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SMART-SIMPLIFIED-SECURED PAYMENT SYSTEM

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***Abstract*---**We all realize that these days technology has exceeded our humanity. Every day, technology is evolving, and new matters are popping out to make our life easier. We are developing this application keeping in mind the comfort of the user as well as of the environment. Smart Payment will be user friendly for both customers as well as the departmental store employees. A brief about the working of this application is as follows- We can use this application to scan the barcode of every product and make a list, pay the bill online and display the receipt at the time of exit. To be precise, the technologies used in this application are XML for UI/UX designing (frontend) and Kotlin for the backend. The main objective of this application would be to save the time of users that they spend standing in long queues as well as to save paper and thus the environment. This application can further be enriched to make it useful in various fields, mainly in health and medicine.

Keywords: *SPAY, Supermarket, Payment, Online, Barcode, Environment.*

I. INTRODUCTION

Smart Payment is a mobile application intended to save time. We all are aware of the fact that whenever we go to a supermarket, we have to wait in long queues to pay our bills, this happens even if we have just 1 item in our cart. Because of this we get really frustrated and feel as if we are wasting our time. Moreover, the shopkeeper scans the barcode[1] of each and every product to make a list of products and then we pay the bills resulting in more time consumption. In addition, the ink which is used for printing receipts is dangerous to health. Thus, Smart Payment is a perfect solution for such problems. Smart Payment makes the payment procedure very user-friendly and timesaving for the customers as long queues can be avoided. It is also an initiative to save the environment as it would save paper.

In this application, the customer just needs to scan the barcode of the product with the help of the barcode

scanner in the app, make the item list by themselves i.e., add or delete the items in their cart, pay online and just need to show the receipts at the time of exit from the departmental stores. As this application is supermarket-oriented we have tried to target a larger audience by integrating multiple famous departmental stores such as Big Bazaar, V-Mart etc.

This research paper delivers an elaborate definition of the intended motive of increasing awareness about online payment improvement programs [16]. The remaining paper talks about the value of illustrations of several online payment systems, their comparison, their history, and more related features and how this application is an effort to reduce cyber-crime[10][11]. We have discussed the improvements to the online payment system and the acquisition granted in Section 4, the detailed working of the application and also the challenges we faced.

SPAY is an application to save our time. Whenever we visit a supermarket, we usually have to spend a lot of our time in long queues to pay our bills. The shopkeeper scans the barcode [9] from each and every product to make a list of products and then we pay the bills. Even if we have just one product in our hands, still this becomes very time-consuming. Also, the ink

used in the paper of bills is harmful to health. So, SPAY (Smart Payment) is a perfect solution for such problems. SPAY makes the payment procedure easy and time-saving for the customers as long queues can be avoided. It is also an initiative to save the environment as it would save paper. Due to the corona pandemic, we all are stuck in our homes and we have to keep social distancing from each other so we took this into consideration and developed an application(SPAY) which is ensures social distancing in various shops. So, this app avoids the long queue and also saves our time. Let's take an overview of the app-

- SPAY makes the payment process effortless and time-saving for the buyers it avoids long queues.

- It is also an endeavour to save the environment as a lot of paper is consumed in the traditional bills.

TABLE gives a summary of all technologies used, as:

- As far as the usage is concerned, the customer just needs to scan the barcode[2] from the product by their device, create an item list by themselves and pay online.

- Customers just need to display the receipts to the gatekeeper at the time of their exit from the stores.

II. TECHNOLOGY USED- PLANNING OF THE WORK STRUCTURE

Here we illustrate the various technologies used as well as the basic planning of the work structure that we will be using to develop this application. The following

TABLE I DESCRIPTION OF TECHNOLOGIES AND THEIR PURPOSE.

