

# Duplicate Product Detection Android Application

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**Abstract** – There are many duplicate goods being sold in the present times. It is mandatory to have a system for the end user to know all the details of the product while buying the product so that the buyer can decide if the good is genuine or not. Our system i.e. an android application can mainly be used while offline shopping. The system maintains information about the already launched logos of the branded companies using Image Labelling.

*Image Labelling - Image Labeling is a process to recognize different entities in an image. Various entities like animals, plants, food, activities, fictional characters, drinks can be known with its help. For the Image Labelling process, a model is created in TensorFlow which will contain the logos of the companies. The customer can check if the logo on the product is real or a counterfeit one. Hereby, allowing the user to be aware about the product and identify if it is of the original brand or any duplicate copy of it. For this purpose, the customer will be provided a GUI to scan the logo assigned on the product and the final result will be displayed.*

**Key Words:** Duplicate detection, android applications, image labelling, counterfeit detection, image classification.

## 1. INTRODUCTION

There have been many instances of counterfeit products across the globe and this issue is increasing day by day on a large scale. To check the genuineness of the product, a system is needed. The database for logos is needed to be maintained. A tensor flow model is useful to maintain the database of the original logos. TensorFlow is an open- source software library for machine learning. It can be used for tasks that has a particular focus on training and inference of deep neural networks. TensorFlow is better than any other source because it is backed up with google. It also allows quick performance.

Apart from this, the libraries are deployed on a hardware machine, which is a cellular device to the computer. TensorFlow is designed to use various backend software like GPUs. The biggest merit of using TensorFlow is that it allows monitoring the training progress of our models and tracking them. In the proposed system, all the launched logos are stored in the

TensorFlow model and the end customer can scan the logo assigned on the product and the final result whether the good is duplicate or not will be displayed on the screen.

## 2. LITERATURE REVIEW

**By means of RFID Tag (13/898,234):** This paper discusses about a system where the authenticity of a product can be done by using a sequential serial number assigned to the product by the manufacturer. The authenticity of the product can be verified at the point of purchase at the retailer or over the phone by way of the sequential number. In this method the manufacturers reach the consumers who purchase the product. The product also has RFID tag and a system is designed to allow the consumers in order to check the authentication of the product based on the RFID tag that is attached to the product. A two-dimensional barcode product verification method and system is also provided.

**By means of digital watermark (16/121351):** In this paper a system is proposed for automated counterfeit detection using steganographic encoding. One form of steganographic encoding includes digital watermarking. Digital watermarking is a process for altering physical or electronic media to fix a machine-readable code into the media. If the media is changed, it may be detected through an automated detection process. Digital watermark is applied on electronic or physical objects such as images, audio and video signals. However, it may also be applied to other types of objects, including, e.g., product packaging, electronics such as circuit boards and CPUs, stickers, logos,

graphics models, and surface textures of such objects.

**Use of sequential number (13/450732):** This paper introduces the concept for detection of counterfeit pharmaceutical products. This method provides a way for the drug consumer to verify whether a pharmaceutical product is a real or duplicate by using a sequential serial number which would be created by the medicine or pharmaceutical company. The consumer should first obtain a “permanent” personal identification number (ID) similar to a Social Security number. The personal ID number should be used with all producers of drugs and assorted products.

**By XID (13/782043):** This paper includes the machine readable instructions, which when executed cause a computer system to: determine a X-identification (XID) associated with a product, wherein the XID includes at least one of an unencrypted element and an encrypted part related with a parameter linked with the product; select at least one validation rule, from a plurality of validation rules, to select at least one validation technique from a plurality of validation techniques used to determine an authenticity of the product; and use, by a processor, the at least one selected validation technique to determine the authenticity of the product based on the XID associated with the product.

**Use of unique tag (15/304,196):** Here the author discusses about a system where there is a central database that contains a listing of unique tag codes, each of which corresponds to a single physical tag that can be created and affixed to a product. The tag can be scanned by a mobile device executing a software program that creates a secure communication channel with a central server. This software gathers properties of the mobile device to create a unique device identification code for the mobile device and allows for scanning of the tag for the unique tag code. The combination of the unique device identification code and unique tag code allows a token to be created that is unique to the device and tag combination. This unique combination of device identification code and unique tag code is communicated to the central server which verifies this code to be authentic if the scanning is successful then a message will indicate that the product is real or is counterfeit and/or that the tag has been re-used or otherwise misused.

