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Bhav-Tol Smart Price Comparison System

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Abstract: *The rapid growth of e-commerce platforms has significantly increased online shopping activity, resulting in price variations across multiple websites for the same product. Consumers often face difficulties in identifying the best available deal due to scattered information, inconsistent pricing, hidden discounts, and the absence of centralized comparison tools. Traditional shopping methods require users to manually browse different platforms, compare prices, analyse ratings, and check delivery details, leading to time consumption and inefficient decision-making.*

To address these challenges, this paper presents BHAVTOL, a Smart Price Comparison Web Application designed to aggregate, analyse, and display product prices from multiple e-commerce platforms within a single interactive interface. The proposed system utilizes modern web technologies such as React.js for frontend development and a cloud-based backend architecture for secure data management and real-time synchronization.

The application integrates advanced features including smart search functionality, dynamic filtering, price comparison tables, best-deal highlighting, and price history visualization. Unlike traditional price comparison systems that focus only on price aggregation, BHAVTOL emphasizes enhanced user experience, interactive design, intelligent ranking algorithms, and optimized performance.

The system introduces additional functionalities such as discount percentage analysis, savings calculation, price trend tracking, and real-time update mechanisms to improve user decision-making efficiency. Experimental evaluation using simulated product datasets demonstrates improved search efficiency, reduced decision time, and higher user engagement compared to conventional manual comparison approaches. The scalable architecture also allows future integration of machine learning-based recommendation systems and predictive price analytics.. .

Keywords: *Smart Price Comparison, E-Commerce Aggregation, Web Scraping, Cloud Computing, React.js, Real-Time Updates, User Experience Design, Intelligent Ranking*

I. INTRODUCTION

The expansion of digital commerce has transformed the global retail ecosystem, offering consumers a wide range of product options across numerous online

platforms. While this growth provides convenience and accessibility, it also introduces challenges in identifying the most cost-effective purchase options. Prices for identical products often vary across platforms due to dynamic pricing strategies, promotional discounts, regional pricing models, and stock availability.

Traditional price comparison methods require users to manually browse multiple e-commerce websites, compare product specifications, evaluate seller ratings, and analyse delivery timelines. This process is time-consuming, inefficient, and prone to oversight, especially when dealing with complex discount structures and fluctuating prices.

Existing price comparison systems primarily focus on basic price aggregation without offering advanced filtering, interactive visualization, or intelligent ranking mechanisms. Additionally, many platforms lack modern user interface design, personalization features, and real-time synchronization capabilities.

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To overcome these limitations, this research proposes **BHAVTOL**, a Smart Price Comparison Web Application designed to centralize product pricing information and provide an enhanced user experience. The system integrates:

- Multi-platform price aggregation
- Intelligent product ranking
- Interactive filtering and sorting
- Real-time data updates
- Price history visualization
- Savings calculation mechanisms

By leveraging modern frontend frameworks and scalable cloud-based backend infrastructure, BHAVTOL aims to optimize online shopping decisions through automation, transparency, and interactivity.

II. LITERATURE SURVEY

Recent research in price comparison systems and e-commerce aggregation platforms highlights the growing demand for automated product comparison tools. Studies on web scraping-based price comparison systems emphasize automated data extraction techniques to collect pricing data from multiple e-commerce platforms. These systems improve accessibility but often lack advanced user interface design and intelligent ranking mechanisms.

Research on cloud-based e-commerce comparison platforms demonstrates the advantages of centralized databases and scalable infrastructure for managing large volumes of pricing data. However, many implementations focus primarily on backend efficiency rather than user interaction and experience enhancement. Several academic prototypes introduce filtering and sorting mechanisms for product comparison, yet they often provide limited personalization features and lack real-time price update systems. Additionally, studies on consumer decision-making in online shopping environments indicate that interactive visualization tools, price history graphs, and discount analysis significantly improve purchasing confidence and satisfaction.

Despite these advancements, existing solutions generally do not integrate smart UI/UX principles, intelligent ranking algorithms, real-time notifications, and predictive analytics into a unified and deployment-ready web platform.

BHAVTOL addresses these research gaps by combining:

- Smart ranking algorithms
- Interactive and elegant UI design
- Real-time synchronization
- Advanced filtering mechanisms
- Price trend visualization

Thus, the proposed system advances beyond basic aggregation tools toward an intelligent and user-centric shopping assistant.

III. METHODOLOGY

The methodology of the **Bhav-Tol Smart Price Comparison System** involves several modules working together to provide accurate product comparison results.

