satisfaction and challenges.

**3.2.4.2.2 Focus Groups**

**Data Collected:**

* Focus group discussions will gather group opinions on the usability and functionality of the DTS, along with any recommendations for enhancements.

**Analysis Method:**

* **Thematic Analysis**: Like interviews, the discussions will be transcribed and analyzed to identify emerging patterns or recurring topics.
* **Narrative Analysis**: The stories shared in focus groups will be interpreted to identify collective views on system strengths and weaknesses.

**3.2.4.2.3 Observations**

**Data Collected:**

* Observations will capture data on how users interact with the DTS, including behaviors, system navigation, and any issues faced during system use.

**Analysis Method:**

* **Behavioral Analysis**: Analyzing user behavior to identify common patterns and difficulties encountered during system interactions.
* **Qualitative Interpretation**: Interpreting observation notes to gain a deeper understanding of how users navigate the system and the challenges they may face.

**3.2.4.3 Data Triangulation**

To enhance the reliability of the findings, **data triangulation** will be used. This involves cross-checking the data obtained from different sources, such as comparing responses from surveys with interview findings and system logs. Data triangulation ensures a more robust and accurate analysis by identifying patterns that emerge across multiple data sets.

For example, if users report high satisfaction through surveys but system logs indicate frequent errors, data triangulation will allow for a deeper investigation into the discrepancy and help uncover underlying issues with the DTS.

**3.2.4.4 Data Analysis Tools**

To perform the data analysis, the following tools will be used:

* **Statistical Software (e.g., SPSS, Excel)**: For analyzing quantitative data, including descriptive statistics, trend analysis, and cross-tabulation.
* **Qualitative Analysis Software (e.g., NVivo, Atlas.ti)**: For coding and thematic analysis of interview and focus group data.
* **Manual Coding**: For analyzing open-ended responses and observation notes to identify key themes and patterns.

3.3 Resources.

**3.3 Resources in Document Tracking System (DTS) Research Proposal**

**Introduction**

The successful implementation and evaluation of the Document Tracking System (DTS) depend on the availability and effective utilization of various resources. These resources can be categorized into **human resources**, **technical resources**, and **financial resources**. The resources must be carefully planned and managed to ensure that the research process runs smoothly and that the DTS operates efficiently during the assessment phase. This section outlines the different resources required for the research and implementation of the Document Tracking System.

**3.3.1 Human Resources**

Human resources are a critical factor in the development, testing, and evaluation of the Document Tracking System. The following roles will be involved in the research process:

**3.3.1.1 Research Team**

The research team will be responsible for collecting data, analyzing the findings, and writing the final report. This team will consist of:

* **Lead Researcher**: Responsible for overseeing the entire research process, ensuring that objectives are met, and managing the project timeline.
* **Data Analysts**: Individuals with expertise in statistical analysis and qualitative research who will analyze the collected data, identify patterns, and interpret the results.
* **Support Staff**: Administrative and technical staff who will assist in scheduling interviews, managing data collection logistics, and coordinating communication with participants.

**3.3.1.2 System Development Team**

The system development team will be responsible for designing, implementing, and maintaining the Document Tracking System. This team will include:

* **System Architects**: Responsible for designing the overall architecture of the DTS to ensure it meets the needs of the organization.
* **Software Developers**: Responsible for the actual coding and development of the system, ensuring that all features are functional.
* **Quality Assurance Engineers**: Responsible for testing the system to identify bugs and ensure that it performs as intended before it is launched.
* **IT Support**: Providing technical assistance during system setup, troubleshooting, and ensuring that the system runs smoothly throughout the research process.

**3.3.1.3 Participants**

The participants in the research study, including users of the Document Tracking System, are vital for providing firsthand feedback. These will include:

* **End Users**: Regular users of the system who interact with the DTS on a daily basis. They will provide valuable insights into the usability and effectiveness of the system.
* **Administrators**: Personnel who manage the DTS, ensuring that documents are tracked and processed correctly.
* **Stakeholders**: Individuals involved in the decision-making process or who benefit from the system’s outputs, including department heads and managers.

**3.3.2 Technical Resources**

The technical resources are essential for the development, deployment, and maintenance of the Document Tracking System. These resources will ensure that the system is functional, secure, and accessible to all users. The following technical resources will be required:

**3.3.2.1 Hardware Resources**

* **Servers**: A robust server infrastructure will be required to host the Document Tracking System, ensuring that it is accessible to users at all times. This could include cloud-based servers or on-premise servers depending on the deployment choice.
* **Workstations and Devices**: End users will need desktops, laptops, or mobile devices to interact with the DTS. These devices should be compatible with the system and able to run the necessary software for interacting with the system.
* **Backup Systems**: Backup servers or cloud storage will be essential to ensure that data is securely stored and can be recovered in the event of a system failure.

**3.3.2.2 Software Resources**

* **Operating System**: A stable operating system (e.g., Windows, Linux) will be required to run the Document Tracking System on both the server and client-side.
* **Development Tools**: Software development tools (e.g., Integrated Development Environments (IDEs) like Visual Studio Code or Eclipse) will be needed for coding and testing the system.
* **Database Management System**: A database such as MySQL or SQL Server will be essential for managing and storing the large volume of documents and user data in the system.
* **Security Software**: Firewalls, antivirus software, and encryption tools will be required to ensure the security and integrity of data in the DTS.
* **Data Analysis Software**: Tools like SPSS, Excel, or specialized software for qualitative data analysis (e.g., NVivo) will be needed to analyze the research data collected.

