An IOT-Based Laundry System Application

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Abstract **- A smart city is a notion that makes use of the Internet of Things to assist and simplify how people access and share information in their daily lives. This work was designed in a way to extend the concept of the smart city. An IoT-based Smart Laundry System Application makes laundry services easily accessible to all users, allowing us to save time and be more practical for users who access laundry services. The primary goal of this work is to create an Android mobile application for laundry shops that will be integrated with the IoT using Arduino and ESP8266 devices. In essence, an IoT-Based Smart Laundry System Application is a demonstration of customers paying for laundry machines (represented by ES8266 devices) via QR code scanning and an e-Wallet payment gateway. When an online payment is made, it successfully creates a connection with an ESP8266 device. The mobile application will then direct customers to a countdown timer page where they can see how long it will take the wash to finish and receive an alert message when it is almost finished, allowing them to walk to the store and pick up their freshly laundered clothes from the service provider. The model is essentially an IoT-based Smart Laundry System Application that customers can use whenever they want, with the ease of online payment and little need for human interaction.**

Index Terms **- Internet of Things, Smart Cities, Laundry System, Devices, QR Code, e-Wallet payment, and Customers.**

1.INTRODUCTION

On-demand applications have become incredibly popular on a global scale in recent years. Many people depend on these applications in some or other ways. Over the years, on-demand services in the supermarket and travel industry have risen in popularity, but now the software for laundry and cleaning services is gaining steam. According to Statista, the global market for online laundry services will be worth more than 96 billion dollars by 2020. By 2022, the worldwide dry-cleaning and laundry services industry will have grown by 10.9 percent or nearly 180 billion dollars. People don't have time to employ a laundry service at home when their discretionary income rises, and their schedules tighten. They favor using these apps to carry out tasks. As a result of the increased demand of today, people are surrounded by a profusion of these applications. The washing application is one of them. On-demand food and grocery delivery apps have grown immensely popular, and laundry apps follow in their footsteps. The suggested proposal is an excellent first step. The proposed application is therefore a crucial part of a hectic daily agenda.

An Android-based laundry app provides a customer with laundry services. It allows them to do their laundry quickly and easily. Since a mobile app has been built as part of the proposed system, it will enable customers to wash their clothes at the most reasonable rates. People seek instant access to everything in this age of time constraints and instant gratification. The application is helpful in this situation. As a result, customers can use this app to get their laundry ready at a nearby location. The suggested strategy satisfies the clients by allowing them to choose their wash type, and the service provider will fix the price associated with each wash type.

1.1 Existing System

In the past, the laundryman used to come to customers' houses every day or once a week to collect filthy garments for washing. When the clothing has finished being washed, it is returned to the owner via the laundryman. This custom has vanished and washing machines have taken its place. Paying guests and hostels, as well as college students living in rented houses, cannot afford to purchase washing machines. To save time, an on-demand laundry app has been

developed. These apps serve as a conduit between the customer and the laundry service, with separate databases for each actor. Additionally, there will be additional charges for the pickup and delivery of items before and after washing by a delivery partner or the laundryman. It appears to be the same as delegating work to someone else and paying them for it. Some of the disadvantages of the current method include the fact that the laundryman will benefit more than the customers because the cost decision is in their hands. There is an additional fee for delivery by a third party, etc.

1.2 Proposed System

There will be no third-party service or a laundryman in the proposed scheme. The customer will use this app to find nearby laundry services, after which they will go to the store and have their laundry done. Following the completion of the wash, the customer is required to leave comments for the service provider. The customer will benefit from this application in every manner conceivable. The customer selects the type of wash for their garments, and the admin determines the cost of washing. Only a customer database is required for this system. Other databases, such as third-person cooperation, are not required, which were present in the existing system. This system is economical. Customers will be happier with the suggested approach because they will be given a cost option based on the type of wash they use. It also aids in how to buy used washing machines for resale, which reduces the installation cost. The proposed system will place a strong emphasis on smart city applications.

2. METHODOLOGY

2.1 System Architecture

Fig 1: System Architecture

An architecture diagram is a diagram of a system that is used to abstract the overall outline of the software system and the interactions, restrictions, and boundaries between components. It is a crucial tool since it gives a comprehensive overview of the software system's physical deployment and development roadmap.

2.2 System Implementation

The main objective of the implementation is to build an Android application that enables customers to access laundry services, enabling them to wash their own clothes without the assistance of a third-party member. Additionally, it has an admin module that the admin can administer and modify the whole system through his website while also getting feedback from the customer application to enhance the service. The entire system is implemented in 3 phases, namely:

1 Development of customer application phase
2 Development of the admin control panel phase
3 The hardware integration phase

2.2.1 Development of Customer Application Phase

The development of a customer application is the initial stage. The main objective of the customer application is to provide consumers with a straightforward interface through which they can scan the QR code that is present on the washing machine to access the laundry services. As a result, this application serves as a bridge between the customer and the washing machine. Android Studio is used to create the user interface, Flutter as a framework, and DART as a programming language is used to create the application.