**By the means of sensing device (11/863270):** Here the author proposes a system for determining a possible duplication of pharmaceutical product packaging, coded data including a number of coded data portions. Each coded data portion is indicative of the identity the pharmaceutical product. The method

includes using a computer system that receives indicating data from a sensing device, which generates the indicating data. The computer system determines the identity from the indicating data and uses this to access tracking data relating to the pharmaceutical product. The tracking data helps to know if product is duplicate.

The other reference papers are helpful in different ways for implementation of proposed system.

**With help of blockchain (e-ISSN: 2395-0056, p-ISSN: 2395-0072):** This paper introduces a system that manages ownership of products using IPFS (Inter Planetary File System) which is the Distributed Web. IPFS and Blockchain are similar. Here the system maintains information about manufacturer of product, how ownership is changing and customer can check who is the current owner of the product. For this purpose, customer will be provided a GUI to scan OR code assigned to the product and the information about the product will be displayed.

**By binary hashing (2017 International Conference on Deep Learning Technologies):** This paper proposes a near duplicate product image detection system for large scale datasets based on binary hashing. A distributed system is designed to process large scale product images, which utilize five strategies including removing the logo area of the product images, accelerating Hamming distance computation by using SSE2, filtering results using color information, dividing the dataset into buckets, distributing the computing using Spark clusters. The experimental results show that the system can detect near duplicate product images in large scale datasets rapidly and accurately.

**By means of duplicate detection algorithms(IEEE Transactions on Knowledge and Data Engineering Vol 19, No. 1, January 2017):** Often, in the real world, entities have two or more representations in databases. Duplicate records do not share a common key and/or they contain errors that make duplicate matching a difficult task. Errors are introduced as the result of transcription errors, incomplete information, lack of standard formats, or any combination of these factors. In this paper, the author presents a thorough analysis of the literature on duplicate record detection.

	Author	Year	Title	Method
1	Kenneth H Pjeri	05/20/2013	Counterfeit products detection	Use of RFID Tag Technology on products
2	Falkenstein, Kristyn R, Reed Alastair M	09/04/2018	Counterfeit detection using machine readable indicia	Here, a digital watermark is necessary on a product to detect any duplicate good.
3	Kenneth H Pjeri	04/19/2012	Counterfeit Pharmaceutical Product Detection Method	The manufacturer ID number (details are with manufacturer only) is assigned to the product along-with the serial number both should match if the product is a real one.
4	Paul Sanjoy Bangalore, Sigh Gurdeep, Sharma Sankalp	03/01/2013	Counterfeit detection using XID code	There is a XID code on the product which is in encrypted format. This can be read by machine readable instructions and can be encrypted to know if the good is counterfeit or real.
5	Jitong Zhang, Harry L Shulman	04/01/2015	System and Method for Product Authentication	The identification tags are affixed to products and a central server to validate and scan tag codes.
6	Pjeri Kenneth H	04/19/2012	Counterfeit Products Detection Methods and System	A sequential serial number is assigned to the particular product by the manufacturer of the product. The authenticity of the product can be verified at the point of purchase at the retailer or over the telephone by way of the sequential serial number.
7	Silverbrook Kia, Lapston Paul	09/28/2007	Method for identifying duplicated pharmaceutical product packaging	The pharma product has a coded data including a number of coded data portions. The computer system determines the identity from the indicating data and uses this to access tracking data relating to the pharmaceutical product.
8	Zhu Xiao Jun	04/20/2004	Method and system for authenticating a package good	Here the first and the second code, is used for authentication. If the first and the second code correlate with a each other the good is real.

Chart -1: Literature Review

### 3. BASIC STEPS OF SYSTEM

System is maintaining a database of the original logos of various companies, dealing with the selection, scanning of logo image and final result display.

#### STAGE I: End user registration/login:

The user needs to register/login the app in order to do the scanning of the logos and to know if the product is a counterfeit one or not.