**3.3.2.3 Network Infrastructure**

* **Internet Connectivity**: A reliable and fast internet connection will be essential for accessing the DTS, especially if the system is cloud-based.
* **Local Area Network (LAN)**: A stable local network will be necessary if the system is hosted on-premise, ensuring users can access the system from different parts of the organization.

**3.3.3 Financial Resources**

Adequate funding is essential for the successful development, deployment, and evaluation of the Document Tracking System. The financial resources will be used for the following:

**3.3.3.1 System Development Costs**

* **Software Licenses**: If any proprietary software is used in the development process (e.g., development tools or database management software), the necessary licenses will need to be purchased.
* **Salaries**: The salaries for the development team, research team, and any other involved personnel will be a major portion of the project budget.

**3.3.3.2 Research and Evaluation Costs**

* **Data Collection Tools**: Budget will be allocated for the development and distribution of surveys, questionnaires, and any other data collection tools used during the research phase.
* **Participant Incentives**: If necessary, participants in the research study may be offered incentives such as gift cards or allowances for their time and feedback.
* **Travel and Logistics**: Funds may be required to cover the costs of transportation for interviews or focus groups and any other logistical expenses incurred during data collection.

**3.3.3.3 System Maintenance and Support Costs**

* **Ongoing Maintenance**: After the system has been developed and deployed, there will be ongoing costs associated with maintaining the DTS, such as server hosting fees and software updates.
* **Technical Support**: A budget will be required for technical support to handle any issues that arise with the DTS during and after the evaluation period

### 3.4 Budget

A well-structured budget is critical for effectively managing the costs associated with developing and implementing the document tracking system.

#### **Software Costs:**

* **Development Tools:** Free or Student Discounts available (e.g., Visual Studio Code is free)
* **Database Management Systems:** Free or Student Discounts available (e.g., MySQL is free)
* **Testing Tools:** Free or Open-source tools (e.g., Selenium)

#### **Human Resources Costs:**

* **Self and Peer Collaboration:** Utilize classmates or team members from university.
* **Mentorship or Advisory Support:** Seek help from professors or university staff (usually free)

**3.5 Project Schedule for Document Tracking System (DTS) Research Proposal**

**Introduction**

The project schedule is a key aspect of ensuring that the Document Tracking System (DTS) research project is completed within the allocated time frame. This section outlines the timeline for each phase of the project, from the planning phase to the final deployment and evaluation. The schedule includes the specific tasks to be completed in each phase, the estimated duration for each task, and the milestones that will mark key achievements throughout the project. The overall goal is to deliver a functional and well-researched Document Tracking System on time and within budget.

### ****3.5.1 Project Phases and Timeline****

The project will be organized into distinct phases, with each phase having its own objectives and tasks. The estimated total duration of the project is **20 weeks**.

1. **Phase 1: Project Planning and Requirement Gathering**
   * **Duration**: 2 Weeks
   * **Tasks**:
     + Define the project scope, goals, and objectives.
     + Identify key stakeholders and gather their requirements.
     + Develop a comprehensive project plan and establish the research methodology.
     + Finalize the system specifications.
2. **Phase 2: System Design and Development**
   * **Duration**: 6 Weeks
   * **Tasks**:
     + Design the architecture of the Document Tracking System (DTS).
     + Develop the system’s user interface (UI) and backend functionalities.
     + Set up and configure the database (e.g., MySQL).
     + Implement key system features such as document upload, tracking, and user management.
     + Conduct initial system testing to verify core features.
3. **Phase 3: Data Collection**
   * **Duration**: 4 Weeks
   * **Tasks**:
     + Develop surveys and questionnaires for collecting feedback from users.
     + Conduct interviews and focus groups with stakeholders.
     + Collect user feedback on the system's usability and performance.
     + Analyze early feedback to inform improvements to the system.
4. **Phase 4: System Testing and Quality Assurance**
   * **Duration**: 3 Weeks
   * **Tasks**:
     + Test the Document Tracking System for bugs and performance issues.
     + Conduct user acceptance testing (UAT) to ensure the system meets the needs of stakeholders.
     + Resolve any bugs or issues identified during testing.
     + Ensure that the system is optimized and meets all performance benchmarks.
5. **Phase 5: Data Analysis**
   * **Duration**: 3 Weeks
   * **Tasks**:
     + Analyze quantitative and qualitative data collected during the research phase.
     + Perform statistical analysis and generate insights from survey data.
     + Conduct thematic analysis of interview and focus group data.
     + Summarize key findings and prepare recommendations for system improvement.
6. **Phase 6: Report Writing and Presentation**
   * **Duration**: 2 Weeks
   * **Tasks**:
     + Write the final research report, including the methodology, data analysis, and conclusions.
     + Prepare visual aids (charts, graphs) to present data clearly.
     + Draft actionable recommendations for the future development of the DTS.
     + Prepare for the final presentation of the project findings.
7. **Phase 7: System Deployment and Evaluation**
   * **Duration**: 2 Weeks
   * **Tasks**:
     + Deploy the Document Tracking System in the organization.
     + Monitor system usage and collect feedback from users post-deployment.
     + Evaluate the system’s effectiveness based on real-world use and make necessary adjustments.

3.6 References

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