	UI/UX	Frontend	Backend
Technology	Adobe XD	XML language on Android Studio	Kotlin on Android Studio

Purpose of the technology used	• Designing the complete UI of the app without the actual implementation and coding.	• Development of front-end User Interface which involves coding complete design. • Material UI Design Pattern by Google and its Implementations are followed to design the buttons and other view elements as per the Material UI Guidelines. • Developed various views and Layouts.	• To implement a Barcode / QR Code Scanner. • Used Razorpay Android SDK for the payment gateway integration. • Used LiveData and LifeCycleOwner to wrap the data and continuously update the UI as the data changes in the backend. • Linked the application to Firebase Realtime Database [6]. • Implemented Recyclerview with a custom Adapter to add items to the list. • LiveData and LifeCycleOwner to wrap the data.

III. ONLINE PAYMENT SYSTEM

As the exchange among several business partners continues available on the e-commerce platform, gradually the old cash-based payment system got replaced by the new electronic payment systems [12].

The manifestation of this development in the global business forum encouraged many businesses institutions that will naturally change from a standard paper-based exchange to an electronic payment system [17].

It is defined as a form of organizational information IOS system for transactions that are related to money, connectivity multiple organizations and individual clients [8]. Need for complex interactions may be required Between partners, environment, and technology [7]. Special features of EPS / IOS also separates it from the standard internal core information systems; in technology, in terms of relationships and organizationally, it is complex and complex, highlighting the importance of cooperation as well the need to combine every element as one.

Significantly, the yearly non-cash transaction is facilitated with online payment and the mobile payment [3] has been growing. In addition, in 2014, volumes of non-paper trading worldwide have risen to 8.9%. 387.3 billion, which is the most significant level of development since time immemorial the first edition of the World Payments Report [15].

The growth was mainly determined by the rapid development of innovations building markets. High development worldwide is expected to continue in 2015, with testing of a development rate of 10.1% which will make it non-paper the exchange volume reaches 426,300,000,000[13]. Internet payment programs are important methods used by individuals as good organizations as a safe and easy way to do payments via the internet and at the same time the

gateway to the destination technological advances in the domain of global economics. Online payment systems also have visual craftsmanship, a reduced level of fraud, and rationality in global payment systems [5].

IV. PROBLEMS ASSOCIATED IN TRADITIONAL MODE OF PAYMENT

Toxic ink used in Receipt

You all might have observed that the ink used in the receipts fade over time. Those are made with 'thermal

paper' that contains toxic chemicals BPA (Bisphenol A) and BPS (Bisphenol S) which cause diseases such as cancer, diabetes, and blood pressure. Working of a traditional mode is shown in the figure below:

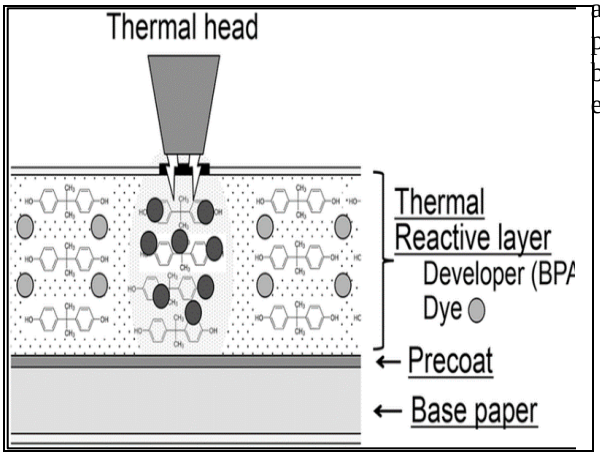


Fig. 1. Diagram of thermal paper

V. BENEFITS OF SPAY TO THE ENVIRONMENT

Spay has many benefits as listed below:

- As mentioned earlier the chemicals which are used in the ink of the bills result in health risks. Plastic Pollution Coalition reported that the chemicals, Bisphenol A (BPA) and Bisphenol S (BPS) that are used by many companies either in cash register receipts or credit/debit machines are still predominating the thermal paper market and can cause human health concerns.

- Another issue is wastage of paper. Statistics show in order to make paper, 21 billion gallons of water and 10 million trees are used in the U.S. The annual waste from receipts in the U.S. is 686 million pounds of waste. Skipping receipts would save 12 billion pounds of carbon dioxide (CO2), the equivalent of one million cars on the road [14].