#### STAGE II: Selecting option for scanning

In the next step the user will either directly opt for the camera option for clicking the virtual picture of the logo on the product or else can select the logo on the product already saved in the memory.

**STAGE III: Choosing the logo/product for scanning:**  
In this stage the end user will select the image of logo or the product for which the scanning is needed to be done.

#### STAGE IV: Scanning and Result Display:

In this stage, the scanning of the logo will be done and finally customer will be provided with the result on the mobile screen whether the good or the logo is a duplicate or a real one.

### 4. PROPOSED FLOW

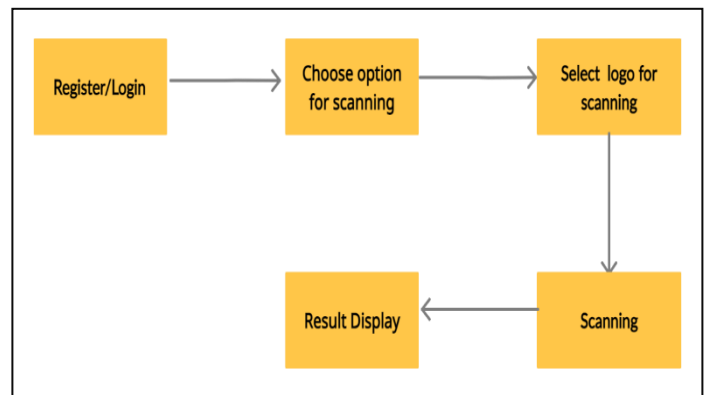


Fig.1: Android Application System

- The first step of the Duplicate Product Android Application is to either create an account or to login the app.
- On the next stage, the user will choose the brand for which the scanning of the logo image is to be done.
- After the selection of the brand, the user selects the logo image from the phone memory or clicks the logo on the product for the purpose of scanning.
- Now, the scanning of the image takes place.
- Finally, the user will get the result if the product is a real or a counterfeit one.

### 5. FLOW DIAGRAM

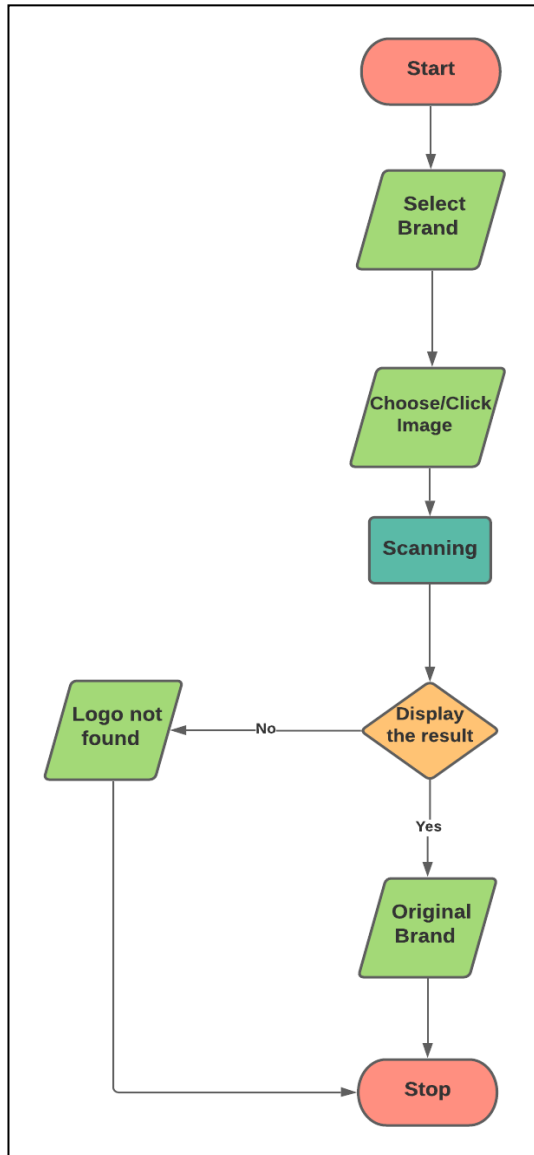


Fig. 2: Flow Diagram

- In order to know if the product is a real or a duplicate product, after registering or logging in, the user will select the brand like Adidas, Nike, etc to carry out the scanning process.
- Later on, the customer will choose the logo image from the device or click the logo on the good and then the scanning is done.
- Finally, the customer will get the result which will display the “name of the brand” if the logo on the product is a real one and “logo not found” if the product is a duplicate.
- Then the user can exit from the application by logging out.

