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Design And Development Of An App For Accessible Wardrobe

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Abstract: The Accessible Wardrobe app is an innovative, mobile-based solution specifically designed to address the clothing needs of disabled individuals and busy professionals who often face challenges in traditional shopping environments. The app is built on the principles of universal design, digital accessibility, and smart shopping experiences, offering users the ability to explore, try, rent, and purchase clothing with ease and personalization. At its core, the application leverages Augmented Reality (AR) and Virtual Reality (VR) technologies to enable a Virtual Try-On (VTO) Room, where users can upload their personal images and visualize how different garments will look on them in real-time. This drastically reduces guesswork and enhances user confidence when making style decisions—especially for users who may be physically unable to try clothes on in traditional stores. The virtual try on feature improves user satisfaction and minimizes returns, which is a common problem in online shopping. The platform provides three primary modes of engagement: A Clothing Purchase Module, where users can buy from a wide variety of curated outfits categorized by gender, type, size, and color. A Clothing Rental Service, designed for short-term needs like weddings, interviews, or events. This not only supports sustainable fashion practices but also makes high-quality clothing more affordable and accessible. A Virtual Try-On, It helps users to select their desired dresses, through the image uploaded in the profile they can easily try the clothes that suits on it Track customer history and preferences.

Index Terms – Virtual Try-On Room, Augmented Reality, Clothing Rental Module, Clothing Purchase Module, Virtual Reality.

I. INTRODUCTION

The Accessible Wardrobe app is a mobile-based platform specifically tailored for disabled individuals and busy professionals. It revolutionizes the clothing shopping experience by incorporating accessibility-first design principles, AR/VR-enabled virtual trials, and a seamless rental/purchase experience. The solution enables users to select garments based on gender, type, color, and size and visualize them with their own uploaded profile image in real time. The admin has complete control over managing dress listings, orders, and rentals. The purpose of this app is to outline the design, features, and implementation approach for the Accessible Wardrobe app. This app aims to assist disabled individuals and busy professionals by providing a seamless platform to shop, rent, and virtually try on clothes. The project emphasizes accessibility, user friendly design, and cutting-edge technologies like AR and VR.

II. LITERATURE SURVEY

In [1] In the Clothing Rental App (2020) this paper utilized the Waterfall Model, a linear and sequential software development methodology where each phase must be completed before the next begins.
In [2] Virtual Try-On Systems (2019) in this they have implemented marker-based Augmented Reality (AR) which is required printed markers or QR codes to trigger virtual clothing overlays.
In [3] E-Commerce Clothing Apps: Most platforms lacked a virtual try-on feature, forcing users to rely on static model photos or 2D images. This led to uncertainty in how the clothes would actually fit, contributing to high return rates.
In [4] Role-Based Systems Used monolithic authentication mechanisms where all users were treated similarly in terms of access and permissions.
In [5] Traditional Delivery Platforms supported online payments only, often excluding users who preferred or depended on cash on delivery (COD). Delivery processes were not tailored based on user types.

III. METHODOLOGY

The development of the Accessible Wardrobe App followed a structured approach, moving through clearly defined stages. Each stage was tailored with appropriate methodologies to ensure the project was user-friendly, accessible, and technologically robust. We adopted the Agile development model, specifically using the Scrum framework, to ensure flexibility, collaboration, and user-focused iterative development. This approach was ideal for a complex, feature-rich application like Accessible Wardrobe, where continuous feedback and adaptive planning were critical to success.

- **Requirement Gathering**
  Methodology Used: Traditional Requirements Analysis Your Update: Defined features like user login, profile management, dress catalog, virtual try-on, and clothing rentals.
  Explanation:
  This initial phase involved understanding the pain points of your target users: people with disabilities and busy professionals. Requirements were gathered through secondary research, brainstorming, and analysis of limitations in traditional fashion e-commerce platforms.
  Key deliverables included a Requirement Specification Document, which outlined user stories, feature scope, and technical needs like accessibility and AR/VR capabilities
- **Design Phase**
  UI Design
  Tools: Figma and Adobe XD
  Focus on button accessibility, high-contrast UI, and easy navigation for disabled users.
  Separate flows for try-on and rentals.
  Database Design
  All tables contain common ’id’ and ’created by’ fields for traceability.
  Tables:
  • users
  • user roles
  • wardrobe
  • orders
  • rentals
  • trials
  Each table is connected via foreign keys for optimized relational structure.

- **Development Phase**
  Methodology Used: Developed the app using React Native, with backend in Spring Boot. Iterative development over short sprints.
  Explanation:
  The frontend was built using React Native, ensuring cross-platform compatibility for Android and iOS devices. The backend was developed using Java (Spring Boot) to handle authentication, product management, order processing, and payment logic.
  Development was modular:
  User Authentication
  Virtual Try-On Clothing
  Catalog and Filtering
  Rental and Purchase Flow
  Integration of AR/VR was planned for future upgrades.
  Code was regularly reviewed using version control tools (GitHub/GitLab).

