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Coupxchange

Ashika C Salian[1], Bhuvan Shetty[2], Gagan V[3], Hithesh Udaya Kumar[4], Sunitha N V[5]
[1, 2, 3, 4]*Student,* [5]*Assistant Professor, Dept of Computer Science and Engineering, Mangalore Institute of Technology and Engineering, Moodabidri*

Abstract: ***Coupons are a way for consumers to receive an incentive to purchase a product by using them. There have been a number of consumer concerns regarding coupon savings that have been exacerbated by the economic and financial crisis. With a strategic approach, online shopping applications can use coupons to attract and retain customers. Online social coupons that offer daily deals are becoming more popular. In addition to offering substantial discounts, these companies also allow their customers to experience a wide variety of products at a reduced cost, while at the same time being able to enjoy substantial discounts on those products. Mobile coupons can be time and/or location sensitive. However, it is not necessary that the customers use those coupons for themselves, since they are no longer useful for them, and it may go waste. So, in this proposed system we provide a facility for the customers to submit the coupons which are not useful to them and earn the points and get the required coupons by redeeming their points. In the backend coupon verification process will be done. This system recommends the coupon based on the category of sites they wanted. Recommendation logic is done in firebase functions. Recommended coupons will always be verified.***

Keywords: Discount coupon, Automation, Category, Verification, Functions

I. INTRODUCTION

Online discount coupons are digital vouchers or codes that offer discounts or savings on a product or service when shopping online. They are typically found on coupon websites, social media platforms, or through email marketing campaigns. Online discount coupons work by providing a specific code that can be entered during the checkout process on an e-commerce website, resulting in a reduced price for the item being purchased. These types of coupons can offer a variety of discounts, including a percentage off the total purchase price, free shipping, or a specific dollar amount off the purchase price. Online discount coupons are a popular way for retailers to attract new customers and retain existing ones, while also providing shoppers with a way to save money on their purchases. Another benefit of online discount coupons is that they can help retailers to increase their sales and revenue. By offering discounts on specific products or categories, retailers can encourage customers to make purchases they might not have otherwise considered. Additionally, by offering exclusive discounts to customers who sign up for their email newsletters or loyalty programs, retailers can build stronger relationships with their customers and encourage repeat purchases. Online discount coupons can also be an effective way for retailers to clear out excess inventory or promote new products. By offering discounts on specific items, retailers can generate interest and buzz around these products, potentially leading to increased sales and revenue in the long term. However, it's important to note that online discount coupons are not without their limitations and challenges. For example, some retailers may only offer discounts on certain products or categories, making it difficult for customers to find the deals they are looking for. Additionally, some coupons may have restrictions or limitations, such as minimum purchase requirements or expiration dates, which can make them less attractive to customers. Furthermore, the widespread availability of online discount coupons has led to a growing concern over coupon fraud and abuse. Some customers may attempt to exploit coupon codes or use them for unauthorized purposes, leading to lost revenue and potential legal issues for retailers.

Online discount coupons came about as a result of the growing popularity of e-commerce and online shopping. As more and more people began to shop online, retailers and marketers realized that they could use discount coupons as a way to incentivize customers to make a purchase, or to promote specific products or services. Online discount coupons also provide a way for retailers to track the effectiveness of their marketing campaigns, as they can monitor how many customers are using the coupons and which products or services are generating the most interest. From a customer perspective, online discount coupons provide an opportunity to save money on purchases and access exclusive deals that may not be available elsewhere. Overall, online discount coupons have become an important tool for retailers and customers alike in the world of online shopping. Another benefit of online discount coupons is that they can help retailers to target specific customer segments. For example, retailers may offer discounts to first-time customers as a way to encourage them to make a purchase and become a loyal customer. They may also offer discounts to customers who have abandoned their shopping carts, as a way to entice them to complete their purchase.