### 6. TESTING and IMPLEMENTATION

- First Page
  - ☑ The name of the application is “TRUTHIFY” which means it identifies the truth if the product is real or fake.

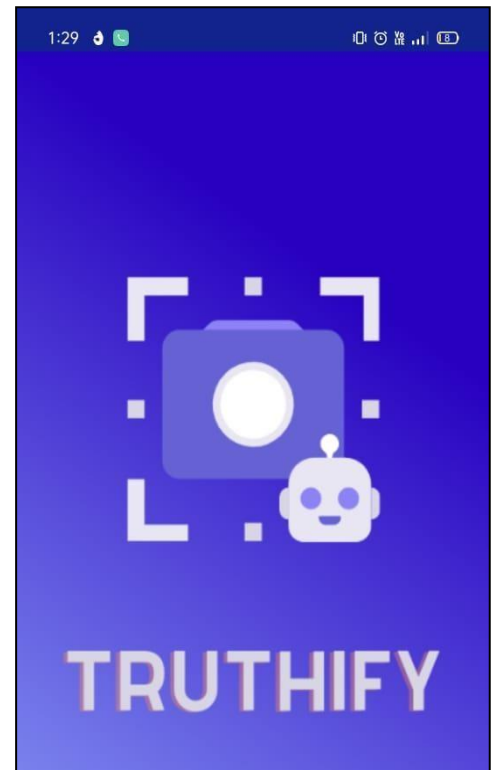


Fig. 3: Front UI

- Registration
  - ☑ For registration, the user will have to enter name, valid email and password or can directly register with the help of their google account.

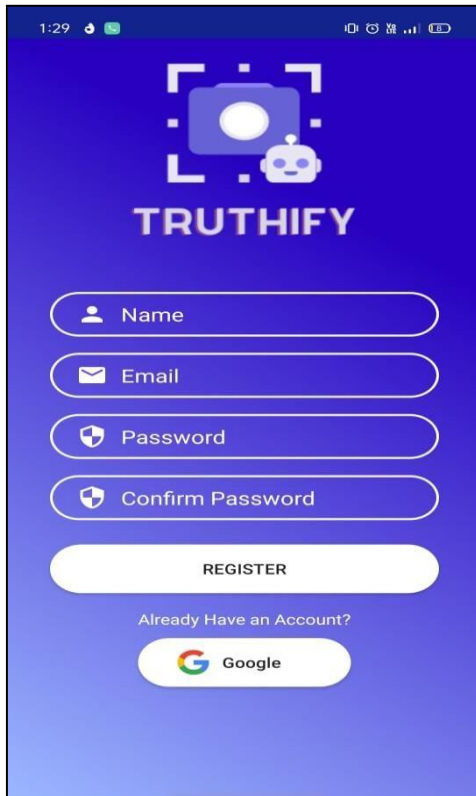


Fig. 4: Register

- Login
  - ☑ For login, the customer has to insert the details of registered email-id and password. Incase if the user has forgotten the password the will get a link on their registered email account in order to re-create the password.

