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Design and Implementation of a Computerized Tailoring Workshop Management System

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Abstract- A Computerized Tailoring Workshop Management System is a software application designed to automate and streamline the operations of a tailoring workshop or a cloth production business. Despite the benefits, many tailoring workshops in Nigeria still lag in adopting computerized management systems due to limited resources and the complexity of the user interface. This study aims to design and implement a Computerized Tailoring Workshop Management System that can help address these challenges and that of the traditional manual management systems, to improve the overall efficiency and productivity of tailoring workshops in Nigeria. The Waterfall Model was employed in the system design and implementation. The implementation was done in phases, with testing and evaluation at each stage to ensure the system meets the requirements of a tailoring workshop. It was developed and implemented using Visual Basics programming language and Microsoft Access database. The system provides a user-friendly interface for tailors and customers to interact, track progress, and manage orders effectively and efficiently. The system's robust and scalable architecture will ensure reliability and performance, making it an ideal solution for tailoring workshops of all sizes.

Keywords/Index Terms – Tailoring workshop, Automation, Database Management System (DBMS), Inventory Management, User-Friendly Interface.

1. Introduction

The tailoring industry to a large extent has contributed to the global fashion market, with a growing demand for personalized dresses and fashion items (Kumar et al., 2020). However, the traditional manual management systems used in tailoring workshops are often ineffective, leading to wasted resources, and poor customer satisfaction (Singh et al., 2019). The arrival of computerized management systems has improved industries including the tailoring sector (Sharma et al., 2019). A computerized tailoring workshop management system (CTWMS) can transform the operations of tailoring workshops positively by way of improvement in productivity, efficiency, and customer satisfaction (Patel et al., 2020).

According to Olufemi et al. (2017), manual management systems are inclined to make errors, and computerization can greatly reduce these errors. Jain et al. (2018) also highlight the importance of effective management in tailoring workshops by stressing the need for a computerized system to replace manual operations. Moreover, Gupta et al. (2020) suggest that a CTWMS can help tailors manage their time, allowing ample time to focus on their primary activities.

Despite the benefits derived from automation, many tailoring workshops in Nigeria still lag in adopting computerized management systems. This is often due to a lack of technical expertise, limited resources, and doubt about the efficiency and effectiveness of such systems, which in most cases lack Reporting, Analytics, and Employee management. Our developed System will bridge these gaps.

Therefore, this study seeks to design and implement a Computerized Tailoring Workshop Management System to help improve the overall efficiency and productivity of tailoring workshops in Nigeria. The Waterfall Model was employed in the system design and implementation.

The structure of this study is in line with Misra's (2021) work. Section 1 is an introduction, Section 2 discusses related literature, Section 3 discusses an overview of existing Systems, Justification, and Functional Requirements of the Proposed System, Section 4 discusses System Implementation, and Section 5 is the Conclusion.

2. Related Work

Several studies have been conducted to determine the benefits of computerized Information Systems in various industries, including Healthcare (Samuel et al. 2019; Oghenevwede et al. 2023), Manufacturing (Wang et al., 2019) and Legacy Information Systems (Edegbe and Onianwa, 2022). Jonathan et al. (2023) designed and implemented a mobile webcast application with Google Analytics and Cloud messaging functionality to enable worshippers to watch messages from their Pastor virtually. Jonathan et al. (2019) also designed and implemented a mobile-based personal digital assistant (MPDA) to help manage Time. Azeta et al. (2016) work enables remote learning by minimizing bandwidth problems and latency issues. Adewumi et al. (2016) system allows students to extract their courses from the database based on their programme and level of study.

However, there is a need for definite research on CTWMS to address the unique challenges faced in the tailoring industry as automated management systems can improve efficiency, and enhance customer satisfaction (Gayathri & Arumugam, 2022). Adewumi et al. (2019) propose a unified Framework for clothing design and assistance to the Customers. Azuwa's (2017) undergraduate project work only focuses on the Tailor Ordering System (OTOS). Omopariola et al. (2023) stated that the Tailoring Management System did not consider reporting, analytics, and employee management. Nevertheless, most of the Tailoring Workshop in Nigeria are still manually driven.

The manual management of tailoring workshops can in most cases lead to inefficiencies and wasted resources. There is a need for a computerized management system to improve productivity and profitability (Kumar et al., 2020; Singh et al., 2019; Olufemi et al., 2017; Jain et al., 2018; Patel et al., 2020). Furthermore, the absence of real-time data and analytics in manual systems makes it challenging for tailoring workshops to make learned decisions and respond to changing market demands (Sharma et al., 2019; Gupta et al., 2020). Hence the automation and adoption of the traditional tailoring workshop management system in Nigeria will help reduce these problems.