User Authentication

Users can create accounts and securely log into the application to access product comparison features.

Product Search

Users enter a product name in the search bar. The system queries the database and external sources to retrieve relevant product information.

Price Data Collection

The backend server collects product price information from multiple e-commerce platforms using APIs or automated scraping techniques.

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Price Comparison Engine

The collected data is processed to identify the lowest price and display a comparison table for the user.

Price History Tracking

The system stores historical price data to help users track price fluctuations over time.

User Interface

The Flutter-based mobile interface provides a clean and interactive environment where users can easily view product comparisons.

IV. IMPLEMENTATION

1. Backend Infrastructure:

The backend of the system is developed using **Node.js**, which handles server-side processing and communication with the database. The backend collects product information and manages price comparison operations. A **database system** is used to store product details, user information, and historical price data.

2. User Interface Design:

The front-end application is developed using **Flutter**, which allows cross-platform mobile development. The application provides features such as:

- Product search
- Price comparison
- Price history visualization
- User login and profile management

3. General flow chart :

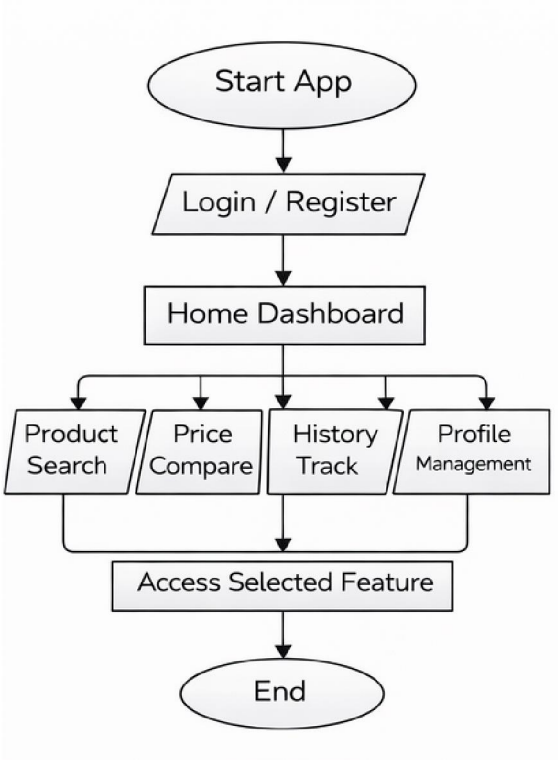

Fig 1. Flow chart for Main Application

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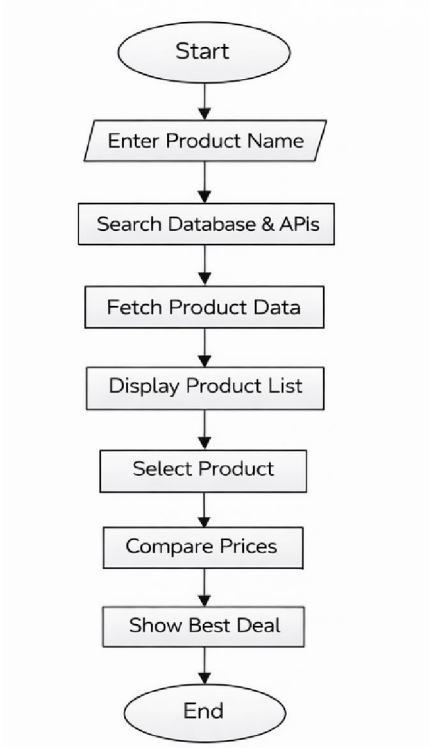

Fig1.1 Flow chart for Product Search & Comparison

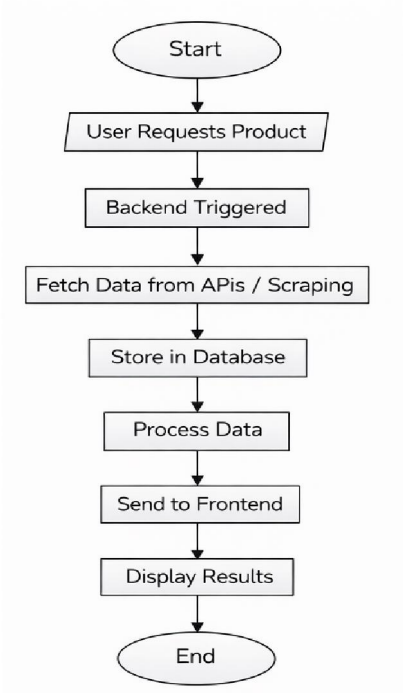

Fig1.2 Flow chart for Price Data Collection

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4. Overview:

A. Logo Page

Figure 1: Bhav-Tol Smart Price Comparison

System Logo

B. Home page

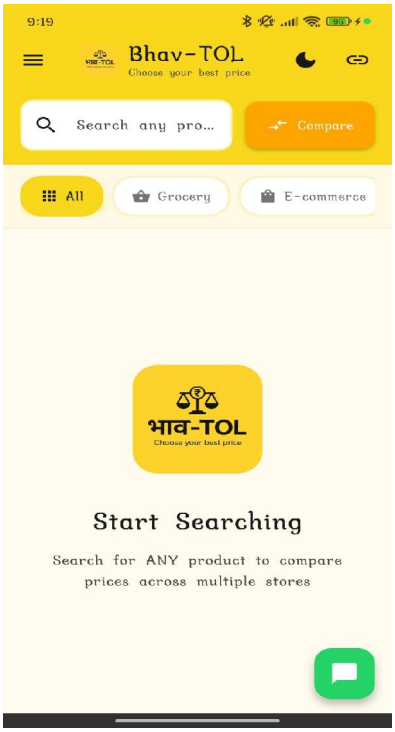

Figure 2: Home Interface of Bhav-Tol System Showing Search and Category Options

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C. Product Search Page

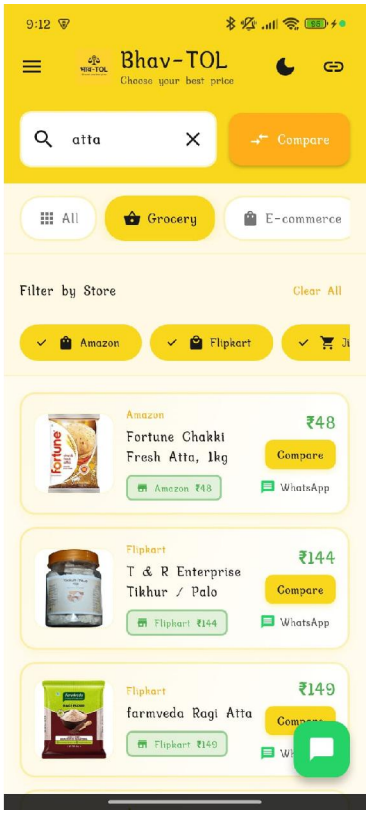

Figure 3: Product Search and Store Filtering Interface for Grocery Items

D. Product Output Page

Figure 4: Product Price Comparison and Best Price Identification Interface

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E. Menu Page

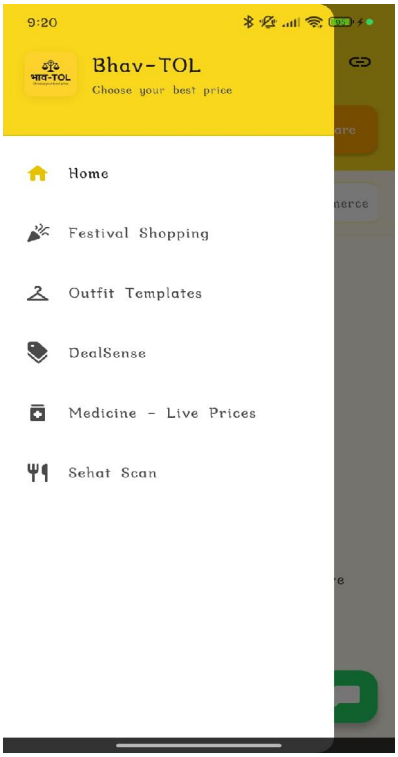

Figure 5: Side Navigation Menu Showing Multiple Features of the Application

F. Festival shopping Page

Figure 6: Festival-Based Shopping Interface of Bhav-Tol Smart Price Comparison System