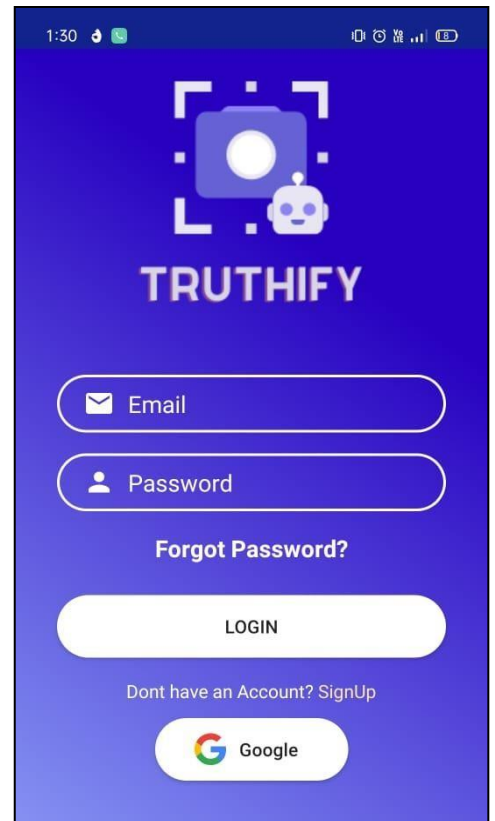


Fig. 5: Login

- Selection of brand
  - ☑ The user selects any of the below mentioned brand for which they want to know if the product is a real or a counterfeit.

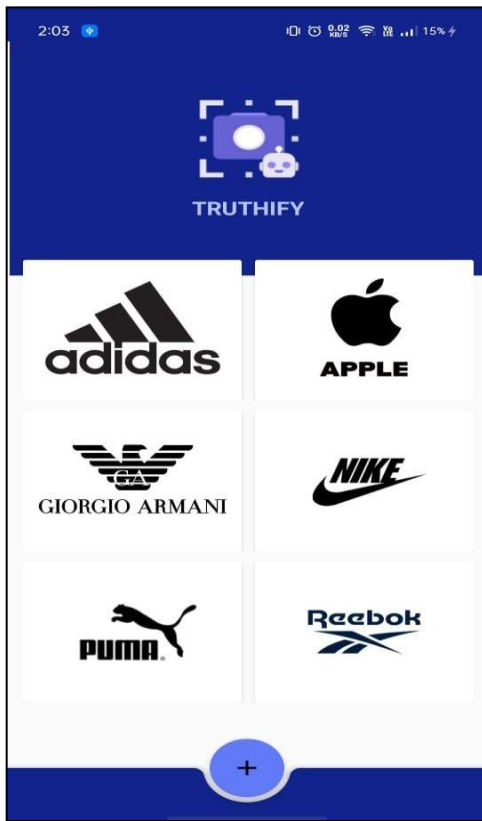


Fig. 6: Selection of brand

- Choose/Click image of logo
  - ☐ After choosing the brand, the customer will get the option to select image from "file manager" or to click logo image

using "camera" for the scanning purpose.

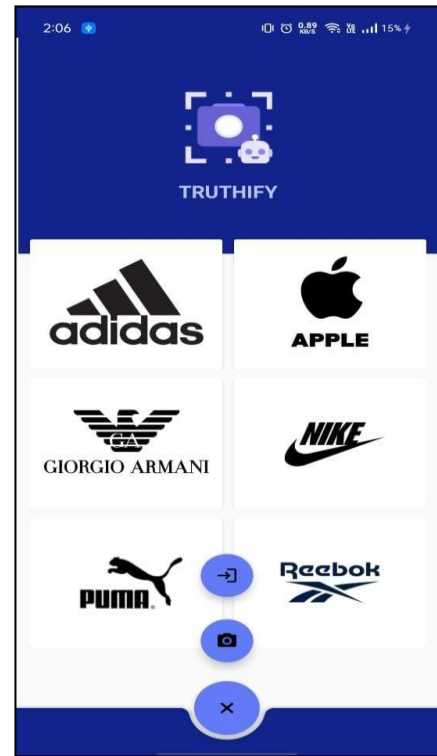
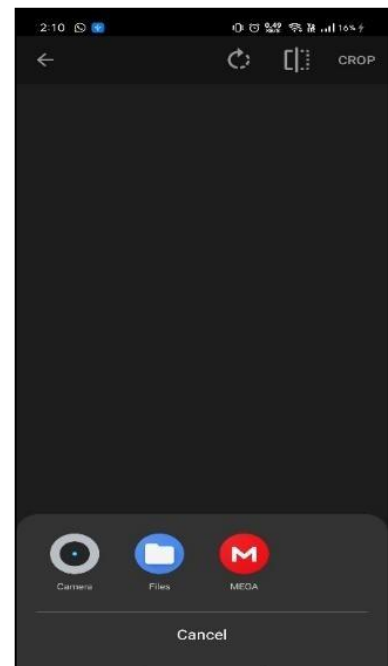