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In addition to targeting specific customer segments, online discount coupons can also be used to promote certain events or occasions. For example, retailers may offer discounts for holidays like Christmas, Valentine's Day, or Black Friday. They may also offer discounts to celebrate the launch of a new product or to commemorate a special occasion like a store's anniversary. Another benefit of online discount coupons is that they can be used to encourage customer referrals. Retailers may offer discounts to customers who refer their friends or family members to the store, as a way to incentivize word-of-mouth marketing and increase their customer base. It's also worth noting that online discount coupons have evolved over time, with many retailers now offering more personalized and targeted discounts based on customer behaviour and preferences. For example, some retailers may use data analytics and artificial intelligence to analyse customer behaviour and recommend discounts that are tailored to their individual needs and interests. Finally, online discount coupons have become increasingly important in the wake of the COVID-19 pandemic, as more people have shifted to online shopping and retailers have sought new ways to attract customers and generate revenue in a challenging economic climate. Overall, online discount coupons are a powerful marketing tool that can benefit both retailers and customers. They provide a way to incentivize purchases, target specific customer segments, and promote events and occasions. As online shopping continues to grow in popularity, it's likely that online discount coupons will remain an important part of the e-commerce landscape for years to come.

Online discount coupons are used nowadays in a variety of ways to attract and retain customers, promote products and services, and drive sales through targeted marketing campaigns. Retailers make use of promo codes, discount links, email campaigns, social media promotions, and affiliate marketing to offer exclusive discounts and savings to their customers. Customers can save money on their online purchases by entering a unique code during checkout, clicking on a special landing page link, signing up for a retailer's mailing list, following them on social media, or accessing exclusive deals through coupon websites and bloggers. Overall, online discount coupons have become an essential tool for retailers to compete in the world of e-commerce and provide customers with an opportunity to save money while shopping online. In addition to being a popular marketing tool, online discount coupons can also provide benefits to customers beyond just saving money. For example, they can introduce customers to new brands and products that they may not have otherwise considered trying. By offering discounts on these items, retailers can encourage customers to take a chance on something new and potentially discover a new favorite product. Online discount coupons can also be a great way to reward loyal customers, providing them with exclusive discounts and deals that are not available to the general public. This can help to foster a sense of community and loyalty among customers, which can be invaluable to retailers in the long term. Additionally, online discount coupons can be a great way for retailers to clear out excess inventory or promote seasonal items, allowing them to make room for new products and stay ahead of the competition.

Online discount coupons can get wasted in a number of ways, ultimately resulting in missed opportunities for both retailers and customers. One of the most common ways that coupons get wasted is through expiration. If a coupon has expired, it cannot be used, and customers may not realize this until after they have attempted to use the coupon. Another way that coupons get wasted is through restrictions. Some coupons may have restrictions on the products or services that they can be used for, the minimum purchase amount required, or the maximum discount that can be applied. This can limit the usefulness of the coupon and result in customers not using it. Technical issues can also lead to wasted coupons, such as broken links or website errors preventing customers from accessing the coupon. Additionally, customers may ignore coupons or forget to use them before they expire, resulting in wasted opportunities for savings. To minimize waste, retailers must ensure that their coupon campaigns are well-designed, easy to access, and clearly communicated to their customers. This can help ensure that customers are aware of the coupon, understand its terms and conditions, and are motivated to use it before it expires. Another factor that can lead to the waste of online discount coupons is the difficulty in finding and accessing them. Customers may not know where to look for coupons or may have trouble accessing them due to website issues or technical problems. This can result in missed opportunities for savings and frustration for customers who are interested in using coupons. To address these issues, retailers can take steps to make their coupons more accessible and user-friendly. This may include providing clear instructions on how to access and use coupons, ensuring that coupon links and codes are easy to find and use, and providing customer support to help customers who are experiencing technical difficulties. Another approach that retailers can take is to personalize their coupon campaigns to target specific groups of customers. This can help ensure that coupons are being offered to customers who are most likely to use them and can increase the likelihood that coupons will be redeemed. For example, retailers can use customer data to offer coupons based on past purchase history, location, or other relevant factors. Overall, minimizing the waste of online discount coupons requires retailers to take a proactive approach to designing and implementing their coupon campaigns. By making coupons easy to find and access, providing clear instructions and support, and personalizing their campaigns to target specific groups of customers, retailers can increase the effectiveness of their coupon campaigns and ensure that customers are taking advantage of the savings opportunities they offer.