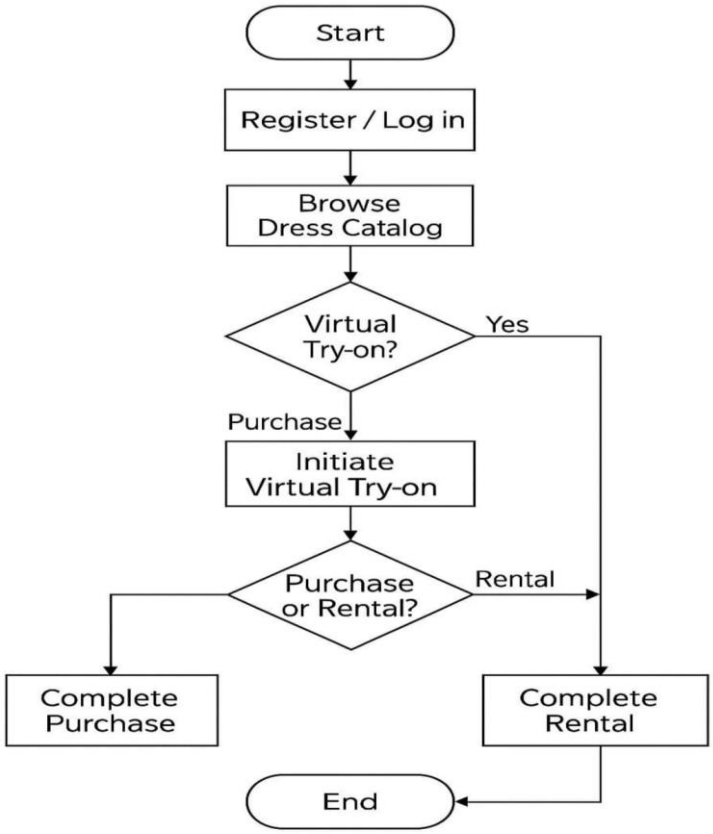

Figure 1: Methodology of the System

IV. BLOCK DIAGRAM AND IMPLEMENTATION OF APP

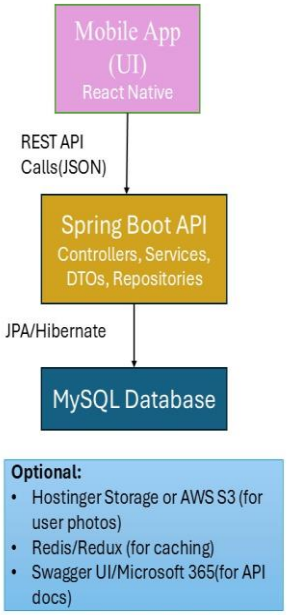

Figure 2: Block Diagram of the System

Explanation:

Mobile App (UI)– React Native

Description: This is the front-end of your application, developed using React Native, a cross-platform mobile app framework.

Role: Provides the user interface (UI) and manages interactions such as:

Virtual try-on using AR

Browsing/renting/purchasing clothes

Login, registration, profile handling

Communication: Sends and receives data via REST API calls (JSON format) to the backend.

Spring Boot API

Description: This is the backend service layer developed using Spring Boot, a Java-based framework.

Modules:

Controllers: Handle incoming API requests from the mobile app.

Services: Business logic for processing data (e.g., validating orders, processing rentals).

DTOs (Data Transfer Objects): Used for clean data exchange between layers.

Repositories: Use Spring Data JPA for database interactions.

Communication: Interacts with the MySQL database using JPA/Hibernate (Object Relational Mapping).

MYSQL Database

Description: This is your primary database system.

Role: Stores structured data like:

User accounts

Clothing inventory

Rental/purchase history

Role-based permissions

Integration: Accessed via Spring Boot using JPA/Hibernate, which abstracts complex SQL queries.

V. RESULTS AND DISCUSSIONS

A complete and fully operational system was developed that supports the entire lifecycle of user interaction: User registration/login, Dress browsing and filtering, Virtual try-on experience, Rental or purchase options, Secure payment processing, Order confirmation and management, Admin functionalities. Both user and admin modules work in synchronization with the backend database, ensuring a seamless flow of data.

The application has been thoroughly tested for:

Functional correctness (every button and link works as expected)

Data integrity (records are stored correctly in the database)

Responsiveness (interface adapts to different devices)

User experience (logical flow and simple UI for accessibility)

- **Virtual Try-on and Secure Trial Deletion Worked as Expected**

The virtual trial room module allows users to:

Upload their profile image

Select a dress from the wardrobe

Generate an output image showing how the dress looks on them using image processing

Behind the scenes:

The system uses AI or basic image overlay techniques to combine the user image with the selected dress image.

This trial is stored in the 'Trials' table and linked to the user and dress for tracking.

After the session ends or the user logs out:

The trial image is safely deleted or marked inactive to preserve user privacy.

This ensures that sensitive user data is not stored unnecessarily or misused.

This shows a strong focus on data security and privacy compliance in the design.