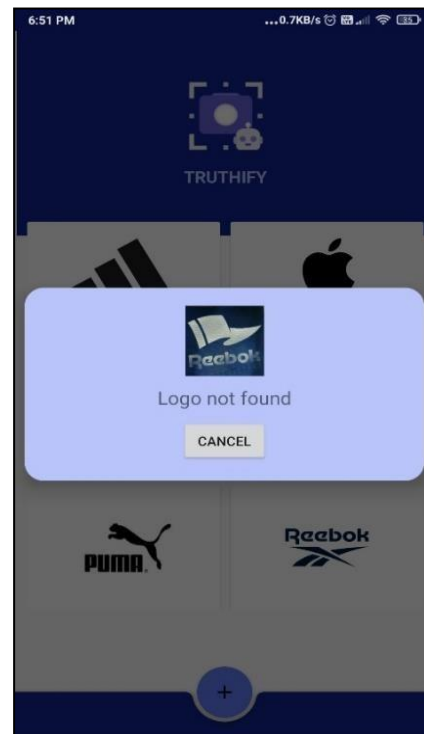
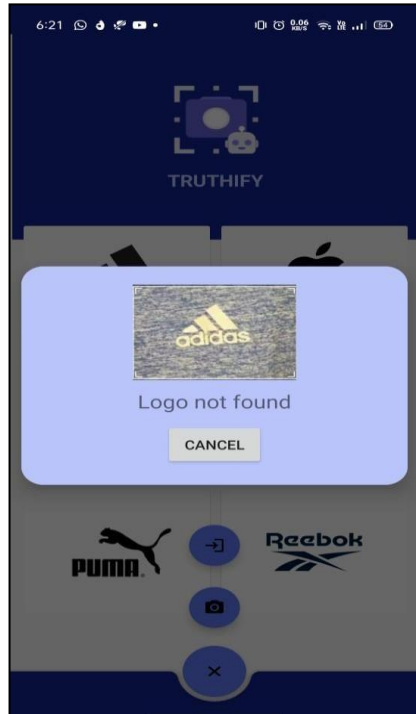