There are some sites that provide the online coupons but each of them is having their own disadvantages, RetailMeNot - Some users have reported that not all of the codes on the site work, and some are outdated or have already been used by other customers. Additionally, the site may display misleading information about the availability and expiration dates of coupons. Coupons.com - The site may require users to download additional software or plugins in order to print or redeem coupons, which can be inconvenient and potentially risky for users concerned about security issues. Groupon - While the site offers significant discounts, users may have limited time to redeem deals before they expire, and some deals may not be available in all geographic locations. Additionally, some customers have reported difficulty in cancelling or getting refunds for purchases. Honey - Some users have raised concerns about the privacy and data collection practices of the site, as it collects information about users' browsing and purchasing habits. Additionally, not all codes may be verified or work properly, and the site may not offer as many options for niche or specialized products. Rakuten - The site may require users to create an account and provide personal information in order to access discounts, and some users have reported difficulties in receiving cashback rewards or getting them credited to their accounts. Additionally, the site may not always offer the highest discounts or best deals compared to other coupon websites.

Coupon exchange applications can help in reducing wastage of coupons by providing a platform for users to trade their unwanted coupons with others who may be interested in them. This can prevent coupons from being thrown away, increase the value of coupons, and provide access to more coupons. By exchanging unwanted coupons for more desirable ones, users can reduce the overall amount of coupon wastage and save money on products they want or need. Additionally, by reducing the amount of coupon waste generated, coupon exchange applications can provide the coupons based on the user category required. When user copied the coupon from the recommended tab his point will be decreasing, as when user submit the coupon and if coupons are verified his points going to be added. In free tab user will get the coupons from some sites that are not that much popular. This free coupons are generated from API process through firebase functions the make the coupon request at background without server maintenance.

II. LITERATURE REVIEW

Goncalo, et al[1] Platform for processing digital coupons proposed by MMA redemption rates of this type of coupons when compared to More specifically, with regard to the processing of digital that digital coupons redemptions account for only 2% of total establishes a set of specifications that define the first version standards; and ultimately, a real-time validation service consumers through custom promotional marketing opportunity for suppliers and retailers to eliminate most cycle of coupons processing, many other solutions seek to provide solutions for the different stages of digital coupons associated to specific products and other types of promotions marketing solutions is offering online coupons in partnership barcode displayed on phones, and through that to promote products and the customization of coupon offers to Various forms and solutions for processing digital technology in processing systems of digital coupons is incorporated describes a set of techniques and mechanisms consumers mobile devices using software for detection, period, the coupons issued in products and services in read a QR code to store coupons in the mobile device.

Kristen, et al[2] Coupons are very important to encourage buyers to buy a product and thus help businesses increase their sales. Research problems arise from the research questions "Are vouchers an innovative and effective tool for sales promotion? Kotler and Keller (2006) identify consumer-oriented sales promotion tools (samples, coupons, presentations), then B2B sales promotion tools (discounts, rebates, free products) and According to Park, Choi, Moon (2013), sales promotion is an incentive for consumers to buy As Isolate (2013) points out, sales promotion is a set of methods aimed at persuading the consumer to buy a product. 5. The coupon as an effective and innovative sales promotion tool coupons are a very popular sales promotion method for new and established products".

