

Counterfeit Product Detection

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Abstract : *The system envisages developing an app that connects consumers to everyday brands and products and enables brands to provide offers and loyalty benefits to consumers. It also empowers a consumer to ascertain that the product they are purchasing is genuine, along with quintessential information regarding the brand and product, all at their fingertips, on their phone.*

Keyword : *counterfeit, incentive model*

I. Introduction

FMCG companies are one of the largest conglomerates in the world, a part of everyday life, across all consumer types. From the masses to the uber rich, these companies play an integral part in one's day to day life. From the time one wakes up, to the time one goes to bed and even while one is asleep, one uses products manufactured by these companies. However, these companies have an inherent problem – they have no way of identifying their consumer. Thus, the loyal consumers receive no benefits for their loyalty to their favorite brands / products. This app connects consumers to everyday brands and products and enables brands to provide offers and loyalty benefits to consumers. It also empowers a consumer to ascertain that the product they are purchasing is genuine, along with quintessential information regarding the brand and product, all at their fingertips, on their phone. This system details the development of a smartphone based loyalty & marketing solution, along with a proprietary anti-counterfeit algorithm, based on a unique code integrated on the product packaging. The key objective of the platform is to create a brand specific loyalty, incentivize the consumer which can be accessed through an Android application.

The system uses image processing for the unique code printed on the product. It uses the smartphone camera to scan and verify the code with that of the brand to check for the authenticity of the product. It will automatically detect the code and the encoded-decoded pattern of it which will be present in the database of that brand. The user will have access to all the brands and their respective products. If the authentication is successful it will show the user full description of the product that the brand puts up. Once a user purchases and scans a product, the user is automatically enrolled in to the loyalty & marketing program of the brand and receives incremental benefits & discounts for purchasing products manufactured by the same brand. The user can also check & redeem applicable offers & rewards through the app itself. This will create a global offer & marketing system rather than offer restricted to a store (viz. more you buy from a brand you will receive offers accordingly from the manufacturer directly). This will also encourage billing in customers bringing legitimacy in the business environment. In addition to these benefits at a consumer level, the system entails an analytics solution at the backend. The platform provides brands with valuable data regarding purchase patterns of consumers and consumer profiling. It also enables brands to access a loyal consumer base to sample new products and receive relevant feedback for new product launches. This is a first-of-its-kind solution that will be deployed for mass market, non-electronic consumer brands for loyalty, marketing & anti-counterfeit in India.

II. Problem Statement And Solution

1. Problem Statement

Duplicate branded goods are most commonly sold unfortunately, not only the stalls on open-air markets but also customers shopping outlets and well-known retail chains. The problem is made worse by some retailers who willingly buy fake goods in order to achieve higher profit margins.

2. Proposed Solution

The front-end checks whether product is genuine. There are very limited ways to do so. One of which is assigning unique barcode to each single product.

This barcode will be assigned per batch number (the place to be sold) and time stamp or time limit for that product. For instance, a pack of medicine made for other country can't be sold in India, also once the product

reaches the expiry date, it can be known. This will regulate the product flow. So, for scanning and displaying maximum information Android barcode app is used.

2. A Counterfeit product recognition:

There is obvious loss to companies due to duplicate products but the user also feels cheated if the products he buys is forged/ fraudulent, also no one can afford to be cheated on products like medicines and cosmetics, which if counterfeit are injurious to health. To avoid this the app uses barcode/QR code unique to each packet to scan the product which can say a lot about the product.

2. B User incentive model:

The discounts today are limited to a store e.g. If a consumer buys a pair of shoes Nike form Bata Kandivali with no offers while there is 20% discount in Bata Malad, this is a serious disadvantage to the customer. Now if the app provides uniform reward points/loyalty scheme for Nike customers, consumer can have discount from any store selling Nike goods directly from manufacturer.

Once a user purchases and scans the product, the user is automatically enrolled in the loyalty & marketing program of the brand and receives incremental benefits & discounts for purchasing products manufactured by the same brand. The user can also check & redeem applicable offers & rewards through the app itself. This will create a global offer & marketing system rather than offer restricted to a store.