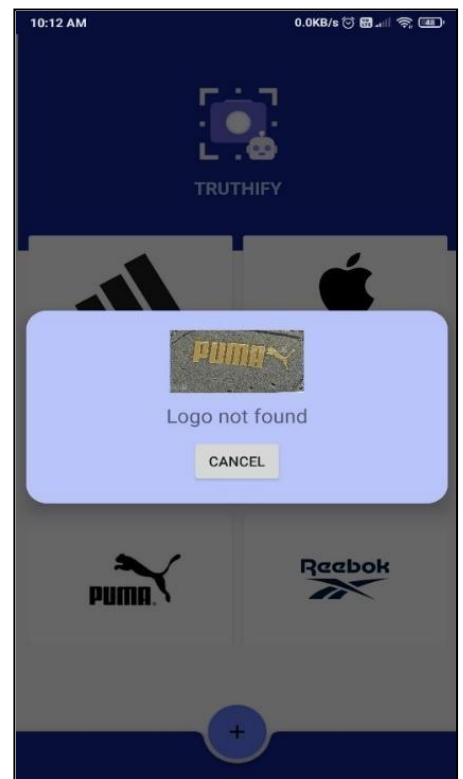
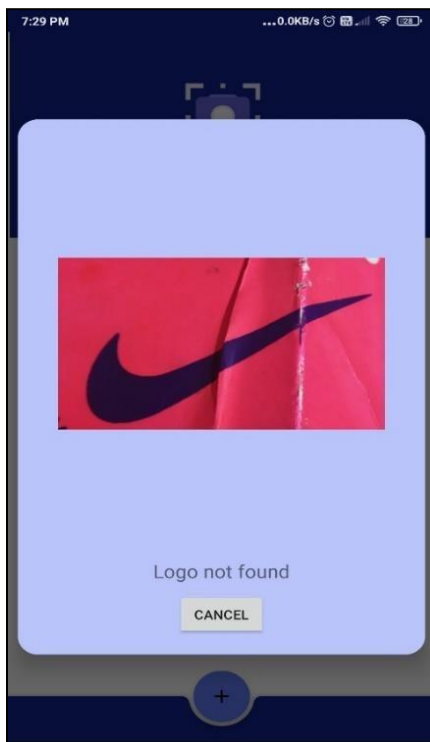
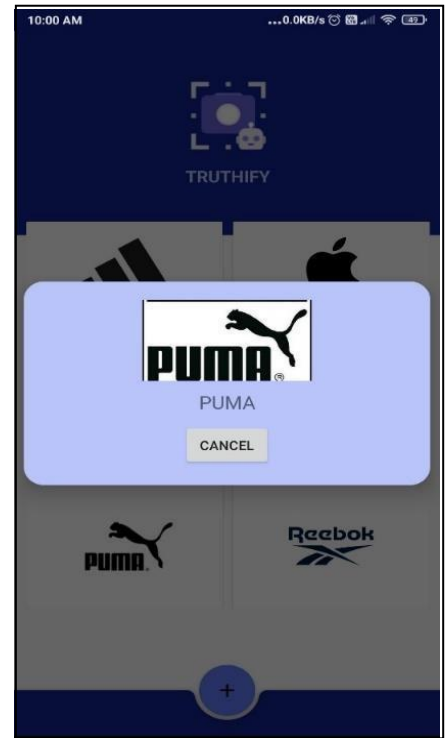
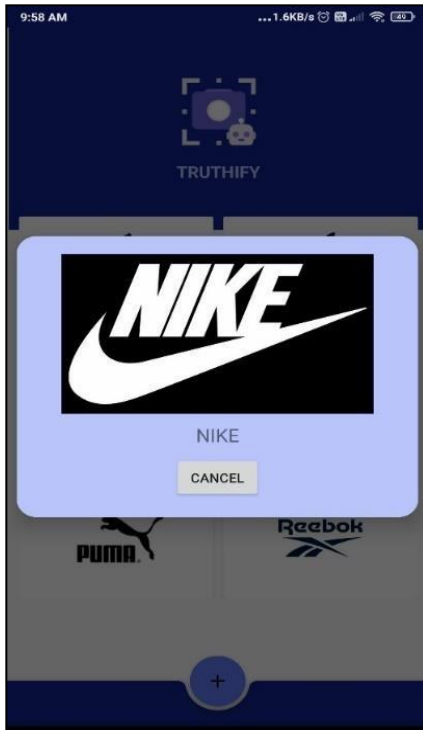
Fig. 6: Choose for scan