Margarita, et al[3] Coupons offer opportunities for price discrimination and contact with new customers For businesses considering offering coupons, the key question is whether First, coupons can facilitate price discrimination by allowing companies to bid favorable price discrimination, consumers who need to be offered discount coupons Second, coupons can benefit businesses through advertising, Voucher Business Model: As the services scale, their ability to deliver is limited We present our coupon model in Section 33 and examine the price the ability for businesses to adjust their prices in anticipation of using coupons and consumers assumes that all consumers are aware of the store, so coupons do not contain advertising can be obtained from the company at a reduced price αp in the first period. Allowing consumers to buy more coupons has mixed effects on corporate profits. The company benefits from a reduced price for these consumers

Benjamin, et al[4] Manufacturers often target coupon offers with different coupon offers to specific consumer segments on multiple coupon delivery methods to reach different consumers more effectively and efficiently respondents said they use paper coupons far more than any other Almost 75% of those surveyed stated that they regularly use paper vouchers always or The vast majority of repeat users of cash, in-store, and online coupons were subsets of paper coupons' loyalty card rebates offer valuable savings in lieu of coupons at checkout, in-store and online.

Online coupons are used by households (Chain Store Age, 2003). Written Survey on Grocery Shopping Behavior, Coupon Usage, and Demographics The use of the coupon can be studied by analyzing shopper demographics and behavior. Often when shopping were marked as frequent users of paper coupons; those who reported at the checkout On the other hand, only 7.3% of those surveyed stated that they regularly use online vouchers. On the other hand, only 7.3% of those surveyed stated that they regularly use online vouchers.

III. METHODOLOGY

Coupxchange system is android application, it combines various technology to give all the functionality in our system. It uses Uipath automation for verification/validation purpose,and data management with API and Firebase function for server-less handling and Apps script for Uipath to Google spreadsheet to Firebase real-time database.
Methodology of coupxchange system will be:

A. Validation/Verification

Once the user submitted the data through the Android application, it will be added to Firebase. From the Firebase, real-time database coupon information will be sent into Google spreadsheets with the help of Apps Script code. This code maintains the up-to-date data between the Firebase real-time database and Google spreadsheets. The UiPath Automation will be used to verify the coupon code this automation is having different workflow activities such as "Use Google Spreadsheet" for the Spreadsheet data fetching, "For Each Row in Spreadsheet" for each of row from the Spreadsheet. Use browser" for the automation of the coupon verification process website. "Type Into" for the searching of product also to type the coupon code. Click activity to click the specific selector. Then we use varies UI path activity for the verification process. Once verification is done by automation process, then data about the verified coupon is stored in spreadsheet which is then synchronized with Firebase using Apps script. Figure 3.1 shows the validation/verification flow.

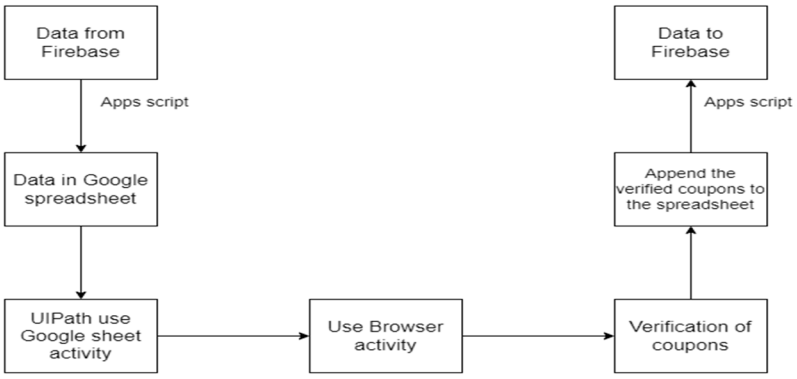


Fig.3.1 Validation/Verification

B. Data Synchronization

There is a need for data synchronization between Firebase and Google spreadsheets. Because when data is added and removed from the Firebase, it should be directly reflected in Google spreadsheets. This is achieved with help of Apps script, where this is need to write the JavaScript code for each of functionality. To get the data from Firebase to Google spreadsheet, there is a need of FirebaseApp library installed. Once the app required libraries are installed, then we need to write JavaScript code as per our requirement. Once all code setup is done, we need to set up a trigger that will trigger for each minute. We can get the output of each of execution throw our mail ID, so that their is no need to check for each of output. Also, some want similar logic is used for the data synchronization between the Google spreadsheet to Firebase. When a new row is appended to Google spreadsheet, a new key and value pair will be added in Firebase. Figure 3.2 shows the Data Synchronization flow.