2. C Analysis of data

The data received from user consists of the location, age, purchase history and other factors which user fills in while logging in. This data is essential for companies and manufacturer to guess the future of product and conduct research of the products. Hence the collected data will be analyzed and detailed feedback will be given to the manufacturers.

III. Review Of Literature

The system Design and development Android application to process and summarize corporate data [1] mentioned in the paper takes advantage of ever growing android industry by developing an android app that would retrieve and display summarized corporate data on android devices. This enables user to get up to date information anywhere with their device and stable internet connection. The authors Seth Y. Fiawoo and Robert A. Sowah state that, this paper mainly focuses on large organizations, where data is of utmost importance. It says that in large organizations where managers have to make quick decisions to enable their organization to remain competitive and profitable, decision making is key in such organizations. Wrong decisions can have serious implications on the company. Top-level managers make such decisions within these organizations and before making any decision, they go through company records; decisions made are based on information garnered. [1] At times information on which to base their decisions on are so voluminous that the decision-making process takes longer than required. In some cases, the company may have a computerized system whereby summarized information can be displayed to managers on request using personal computers. However, in such cases, it becomes difficult for managers to access such information while on the go. The goal of this system is to develop an Android application that would retrieve and display summarized corporate data on android devices [1].

This is achieved in the given system paper (1) creating a backend application of the system which would be a Web application that would be used to capture data at local offices, (2) implementing and deploying a database that would host captured data and (3) developing a frontend application which would be an Android application that would interface with the database to retrieve information and display it on an Android device. [1]

The whole counterfeit detection app system is similar in terms of data flow as given in the paper. It gives information about collecting data from android app, transferring it to server, processing it on backend and displaying processed data to concerned authority. In the paper The Research of Improved Apriori Algorithm for Mining Association Rules. [2] the authors Sheng Chai, Jia Yang and Yang Cheng present an improved Apriori algorithm to increase the efficiency of generating association rules. This algorithm adopts a new method to reduce the redundant generation of sub-item sets during pruning the candidate item-sets, which can form directly the set of frequent item sets and eliminate candidates having a subset that is not frequent in the meantime. This algorithm can raise the probability of obtaining information in scanning database and reduce the potential scale of item-sets. In classical Apriori algorithm, when candidate generations are generated, the algorithm needs to test their occurrence frequencies. The manipulation with redundancy result in high frequency in querying, so tremendous amounts of resources will be expended whether in time or in space [2].

In this an improved algorithm is proposed for miming the association rules in generating frequent k-item sets. Instead of judging whether these candidates are frequent item sets after generating new candidates, this new algorithm finds frequent item sets directly and removes the subset that is not frequent, which based on the classical Apriori. [2]

This algorithm almost reduces the data size by half. It does so by considering only frequent data items and removing the non-frequent items from further iteration. This reduces data size as well as computational power required. [2]

The paper Data Clustering with Modified K-means Algorithm [3] presents a data clustering approach using modified K-Means algorithm based on the improvement of the sensitivity of initial center (seed point) of clusters. This algorithm partitions the whole space into different segments and calculates the frequency of data point in each segment.

