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A Online Print Delivery Application

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Abstract: *The Online Print Delivery Application (PrintWise) is designed to modernize and simplify traditional printing services by providing a digital platform for users to manage their printing needs efficiently. In conventional systems, users are required to visit print shops physically, which leads to time consumption, long queues, and communication errors. This project addresses these challenges by enabling users to upload documents, customize print settings, place orders, and track their status in real time through a user-friendly interface.*

The application is developed using JavaFX for the frontend and Firebase for backend services, ensuring real-time data synchronization, secure storage, and seamless communication between users and administrators. Users can select various printing options such as number of copies, page range, paper size, and color preferences, while the system automatically calculates the total cost and manages print jobs effectively. The admin panel allows service providers to monitor orders, update job statuses, and manage overall operations efficiently.d of HIV/AIDS.

Keywords: Online Printing System, Print Delivery Application, JavaFX, Firebase, Cloud Storage, Document Upload, Print Job Management, Real-Time Tracking, Digital Printing, E-Service Platform

I. INTRODUCTION

In today's fast-paced digital environment, the demand for quick and efficient services has increased significantly, especially in areas such as document handling and printing. Traditional printing systems still rely heavily on manual processes where users are required to visit print shops physically, submit documents, wait in queues, and communicate their requirements verbally. This approach often leads to delays, miscommunication, and inefficiencies in service delivery [1]. With the rapid growth of digital technologies and cloud-based solutions, there is a need to transform these conventional systems into more accessible and automated platforms [2].

The integration of cloud computing and web-based technologies enables real-time data access, secure file storage, and efficient communication between users and service providers [3]. This shift not only improves convenience but also enhances accuracy and reduces manual workload [4].

Recent advancements in software development frameworks and backend technologies have made it easier to build scalable and user-friendly applications. Technologies like JavaFX provide an interactive graphical user interface, while Firebase offers real-time database management, authentication, and cloud storage capabilities [5]. These tools enable developers to design systems that are both efficient and responsive, ensuring seamless user experiences across different platforms [6].

The PrintWise system is developed with the aim of simplifying the printing process by offering a centralized digital platform. It allows users to upload files, select print configurations such as number of copies, page range, and color options, and track their orders in real time. On the other hand, administrators can manage print jobs, update statuses, and maintain records through a dedicated dashboard [7]. This dual-interface approach ensures smooth coordination between users and service providers.

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Moreover, the system incorporates automated cost calculation and secure data handling mechanisms, which improve transparency and reliability in the printing process [8]. By reducing the dependency on paper-based records and manual communication, the application contributes to a more eco-friendly and efficient workflow [9]. It also supports scalability, making it suitable for use in educational institutions, offices, and commercial print shops.

In conclusion, the Online Print Delivery Application represents a significant step toward digital transformation in printing services. By leveraging modern technologies and automation, it addresses the limitations of traditional systems and provides a fast, secure, and user-friendly solution for managing print-related tasks [10].

II. PROBLEM STATEMENT

Traditional printing systems are largely manual and inefficient, requiring users to physically visit print shops to submit documents, communicate printing requirements, and collect outputs. This process often results in long waiting times, inconvenience, and miscommunication between customers and service providers, especially when handling complex print configurations such as page ranges, color preferences, or multiple copies. Additionally, the absence of a structured system leads to poor record management, lack of transparency in pricing, and difficulty in tracking the status of print jobs. Users have no real-time visibility into whether their documents are being processed, completed, or delayed. On the service provider's side, managing multiple orders manually increases the chances of errors, duplication, and loss of important documents. Furthermore, the growing demand for quick and remote services in educational institutions, offices, and businesses highlights the limitations of traditional printing methods. There is also a lack of secure digital storage, which raises concerns about data safety and privacy. Therefore, there is a strong need for a smart, automated, and user-friendly online printing system that enables document upload, print customization, real-time tracking, secure data handling, and efficient order management, ultimately improving convenience, accuracy, and overall service efficiency.