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G. Outfit Recommender Page

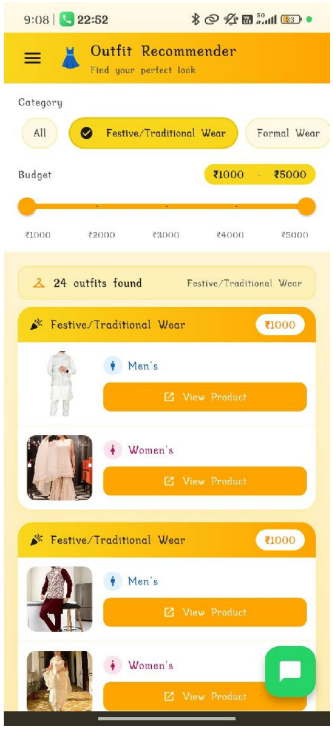

Figure 7: Outfit Recommendation Module with Category and Budget Filtering

H. Deal Sense Page

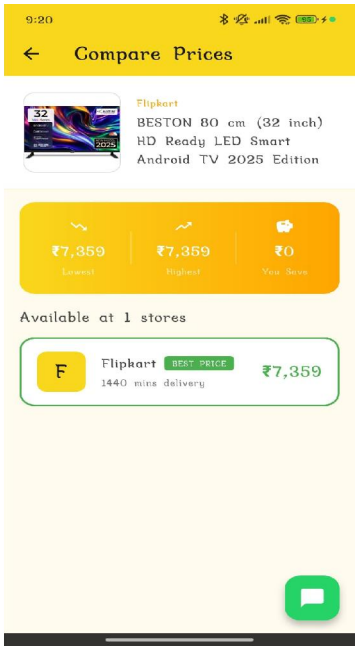

Figure 8: DealSense Interface Showing Best Price Identification and Savings Analysis

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I. Medicine Scan Page

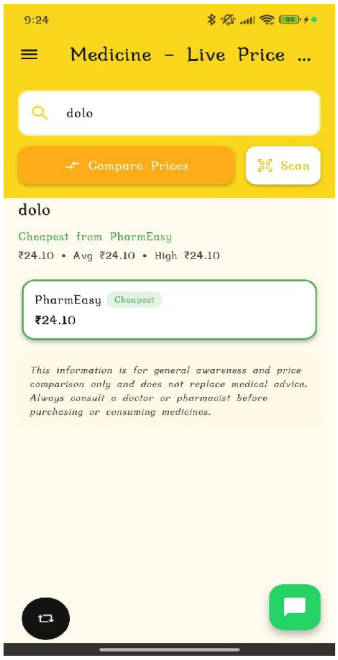

Figure 9: Medicine Price Comparison Interface with Cheapest Option Display

J. Sehat Scan Page

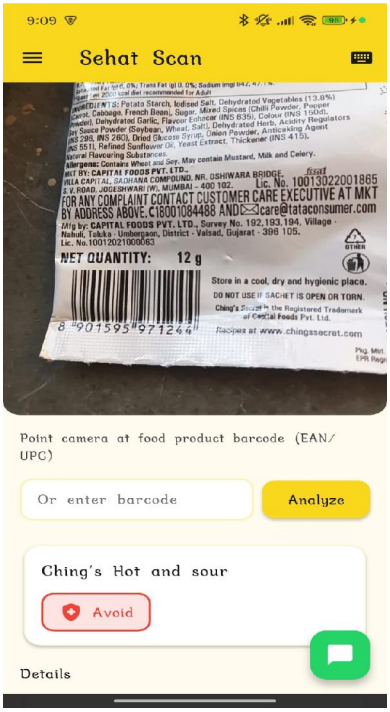

Figure10: Food Product Barcode Scanning and Health Analysis Interface

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V. DISCUSSION

The Bhav-Tol Smart Price Comparison System successfully demonstrates how modern web and mobile technologies can be integrated to improve online shopping experiences.

Strengths

- Provides quick comparison of product prices across platforms.
- Saves time for users searching for the best deals.
- Maintains historical price data for analysis.
- User-friendly mobile interface.
- Scalable backend architecture.

Weaknesses

- Price data accuracy depends on external APIs and scraping methods.
- Requires internet connectivity for real-time comparisons.

FUTURE SCOPE:

The Bhav-Tol system has strong potential for future development and expansion.
Future improvements may include:

- Integration with **more e-commerce platforms**
- Implementation of **AI-based product recommendations**
- **Price drop notifications** for users
- **Browser extension** for quick comparisons
- Advanced **data analytics for shopping trends**

These improvements can make the system more intelligent and beneficial for consumers.

VI. CONCLUSION

The Bhav-Tol Smart Price Comparison System provides an efficient solution to the challenges faced by consumers in identifying the best product prices across multiple online platforms. By combining mobile application technology, backend processing, and automated data collection methods, the system enables users to quickly compare prices and make informed purchasing decisions. The platform enhances transparency in online shopping and simplifies the product selection process. With further development and integration of advanced technologies such as artificial intelligence and predictive analytics, the system has the potential to become a comprehensive smart shopping assistant for digital consumers.

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