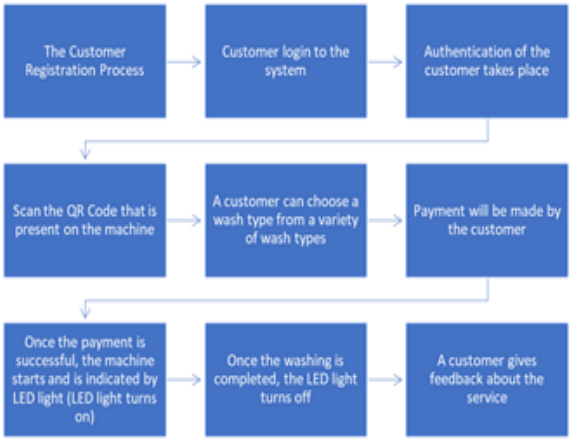

Fig 2: Steps to be Followed by Customer While Using Laundry Application

2.2.2 Development of Admin Control Panel Phase

The development of the admin control panel is the second phase. The creation of the web application interface for administrators, which allows them to manage the dashboard for laundry services. The image below displays the admin dashboard. The administrator can modify the dashboard by adding or removing machines; checking the list of users and their reviews; and updating the wash type menu using the insights. All these tasks will be managed by the admin. DART as a programming language is used to create the admin control panel using the Flutter framework and MongoDB to store the data of clients, washing machines, customer feedback, menus, and washing services.

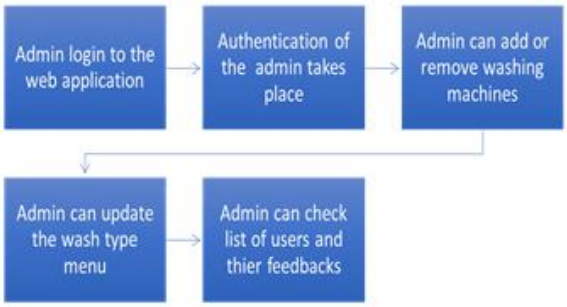

Fig 3: Steps to be Followed by Admin to Control Dashboard

Fig 4: Admin Control Panel

2.2.3 The Hardware Integration Phase

The hardware integration is the final stage of system development which uses an external hardware device to signal the existence of the washing machine. The ESP8266 Wi-Fi module, which is connected through probes and LEDs, serves as the external hardware component for the system. The existence of an LED in this instance displays the washing machine's state. The LED light turns on when the washing machine is running, and it gets turned off when the washing machine is in an ideal state.

2.3 Results

An IoT-based Smart Laundry System Application promotes the idea of smart cities. The proposed system makes laundry services easily accessible to all users, allowing the customers to save time and be more practical for users who access laundry services. Customers can use it whenever they want, with little or no human interaction with the convenience of online payment. When customers pay for laundry services via QR code scanning and an e-Wallet payment gateway, when an online payment is made, it successfully creates a connection with an ESP8266 device, and the application will direct the customer to the countdown timer page, which will show the amount of time it will take to finish the wash. The ESP8266 Wi-Fi module, which is connected through probes and LEDs, represents the washing machine. The existence of an LED in this instance displays the washing machine's state.

Fig 5: When Washing Machine is in Running State Indicated by Turning on LED Light

Fig 6: When Washing Machine is in Idle State Indicated by Turning on LED Light

3. CONCLUSIONS

Technology is improving every day in a variety of fields to address the difficulties that people face every day. There is one such common problem that needs to be tackled, and that is the lack of technology in the laundry service sector, where many individuals still use traditional laundry services. To address this issue, the proposed system includes an Internet of Things-integrated application that will allow people living in hostels, near college campuses, and PGs to get their clothes washed at a low cost in nearby laundry service stations with an easy-to-use interface and no third-party intervention. The application is designed to overcome all flaws and automate all actions and duties. It isolates all manual operations and makes them simple to accomplish while increasing efficiency. It also enables organizations to make more money in the long term by being more efficient and reducing the number of processing errors caused by manual labor. Overall, the software is simple to set up, use, and maintain.

ACKNOWLEDGEMENT

We would like to use this occasion to express our heartfelt gratitude to everyone who assisted us in the completion of this project, whether directly or indirectly. We are grateful to The National Institute of Engineering, Mysuru, Karnataka, India, for providing us with the opportunity and resources to complete the work effectively.

It also brings us great pleasure to express our gratitude to Dr. V K Annapurna, Professor of the Department of Computer Science and Engineering, NIE Mysuru, our project guide, for her unwavering enthusiasm and assistance throughout the process.

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