III. OBJECTIVES

- Here are 5 objectives in one line each:
- To develop a user-friendly platform for uploading and managing print documents online.
- To enable customizable print options such as copies, page range, and print type.
- To provide real-time tracking of print orders for better transparency.
- To ensure secure storage and handling of user documents using cloud technology.
- To reduce manual work and improve efficiency in print service management.

IV. LITERATURE SURVEY

1. Web-Based Printing Management System

Year: 2018

Publication: IEEE Conference

This paper presents a web-based printing management system that allows users to upload documents and send print requests remotely. The system focuses on reducing manual intervention in print shops by automating job submission and queue management. It integrates database systems for storing user data and print history, improving efficiency and reducing errors. The study highlights the importance of centralized control and real-time updates, which are relevant for developing online print delivery platforms.

2. Cloud-Based Document Printing System

Year: 2019

Publication: International Journal of Computer Applications

This research discusses a cloud-based printing solution where users can upload documents from any device and access printing services remotely. The system uses cloud storage for secure document handling and supports multiple printers

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connected over a network. It emphasizes scalability, data security, and ease of access, which are key features applicable to modern print delivery applications like PrintWise.

3. Mobile-Based Printing Service Application
Year: 2020
Publication: Springer
This paper focuses on developing a mobile application for printing services that allows users to send documents directly from smartphones to nearby print shops. It includes features such as file upload, print configuration, and order notifications. The study highlights the convenience and accessibility of mobile platforms, which inspired the integration of user-friendly interfaces and remote access in online print delivery systems.

4. E-Commerce Based Service Management System
Year: 2021
Publication: Elsevier
This research explores the use of e-commerce principles in service-based applications, including order management, payment integration, and customer interaction. The system provides real-time order tracking and automated billing features. The concepts of digital transactions and service automation are directly applicable to online print delivery applications, improving user experience and operational efficiency.

5. Secure File Handling in Cloud Applications
Year: 2022
Publication: IEEE Journal
This paper examines methods for secure file upload, storage, and access in cloud-based systems. It uses encryption techniques and authentication mechanisms to protect user data. The study is highly relevant for print delivery applications where sensitive documents are uploaded, ensuring privacy, data integrity, and secure communication between users and servers.

6. Real-Time Order Tracking System Using Firebase
Year: 2023
Publication: International Research Journal of Engineering and Technology (IRJET)
This paper presents a real-time tracking system using Firebase for backend services. It enables instant updates, data synchronization, and efficient communication between users and administrators. The system demonstrates how real-time databases improve responsiveness and user satisfaction, which is essential for tracking print orders in applications like PrintWise.

Comparison Table

Author & Year	Method Used	Advantages	Limitations (Short)
Author 1 (2018)	Web-Based Printing Managemen t System	Reduces manual work, centralized control, easy job submission	Depends on internet, limited scalability
Author 2 (2019)	Cloud- Based Document Printing System	Secure storage, remote access, scalable solution	Data security concerns, requires stable network
Author 3 (2020)	Mobile- Based Printing Application	User convenience, accessibility via smartphones	Limited to mobile devices, performance issues
Author 4	E-	Real-time tracking, automated billing,	Complex implementation

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(2021)	Commerce Service Management System	improved UX	, higher cost
Author 5 (2022)	Secure Cloud File Handling System	Data security, encryption, user privacy protection	Increased processing time, system complexity
Author 6 (2023)	Firebase- Based Real-Time Tracking System	Instant updates, fast synchronization , efficient communication	Dependent on cloud services, internet required