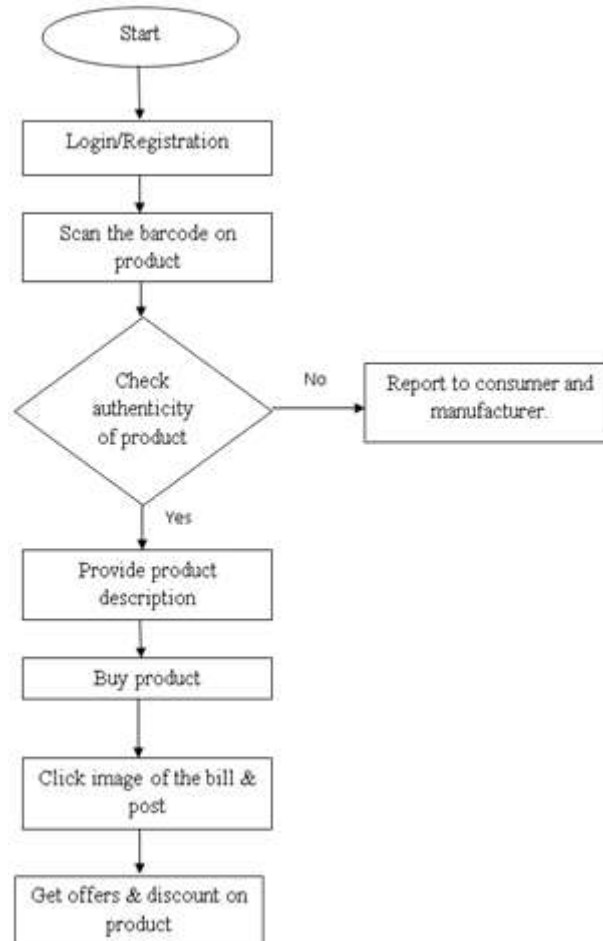


Fig.1. flow of customer side

The authors Ran Vijay Singh and M.P.S Bhatia have found new method for clustering. The segment which shows maximum frequency of data point will have the maximum probability to contain the centroid of cluster. The number of cluster's centroid (k) will be provided by the user in the same manner like the traditional K-mean algorithm and the number of division will be $k*k$ (' k ' vertically as well as ' k ' horizontally). If the highest frequency of data point is same in different segments and the upper bound of segment crosses the threshold ' k ' then merging of different segments become mandatory and then take the highest k segment for calculating the initial centroid (seed point) of clusters. In this paper, we also define a threshold distance for each cluster's centroid to compare the distance between data point and cluster's centroid with this threshold distance through which we can minimize the computational effort during calculation of distance between data point and cluster's centroid [3]. It is shown that how the modified k-mean algorithm will decrease the complexity & the effort of numerical calculation, maintaining the easiness of implementing the k mean algorithm. It assigns the data point to their appropriate class or cluster more effectively.

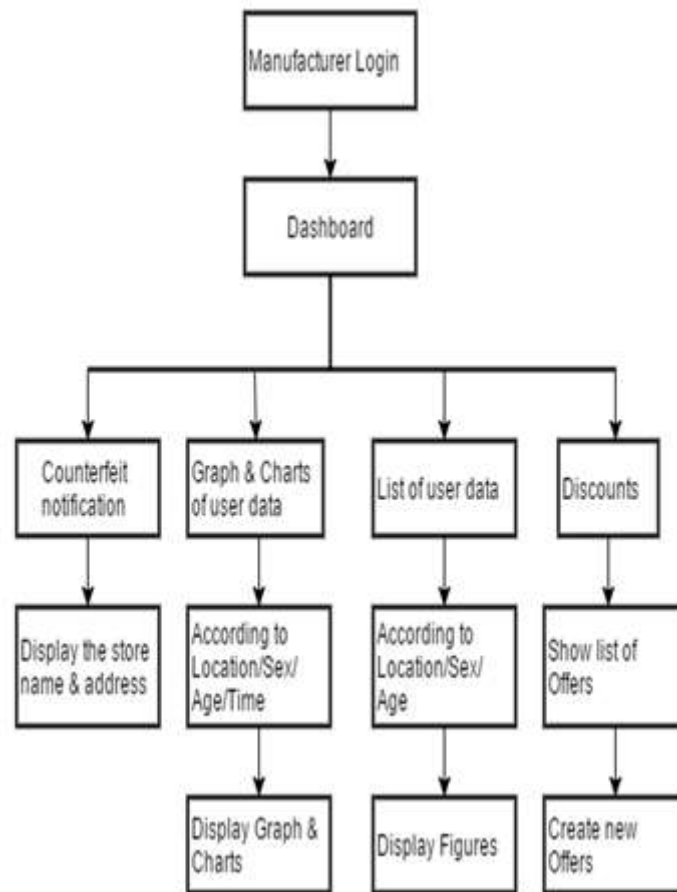


Fig.2. flow of customer side

IV. Conclusion

Find counterfeit products using android barcode scan technique. After barcode code scan user able to find out product fake or real. User can able to buy product using this app for more discounts and offers. If fake products found, then user scan product barcode then user able to report to companies. Companies take necessary action regarding fake product report.

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