VI. ONLINE PAYMENT SYSTEM AT A GLANCE

The available modern online payment services mostly offer simple, fast and secure ways to pay. Following are some fundamental features that is ultimately expected from payment providers, as:

a. Security measures
b. Easy integration of various techniques
c. Detailed reporting of each item and selections
d. Several Invoicing options
e. Numerous payment options
f. Fast dealing and processing speed

We all rely on online platforms. These payment systems are discussed in table below:

TABLE II .DESCRIPTION OF ONLINE PAYMENT PLATFORMS

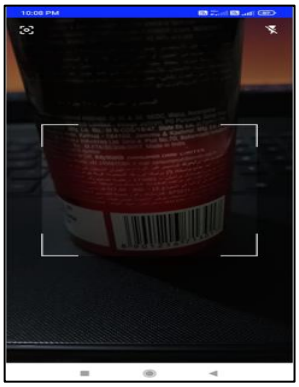
	Paytm	**Google Pay**	**Bhim**	**Bharat Pe**
Year	2010	2011	2016	2018
Founder	• Vijay Shekhar Sharma	• Sujith Narayanan and Sumit Gwalani	• National Payments Corporation of India	• Ashneer Grover and SashvatNakrani
Characteristics	• One of India's biggest payments platforms.	• Platform provided by Google.	• BHIM is an Indian payments platform.	• Bharat is a fintech company based in India.

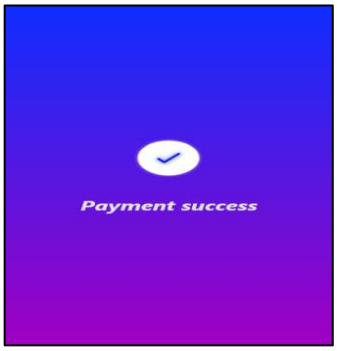
	• Provides us with a digital wallet to store money[18].	• It is similar to Paytm, however, it relies more on UPI id[19].	• It is based on the recent techniques that include the Unified Payment Interface (UPI)	• It helps out small merchants and general store owners in India[8].

VII. STEPS TO USE SPAY APP

The systematic steps are essential to get the online payment done successfully. These steps are displayed in the table below:

TABLE III DESCRIPTION OF ONLINE PAYMENT PLATFORMS

Step1: Open the application	**Step 2: Select any supermarkets**	**Step 3:Scan the barcode of the products**
		
Fig 4(a): First screen of the application	**Fig 4(b): View of supermarkets**	**Fig 4(c): Displaying the barcode**

Step 4:Verify cart's item	Step 5: Continue to pay	Step 6: Show the e-receipt at exit and avoid bills with toxic inks. [20]
		
Fig 4(d): List of items purchased	**Fig 4(e): Payment gateway**	**Fig 4(f): Payment has been done**