- Result for Adidas for scanning  Result for Reebok

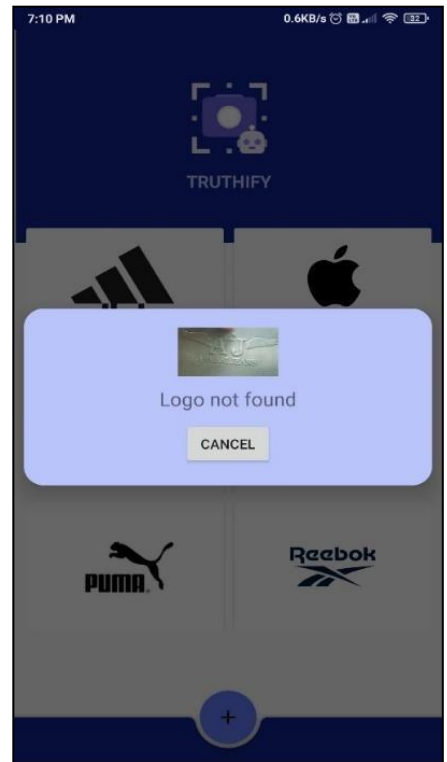
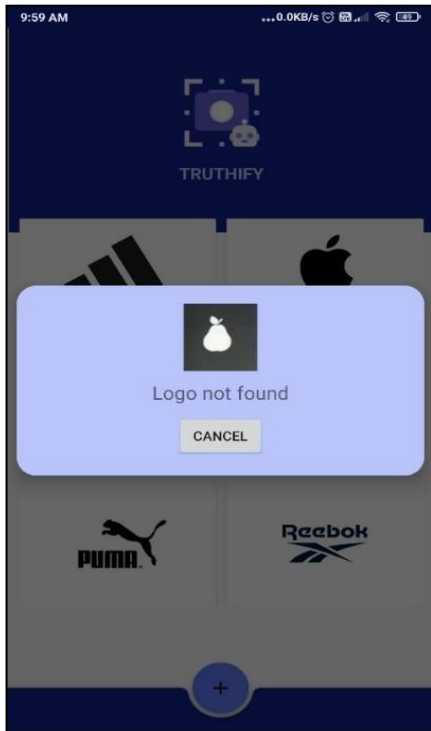
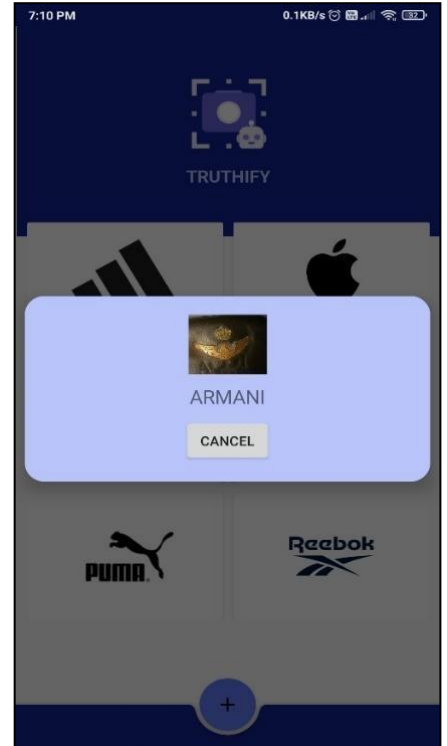
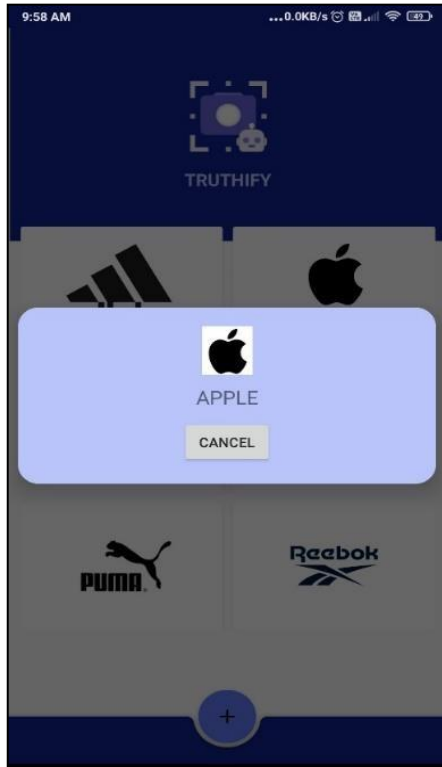


- Result for Nike  Result for Puma





- Result for Apple  Result for Armani



## 7. CONCLUSION

Thus, the proposed system is useful for the end user to detect duplicate products in the market. The system is based on Image Labelling technique. The experiments show that the system can achieve accurate detection. The system can also support multiple image data sets. The main function of this application is to show the user if the good purchased is fake or real. It also saves the prestige and dignity of the branded companies. The scanning of the product is based on the logo. If the logo matches then it the product is real else duplicate. This definitely simplifies the whole buying process.

## 8. FUTURE SCOPE

The future enhancements could be as follows:

- New logos of different companies can be added
- If existing companies launch new logos then they can surely be added in the database for more accuracy.
- Another scope is that after scanning if the logo is not found then a new page can be redirected to google maps which can show nearby shops of particular brand.
- This app is worth exploring because it reduces the risk rate of being cheated by counterfeit products.
- It will not only make the user or the customer aware but also help government and cops to cease counterfeit markets.
- Apart from this, the prestige of the branded industries is also saved.

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