Nevertheless, the traditional Tailoring Workshop Management System often referred to as the Existing Manual System, is easy to understand and implement as it does not require any special training, technology or software. There are direct physical interactions with customers. Also, there is no risk of system downtime. These advantages are some of the limitations of the Computerized Tailoring Workshop Management System.

3 Analysis of the Proposed System

The proposed Computerized Tailoring Workshop Management System seeks to automate and restructure the operations of a tailoring workshop. Below is the analysis of the system's design and implementation:

3.1 Functional Requirements:

i. Customer Management: The system should allow for easy customer registration, tracking of customer orders, and management of customer information.
ii. Order Management: The system should enable the creation, tracking, and management of orders, including fabric selection, measurement tracking, and payment processing.
iii. Fabric Management: The system should allow for fabric inventory management, tracking fabric usage, and automatic fabric cost computation.
iv. Employee Management: The system should enable employee registration, task assignment, and performance tracking.
v. Reporting and Analytics: The system should provide real-time reporting and analytics to help management make informed decisions.

3.2 Non-Functional Requirements:

i. Security: The system should ensure secure data storage and access controls to protect customer and business data.
ii. Scalability: The system should handle increased workload and user growth without compromising performance.

iii. User-Friendliness: The system should have an intuitive interface for ease of usage by employees and customers.
iv. Integration: The system should be able to integrate with existing hardware and software systems.

3.3 Design:

i. User Interface Design: The user interface was designed using Visual Basics for easy access and use.
ii. Database Design: A relational database management system (RDBMS) Microsoft Access was used to store customers' data and other information.

4. Implementation:

i. Programming Languages: Visual Basics was used to develop the application logic.
ii. Database Design: Microsoft Access was used to design the database.

4.1 Testing: Comprehensive testing, including unit testing, integration testing, and user acceptance testing, was done to make sure that the system is reliable and functioning properly.

4.2 System Design and Specification

System Architecture:

i. Client-Server Architecture
ii. Web-based Application
iii. Database: Relational Database Management System (RDBMS)

4.3 System Components:

i. User Interface (UI): Web-based interface for users to interact with the system
ii. Business Logic Layer (BLL): Handles data validation, calculations, and logic
iii. Data Access Layer (DAL): Interacts with the database

Database: Stores all data related to the tailoring workshop. Figures 1,2,3 and 4 illustrate the Data Flow Diagram, User Registration, User Login, and Customer Request Report. Tables 1 and 2 provide details on Customer Registration and Customer Requests.

4.4 Data Flow Diagram

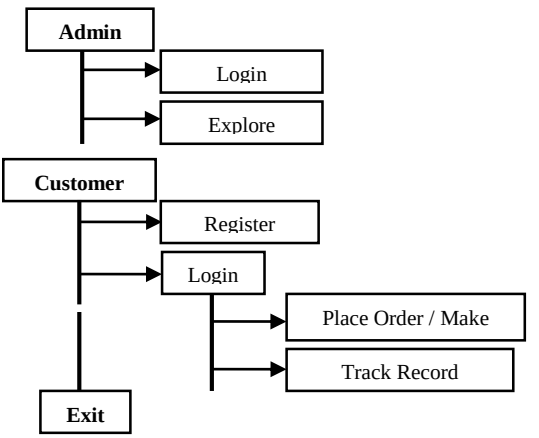

Figure 1: Data Flow Diagram

4.5 Database Design

Microsoft Access Database was adopted in the design of the new system database. Below is the database structure and specifications.

4.6 Table Specification

Table 1: Customer Registration

FIELD NAME	DATA TYPE	SIZE
FULL NAME	Text	30
CLOTHING STYLE	IMAGE	50
SIZE	Text	15
MEASUREMENT SPECIFICATIONS	Text	100
PHONE NUMBER	Long	50
PROOF OF PAYMENT	Image	25
TRANSACTION ID	Long (Auto Generate)	15
DATE	Date	20

Table 2: Customer Request

FIELD NAME	DATA TYPE	SIZE
FULL NAME	Text	30
GENDER	Text	15
PHONE NUMBER	Long	20
ADDRESS	Text	50
EMAIL	Text	25
AGE	Integer	5
USER ID	Text	20
PASSWORD	Text	20
CONFIRM PASSWORD	Text	20

4.7 System Setup:

The system was set up on a local server, and the required hardware and software components were installed. The database was created, and the system was configured to meet the specific needs of the tailoring workshop.