VIII. SYSTEMATIC FLOW OF PROPOSED GATEWAY

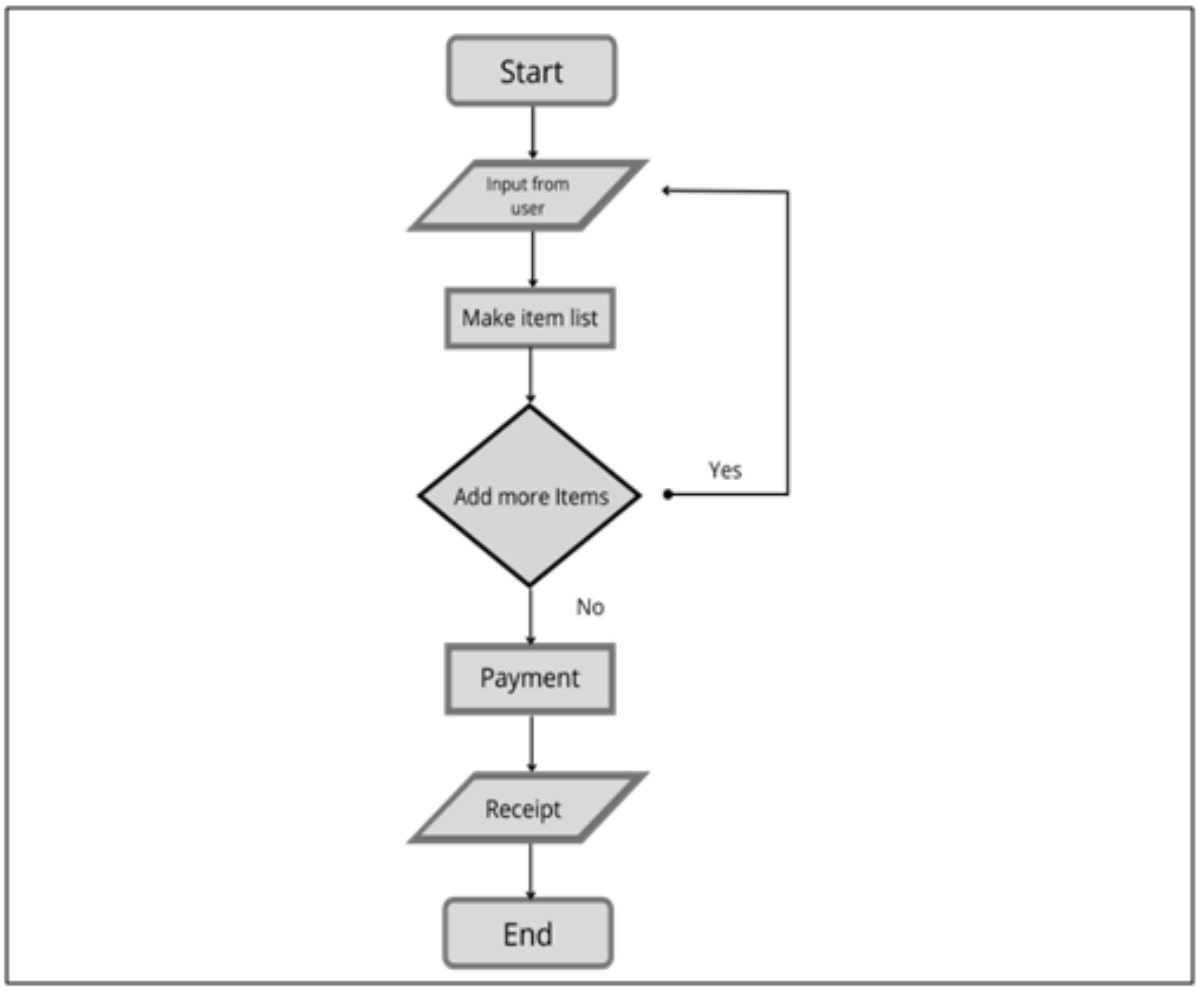


Fig. 5. Flow diagram of proposed gateway

The systematic steps are essential to get the online payment done successfully. The above flowchart can be described as:

Steps	Descriptions

Step 1: Firstly, click the icon of the application and you will find the splash screen with the logo of the mobile application on it.

Step 2: Further, an activity with all the departmental stores will be opened. Check and click them as required.

Step 3: Next, you we need to scan the barcode of the item that you want to buy.

Step 4: Carefully verify the items that you have added in your cart.

Step 5: In the next step continue to make the payment using the desired payment gateway, viz Card, UPI, wallet etc.

Step 6: Finally, get the e-receipt generated , and show that receipt to the cashier or the guard

CONCLUSION

Smart Payment is an initiative to digitalize India. People would start preferring departmental stores even more due to the ease of access of items as well as the bill payment. This will result in profits for the stores as well.This document summarizes different research works. Nowadays, everybody prefers supermarkets, therefore customer management becomes time-consuming and ink used in the bill is extremely harmful. Thus, this application is the solution. Several approaches involved in the development of this app have also been mentioned in this paper. Also, the difficulties faced during the feature extraction module have also been summarized. If we talk about reliability, nowadays, cybercrimes are a common concern in our society. In order to protect our system from such activities, we need to be extra careful. Thus, we add the feature of declining the bills after payment so that nobody can misuse the previous bills. So, every customer has to show the bill to the guard at the time of exit and then the gatekeeper will decline that bill. Our application could be a better approach for reducing the length of the queues in supermarkets and it is trustable as well. The security and ease for the customers have been prioritized.

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