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Article

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Abstract: The textile manufacturing sector in Kyrgyzstan faces challenges with inefficient order management, lack of transparency, and limited communication between customers and manufacturers. This project proposes a mobile application to address these issues through an auction-based order placement system, real-time tracking, and integrated messaging. Our platform aims to streamline operations, enhance collaboration, and provide increased market access for small-scale manufacturers. This paper discusses the research background, methodology, expected results, and potential impact.

Keywords: textile industry; mobile application; order management; auction system; real-time tracking; Kyrgyzstan

1. Introduction

During my research in the textile sector of Kyrgyzstan, I observed persistent issues in order communication and transparency. Both customers and manufacturers experience significant friction due to inefficient processes and lack of structured platforms. Unlike typical e-commerce platforms, the textile industry requires customized order tracking, production scheduling, and flexible bidding mechanisms. This motivated the development of a dedicated mobile solution to streamline and optimize the order management workflow.

2. Problem Statement

The textile industry in Kyrgyzstan lacks a centralized platform for managing production orders. Customers face difficulties finding reliable manufacturers, monitoring order status, and ensuring consistent communication. Manufacturers struggle to promote their services and maintain a steady workflow. Traditional approaches, such as ad hoc communication through social media, are insufficient for the specialized needs of textile production, leading to delays, misunderstandings, and lost business opportunities.

3. Objectives

*   Develop a mobile platform tailored for textile order management.
*   Introduce auction-based bidding to promote fair pricing and manufacturer competition.
*   Implement real-time order tracking to enhance transparency.
*   Facilitate seamless communication between stakeholders.
*   Provide increased visibility for small and medium manufacturers.

4. Hypothesis

*   Introducing a structured auction system will reduce pricing inconsistencies by 30%.
*   Real-time tracking will improve customer satisfaction and reduce order miscommunication by at least 50%.
*   Integrated messaging within the app will enhance collaboration and lower negotiation time.

- A freemium-based subscription model will enable sustainable platform growth.

5. Research Methodology

5.1. Problem Analysis and Requirements Gathering

We conducted a survey involving 50 stakeholders, including manufacturers and customers, to identify key pain points and essential platform features.

Key Findings:

- 85% reported tracking issues.
- 78% experienced price negotiation problems.
- 90% desired integrated messaging.
- 65% needed better market access.

5.2. System Design

The system follows an Agile development approach with modular, object-oriented architecture. Backend development uses Java Spring Boot, while the frontend is built with Flutter for cross-platform compatibility. PostgreSQL serves as the database, and Firebase Cloud Messaging supports real-time updates.

5.3. Data Collection and Integration

Survey data and industry feedback have been integrated into the system's requirement specifications. Future iterations will incorporate additional user feedback from beta testing phases.

5.4. Performance Analysis and Evaluation

System performance will be evaluated based on:

- Time to create an order.
- Time to track order updates.
- User satisfaction surveys.
- Conversion rate from free to premium plans.

5.5. Iterative Improvement

Following user testing, iterative updates will optimize user experience, fix emerging bugs, and refine auction and communication functionalities.

6. Related Work

Platforms such as InDrive, Upwork, and Etsy offer related features like bidding and messaging. However, they are not specialized for the large-scale textile production environment, highlighting the niche that this project addresses.

Studies such as [1] emphasize the importance of sector-specific mobile apps for process optimization in textiles, while [2] highlight the role of mobile tools in cost estimation and management for small textile businesses.

7. System Architecture

The system architecture is based on a client-server model.

The frontend of the application is developed using **Flutter**, which allows cross-platform mobile application development with a single codebase, ensuring smooth and responsive user interfaces on both Android and iOS devices.

The backend is built using **Spring Boot** with a RESTful API architecture. This provides a robust, scalable, and secure environment for handling business logic and ensuring effective communication between the mobile application and the server.

PostgreSQL is utilized as the primary relational database. Its reliability, scalability, and support for complex queries make it ideal for managing transactional data related to orders, users, and manufacturers.

For real-time notifications, the system integrates **Firebase Cloud Messaging (FCM)**, ensuring users receive timely updates on their order status, auction bids, and communication alerts.

GitHub is used for version control, enabling efficient collaboration among developers, change tracking, and maintaining code quality during the project lifecycle.

8. Challenges Faced

One of the main challenges was ensuring **real-time synchronization** between customers and manufacturers. Implementing a reliable notification system using FCM helped maintain accurate communication.

Another critical issue was **balancing auction fairness**. Rules were set within the bidding mechanism to avoid extreme price dumping and protect both customers and manufacturers.

Maintaining **performance across platforms** (Android and iOS) required careful optimization of Flutter UI elements and background processes to prevent lags and crashes.

Finally, **data privacy and user authentication** posed significant challenges. Secure login methods and encrypted data transfer protocols were implemented to protect sensitive information.

9. Methods

The project follows iterative Agile cycles with regular user feedback sessions. Core functionalities such as auction bidding, messaging, and tracking were prioritized in the initial MVP. Later cycles will focus on enhanced analytics, portfolio features for manufacturers, and advanced recommendation algorithms.

10. Expected Results

- 50% reduction in communication errors.
- 30% improvement in pricing fairness.
- 20–30% faster order fulfillment times.
- Higher satisfaction scores among manufacturers and customers.

11. Conclusion

This project proposes a targeted mobile solution for the textile manufacturing industry in Kyrgyzstan. The auction-based ordering system, real-time tracking, and integrated messaging directly address current inefficiencies. Early survey results validate the demand for such a platform. Future improvements will focus on expanding functionalities and scaling the system nationally and internationally.

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