4.8 Data Migration:

Data from the existing manual system was migrated to the new computerized system. This involved moving customer information, fabric details, order records, and other relevant data to the new system.

4.9 Testing:

The system was tested to ensure that it met the requirements and specifications. Testing involved checking the user interface, database functionality, and system performance. The system was deployed in the tailoring workshop, and users were trained in the usage.

4.10 System Requirements

The Computerized Tailoring Workshop Management System requires a robust and scalable architecture to meet the demands of a busy tailoring workshop. To achieve this, the system requires hardware and software components, including a powerful server, high-performance workstations, and a robust database management system. Additionally, the system must be designed with security and reliability in mind, to protect sensitive customer data and prevent system downtime. Meeting these requirements, the Computerized Tailoring Workshop Management System will be able to provide an efficient and effective solution for managing the operations of a tailoring workshop.

4.11 Input and Output Requirements

This input of the new system is designed in a way that satisfies the input requirements. The variables keyed into the computer are called input of the new system.

User Registration (Input)

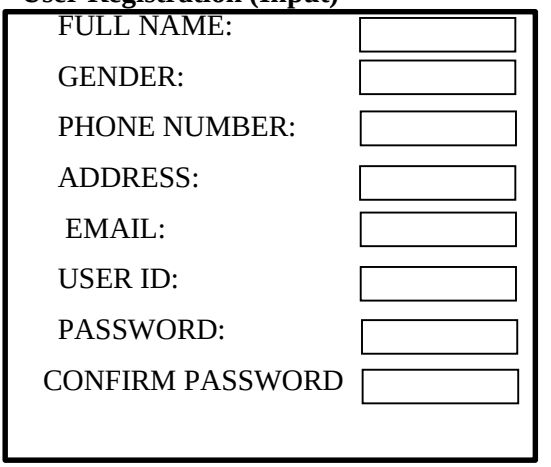

Figure 2: User Registration (Input)

User Login (Input)

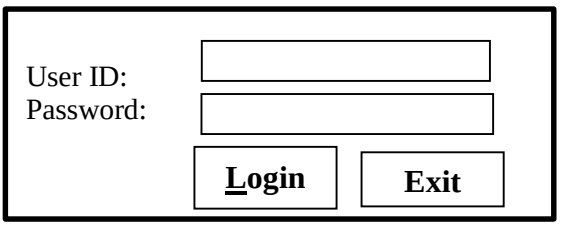

Figure 3: User Login

Customer Request Report (Output)

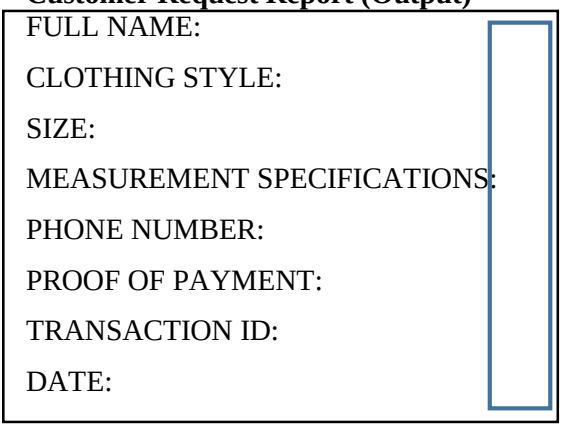

Figure 4: Customer Request Report

4.12 Hardware and Software Requirements

1. Hardware:
   i. Server (at least 2 CPU cores, 4 GB RAM, 500 GB storage)
   ii. Workstations (at least 1 CPU core, 2 GB RAM, 250 GB storage)
   iii. Network infrastructure (WAN, Wi-Fi)

4.13. Software:

i. Operating System (Windows or Linux)
ii. Programming Language (Visual Basics)
iii. Database Management Software (Microsoft Access)

5. Conclusion

The proposed Computerized Tailoring Workshop Management System (CTWMS) is a crucial investment for any tailoring workshop seeking to improve its operations and remain competitive. The Waterfall Model was employed in the system design and implemented using Visual Basics programming language and Microsoft Access database. The system will provide a user-friendly interface for tailors and customers to interact, track progress, and manage orders effectively and efficiently. The system's robust and scalable architecture will ensure reliability and performance, making it an ideal solution for tailoring workshops of all sizes.

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