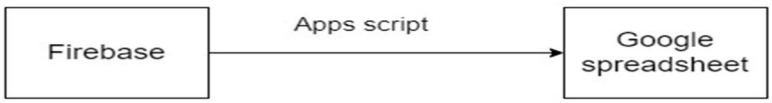


Fig.3.2 Data Synchronization

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C. Free coupon Generation

In the CoupXchange system, there will be a free tab for free coupons, Coupons present in that tab is not submitted by other user it is generated through specialized API parsing in Firebase functions. "getOffers" function is written in Firebase serverless function and deployed it locally using Node.js client in local machine. There will be addition of timestamp for each of coupons generated so that there will be up to date data maintenance. Older data will be rewritten by newer data. There is scheduled function deployement using "pubsub" Firebase base scheduling feature. Execution of functions is set the weekly wise, so that there will be new generation of coupons. Figure 3.3 shows the Free coupon Generation flow.

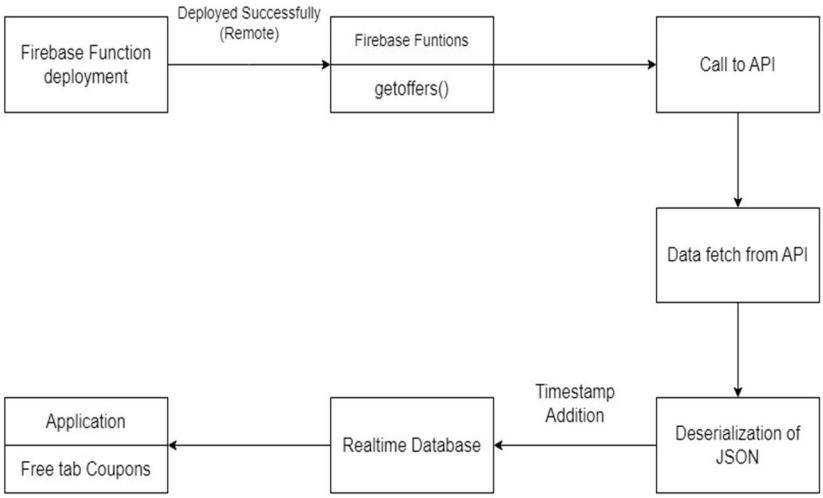


Fig.3.3 Free coupon Generation

D. Coupon Categorization / Recommendation

In Coupxchange system, when a new user registered he will be asked to give the preference based on the most used websites. Later by using the preferenced website coupon will be recommended to the user. This recommendation logic is done at backend server-less Firebase functions. When a user submits a coupon it will be stored "UserCoupon" key in real-time database, later once the coupon is verified it will come under "Tokens" key and also "Category" key. The process of storing the data/coupon is done through Firebase functions written in Node.js environment, deployed to remote server from the local machine. In Firebase functions with the help of API in JavaScript code input is given to API as a company name, API returns category in which company belongs. In Firebase function "clearbit" API is used, it is a "Reveal API". Figure 3.4 shows the Coupon Categorization / Recommendation flow.



Fig.3.4 Coupon Categorization / Recommendation

E. Firebase function deployment

In the Coupxchange system, all the server-less code runs in Firebase functions. Initially, Firebase functions need to be inited to local machine, by using the command: "firebase init". Once Firebase function is locally initialized, in local machine there is an index.js file. All the backend logic written in JavaScript language in index.js file. Once logic is completed, functions are deployed to the remote Firebase server using the command: "firebase deploy --only functions". Figure 3.5 shows the Firebase function deployment flow.