V. WORKING OF SYSTEM

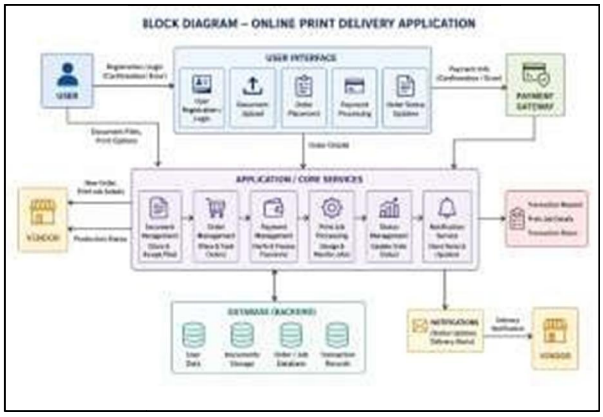

Fig 1: Design of the system

1. User Authentication Module

This module is responsible for managing user access to the system. When a user enters login or signup details, the system validates the information and either grants access or displays an error. It ensures that only authorized users can use the application, thereby maintaining security and data privacy.

2. Document Upload Module

In this module, users upload their documents along with required printing preferences. The system captures both the file and its configurations, ensuring that all details needed for printing are properly recorded. This step eliminates manual communication and reduces chances of errors.

3. Order Placement Module

After uploading the document, the system creates an order containing all print specifications. This module acts as a bridge between the user and the backend processing system by organizing and storing order data systematically for further operations.

4. Payment Processing Module

This module processes user payments securely through an external payment gateway. It ensures that transactions are successful before proceeding with order execution. Payment confirmation or failure messages are sent back to the user, maintaining transparency.

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5. Print Job Processing Module

Once payment is confirmed, the print job is forwarded to the vendor or printing system. This module ensures that the job is processed correctly based on user requirements. It coordinates with vendors and monitors the progress of the printing task.

6. Order Status Update Module

This module continuously updates the status of the order and reflects it in the user dashboard. It ensures that users are aware of the current stage of their print job, improving transparency and user experience.

7. Notification Module

The notification system keeps both users and vendors informed by sending updates such as order confirmation, processing status, and delivery alerts. It enhances communication and ensures timely information flow.

8. Vendor Module

The vendor module represents the print service provider. Vendors receive job details, execute printing tasks, and update the system with production status. This ensures smooth coordination between the system and physical printing operations.

9. Transaction Management Module

This module manages all financial transactions related to print orders. It keeps a record of payments, transaction IDs, and statuses, which is useful for auditing, reporting, and resolving payment-related issues.

10. Order Fulfillment Module

This is the final stage where the order is completed and delivered to the user. The system confirms that the printing job is successfully finished and notifies the user about delivery or pickup, ensuring closure of the process.

VI. SYSTEM DESIGN

Fig 2: System Design

1. User Interface (UI) Module

This module represents the front-end layer of the system where users interact with the application. It is designed using JavaFX to provide a clean, responsive, and user- friendly interface. The UI allows users to perform operations such as registration, login, document upload, order placement, and tracking. It ensures smooth navigation and displays real-time updates received from the backend.

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2. Authentication Module

The authentication module is responsible for validating user identity and managing secure access. It handles user registration, login, and session management using Firebase Authentication. This module ensures that only authorized users and admins can access system features, thereby maintaining security and preventing unauthorized usage.

3. Document Management Module

This module manages the uploading, storing, and retrieval of user documents. Files such as PDFs, images, and Word documents are uploaded and stored in cloud storage (Firebase Storage). It also maintains file metadata and ensures that documents are properly linked with corresponding print orders. This module plays a crucial role in secure and efficient file handling.

4. Order Management Module

The order management module is responsible for creating, storing, and managing print orders. It captures details such as number of copies, print type, page range, and paper size. Each order is assigned a unique ID and stored in the database. The module also tracks order lifecycle stages like pending, processing, and completed.

5. Payment Management Module

This module handles all payment-related operations. It integrates with a payment gateway to process online transactions securely. It verifies payment status, stores transaction details, and ensures that only successful payments proceed to the next stage. This module enhances reliability and ensures transparency in billing.

6. Print Job Processing Module

This module is responsible for converting orders into executable print jobs. It sends job details to the vendor or printing system and manages the execution of printing tasks. It ensures that the print job follows the exact specifications provided by the user and monitors progress during execution.