- **Admin Module Lets Business Owners Manage Everything from Their Phone**

The Admin dashboard is built as part of the mobile/web interface, allowing easy management on the go.

Admin functionalities include:

Login securely

Add new dresses to the wardrobe with details like category, price, rent, size, etc.

Edit existing dress information (e.g., price updates, image changes)

Delete dresses that are out of stock or discontinued Monitor orders and rentals placed by users

This enables the business owner or admin to:

Update the catalogue in real-time

Manage operations without needing a desktop or technical support

Respond to user needs and inventory changes quickly

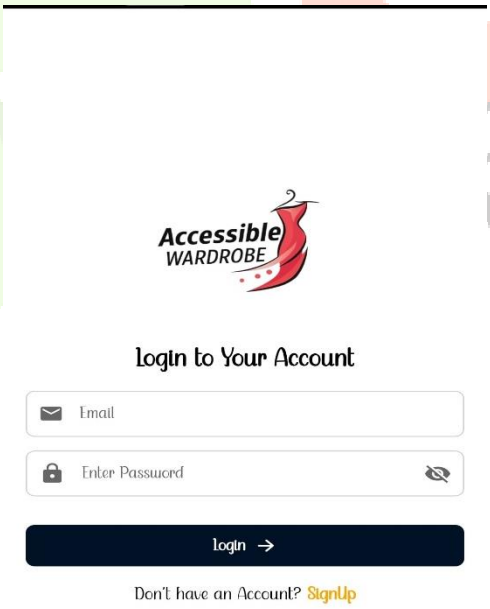

Figure 3: Resultant Login Page of the app

Figure 4: App Logo

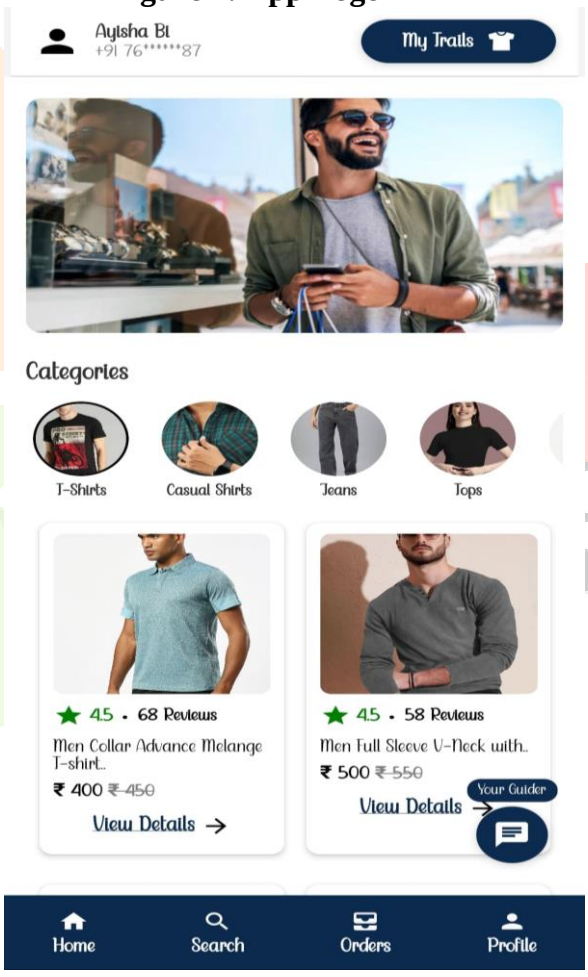

Figure 5: Home Page of the App

Table 1: Performance Metrics of the Model

Features	Status	Remarks
User registration & login	✓	Secure and working
Dress browsing	✓	Filters by gender, type, etc.
Virtual trial room	✓	Output image generated
Purchase & Rental	✓	Both pathways functional
Admin management	✓	Mobile-ready dashboard
Data deletion (trial)	✓	Ensures user privacy

VI. Conclusion

The Accessible Wardrobe App is a forward-thinking solution that effectively bridges the gap between fashion accessibility and technological innovation. Designed with inclusivity at its core, the application specifically addresses the needs of disabled individuals, elderly users, and busy professionals who face difficulties in traditional shopping experiences. By integrating AR/VR-based virtual try-on, clothing rentals, and seamless e-commerce functionality, this app brings together convenience, affordability, and inclusiveness.

From its early stages, the project followed a structured development lifecycle using Agile methodology, ensuring timely updates, adaptability to feedback, and progressive delivery. Starting with requirement analysis, the team successfully identified user pain points and proposed innovative features like virtual trials, day-wise rentals, and encrypted user profiles. The UI/UX design created through Figma and Adobe XD focused on simplicity, accessibility, and ease of navigation, ensuring that all users can interact with the app independently and efficiently.

- Virtual Try-On replaces the need for physical dressing rooms.
- Day-wise rentals make fashion more affordable and flexible.
- Full admin control allows backend managers to efficiently handle wardrobe listings, rentals, and order data.
- Cash on delivery and upcoming payment gateway integration address diverse payment preferences

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