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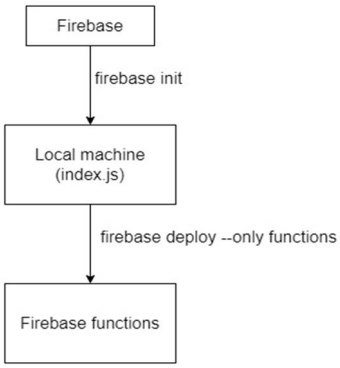


Fig.3.5 Firebase function deployment

F. User point addition and deletion

If a user has a point balance of greater than 1, they are able to copy a coupon code. Upon copying the coupon code, the user's point balance will be deducted by the corresponding amount. This feature incentives users to accumulate points and use them to obtain coupons, while also ensuring that the points are being utilized within the system.

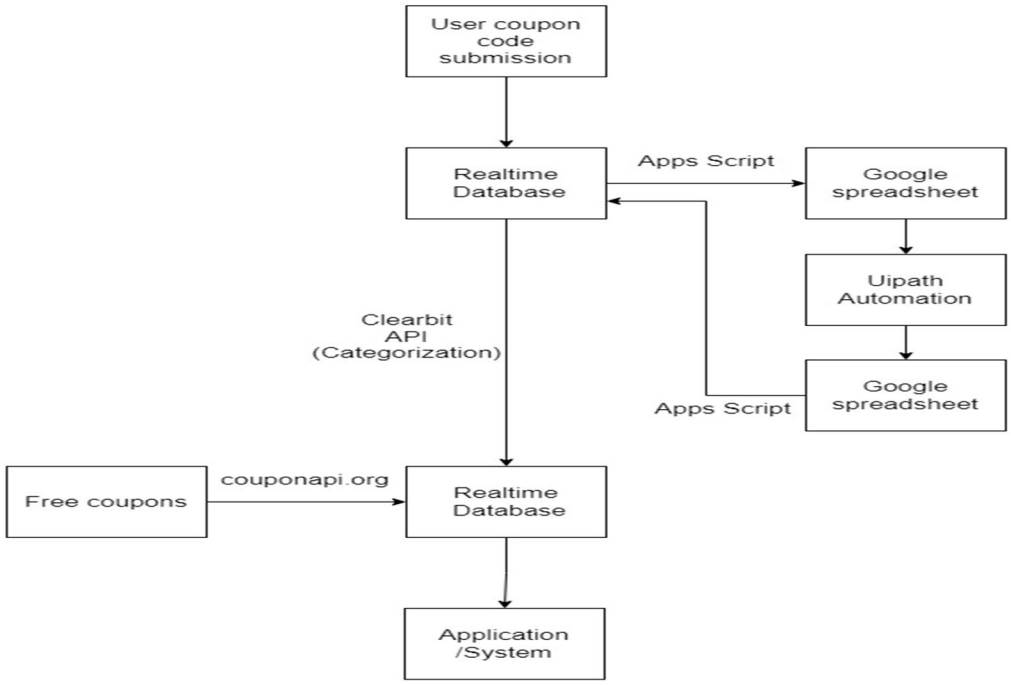


Fig.3.5 Coupxchange System workflow

The figure 3.5 shows the overall workflow of the coupxchange system, when the user submitted the coupon it goes under various process for validation and later it comes to recommendation tab.

IV. RESULTS AND ANALYSIS

Coupons are the way through which users will get a discount when buying the product online. in Coupxchange system helps to exchange the coupons between users so that coupons will not get wasted. In coupxchange system coupons are validated/verified by the automation process. Verified coupons will be stored in category-wise through API so that it will be recommended to user later based on his preference. Firebase functions deployment usage figure 4.1 show below:

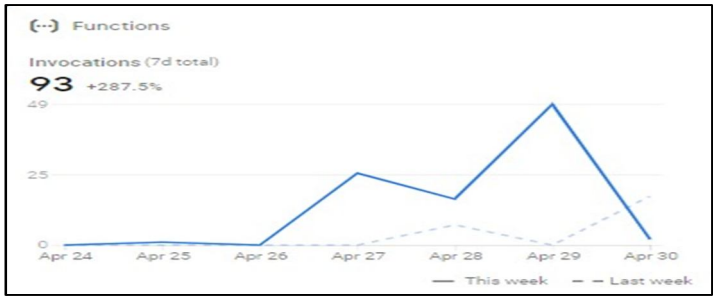


Fig.4.1 Firebase function invocation



Fig 4.2 Free coupon tab

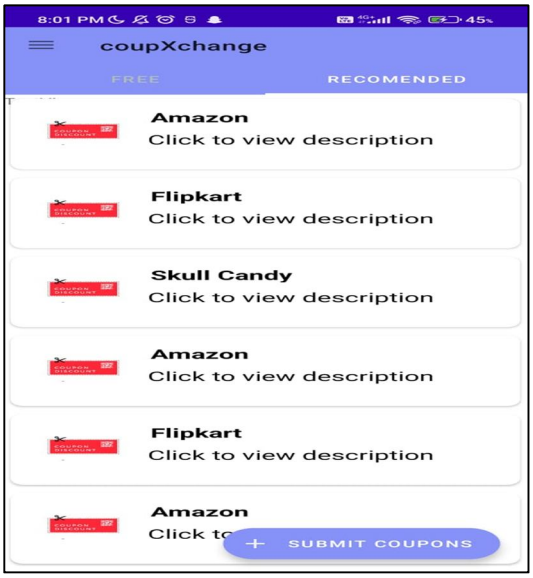


Fig 4.3 Recommended tab

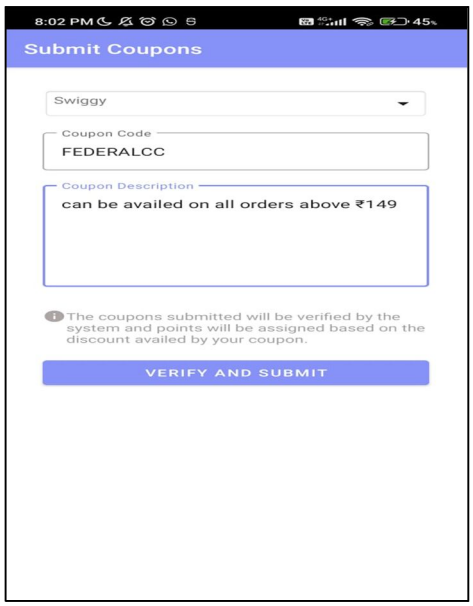


Fig 4.5 Coupon submission

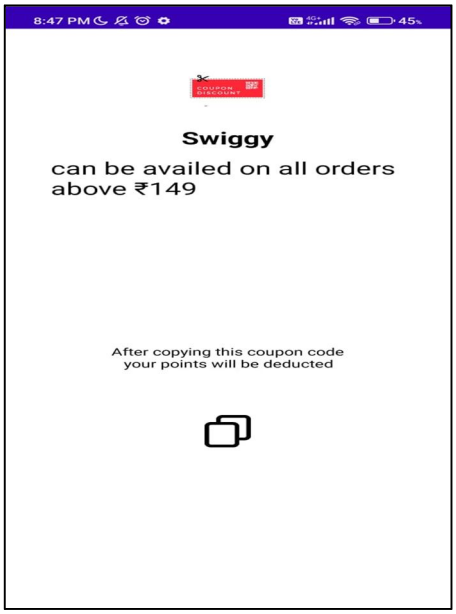


Fig 4.5 Copying recommended coupon

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V. CONCLUSION

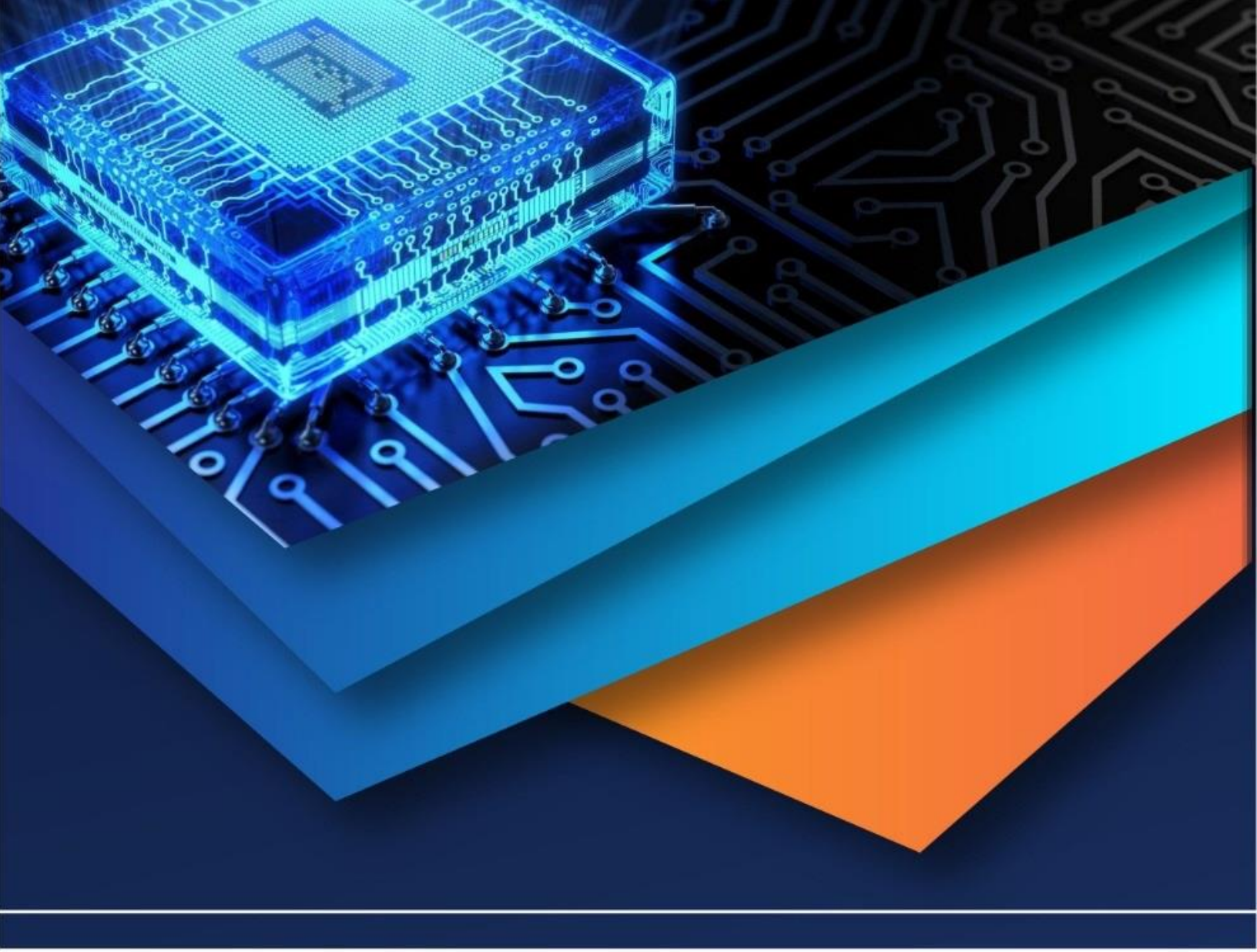
In conclusion, our project focuses on the development of the system that can exchange coupons between the users to get discounts on certain products by redeeming their points. The system will collect coupons from users and use automation to verify their validity, after which points will be awarded to the user. In addition to these user-submitted coupons, the system will also offer free coupons that have not been submitted by other users. However, there is no guarantee that these free coupons have been verified.

This system provides a platform for users to exchange and benefit from coupons in a more efficient manner. By using automation to verify submitted coupons, the process of collecting and awarding points can be streamlined, reducing the need for manual verification. Furthermore, the availability of free coupons can provide users with additional options to obtain discounts. However, the lack of verification for these free coupons means that users should exercise caution when using them. Overall, this project aims to create a coupon exchange system that is convenient, user-friendly, and beneficial to all parties involved.

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