7. Status Management Module

The status management module tracks and updates the progress of each print order. It updates the order status dynamically (e.g., New, Pending, Printing, Completed). This information is reflected in the user dashboard, providing real-time tracking and improving user experience.

8. Notification Module

This module is designed to keep users and vendors informed about important events. It sends notifications related to order confirmation, payment status, job progress, and delivery updates. Notifications can be displayed within the application or sent through alerts, ensuring effective communication.

9. Vendor Management Module

The vendor module manages interactions with print service providers. Vendors receive print job requests, process them, and update the job status. This module ensures smooth coordination between the system and printing units, enabling efficient job execution and delivery handling.

10. Database Module (Backend)

The database module acts as the central storage system for all application data. It stores user information, document details, print orders, and transaction records using Firebase Realtime Database or Firestore. It ensures data consistency, fast retrieval, and real-time synchronization across the system.

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VII. RESULTS

1. Login / Signup Page Result

Fig.3.Login / Signup Page

The login and signup module works efficiently by allowing users to register and access the system securely. The interface validates user credentials and displays appropriate confirmation or error messages. The system successfully ensures secure authentication and smooth user entry into the application.

2. Home Dashboard Result

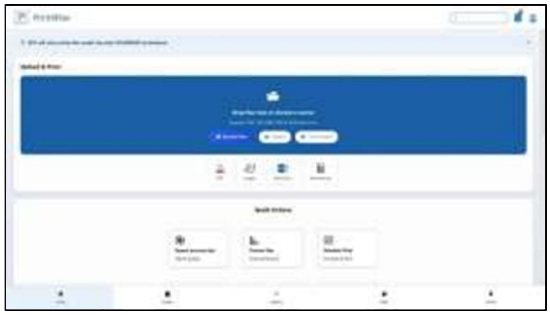

Fig.4.Home Page

The home dashboard provides a clean and user-friendly interface where users can easily navigate different features. It displays options such as document upload, quick actions, and order tracking. The dashboard responds quickly and enhances user experience by organizing all functionalities in one place.

3. File Upload Page Result

Fig.5.File Upload Page

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The file upload functionality performs accurately by allowing users to upload various document formats such as PDF, images, and Word files. Users can configure print settings like number of copies, color type, and page size. The system successfully stores files and captures user preferences without errors.

4. Explore Section Result

Fig.6.Explore Section

The explore section organizes documents into categories such as student materials, faculty resources, and general files. It improves accessibility and helps users quickly find required content. The system efficiently displays categorized data and ensures smooth navigation.

5. Admin Panel Result

Fig.7.Admin Panel

The admin panel allows efficient management of print jobs. Admins can view all orders, update statuses, and manage operations easily. The system responds quickly and ensures smooth coordination between users and vendors.

VIII. CONCLUSION

The Online Print Delivery Application (PrintWise) successfully demonstrates how traditional printing services can be transformed into a smart, efficient, and user-friendly digital system. The application integrates modern technologies such as JavaFX and Firebase to provide seamless document upload, customizable print options, secure payment processing, and real-time order tracking. It effectively reduces manual effort, minimizes errors, and saves time for both users and service providers. The system ensures secure handling of user data and documents while maintaining high performance and reliability. Overall, the project achieves its objective of delivering a convenient, scalable, and automated printing solution that enhances productivity and user experience across various domains such as colleges, offices, and businesses.

IX. FUTURE SCOPE

The PrintWise system can be further enhanced by incorporating advanced features and expanding its capabilities. Future improvements may include the development of a mobile application for Android and iOS platforms to increase

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accessibility. Integration of multiple payment options such as UPI, digital wallets, and net banking can provide greater flexibility to users. The system can also include live GPS-based delivery tracking to improve transparency in order delivery. Additionally, implementing AI-based recommendations for print settings and cost optimization can enhance user experience. Features like email/SMS notifications, multi-vendor support, and automated print queue optimization can further improve efficiency. Expanding cloud storage capacity and strengthening security mechanisms will make the system more robust and scalable for large-scale usage.

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