Product Recognition for Shopping using Artificial Intelligence and Machine Learning with Mobile App

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Abstract

The purpose of this project was to create a way to buy products that we see online worn buy models or seen in some add on social media platforms like instagram, facebook and twitter etc. There are times when we get this urge to buy a product worn by some movie actor and we end up wasting valuable time in search of that product online. Sometimes we are not able to locate those products even after rigorous hours of surfing the Internet, to minimize this hustle this project was designed. We are introducing a way to buy products online in a very different approach Using the Haar Cascades the logo of the product is detected then ADA boost is used to optimize the classifiers for better web scraping and accurate results. In addition to this there is a special feature where if a company is sponsoring the application then only that company's product will be displayed and the products in the similar type category will be from the same company only, otherwise whatever is the best possible result will be displayed. All these implementations will be carried out by a mobile application that will be cross platform in nature.

Keywords: Object detection, Object Feature extraction, Ecommerce ,Sponsorship, Mobile Application, Cross Platform.

Introduction

Nowadays we see a lot of products online that is worn buy models or seen in some add on social media platforms like instagram, facebook and twitter etc. People easily get intimidated by these models and products seen online and there are times when we get this urge to buy that product worn by some movie actor and we end up wasting valuable time in search of that product online. Sometimes we are not able to locate those products even after rigorous hours of surfing the Internet, to minimize this hustle this project was designed. We are introducing a way to buy products online in a very different approach, In our day to day life we come across text search almost every time and if we go beyond that then speech recognition is the most we can opt for, but with this project we are using images to detect objects and locate them on the internet this way people can save a large amount of time for buying products because they don't need some specific keywords only an image is more than enough. Using the Haar Cascades the logo of the product is detected then ADA boost is used to optimize the classifiers for better web scraping and accurate results. In addition to this there is a special feature where if a company is sponsoring the application then only that company's product will be displayed and the products in the similar type category will be from the same company only, otherwise whatever is the best possible result will be displayed. All these implementations will be carried out by a mobile application that will be cross platform in nature.

Installation Step

Prerequisites:

- A Smart Phone

- Good Internet Connection

A smart phone with good internet connection is need, a particular app that we are building need to be installed for now to demonstrate the working on model.

Implementation Details/Working

Step 1:

Here we extract local features including SIFT (Scale-invariant feature transform) features and grid-based patch features as the visual signatures of images.

Here all the local features and color patch are quantize the SIFT features into visual words by inverted-file index approach, K-means clustering technique is used to obtain the visual words vocabulary training images.
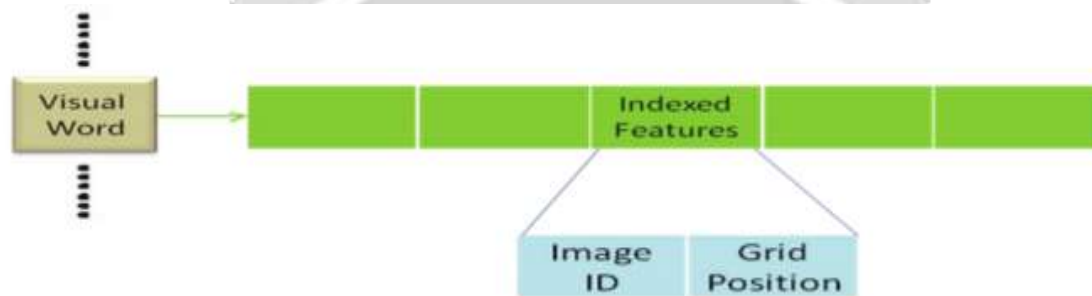
Step 2:

Global Matching Performed

To improve the discriminative power of single local features during global matching, we encode the spatial context with grid representations(16*16) and a simple but effective approach using triangle relations constraints is proposed for spatial consistency filtering.

Local Matching Performed

The following strategies to emphasize users' preferred local patterns

i.   Enlarge the weights of matching scores of SIFT points inside selected regions

ii. Apply a spatial coherent constraint on matched SIFT points within the same region. Since SIFT points inside a region are close to each other, their matched points in test image should be neighboring either.

iii. Apply triangle relations constraints on SIFT key points among regions if the number of users specified regions are larger than 2.

Step 3:

Global and local matching scores are linearly combined to rank the retrieved image results. Therefore, with our system, users are allowed to highlight the image sections of focus and do precise search.

Haar Features

Convolution lattice otherwise called cover is a grid utilized for picture handling activities, for example, embellishing, edge location and so forth Convolution portion pixels, which are gotten from the white pixels in the dark foundation from the info picture consummately coordinates with the extreme focus pixels in the yield picture. Here any item location execution incorporates checking of the specific required article and filling the picture as highly contrasting pixels.

A while later, figuring for the each haar include is done where amount of dark force pixels and white power pixels are determined. There are distinctive haar highlights utilized for the recognition of the item are as following:

1.) Edge highlights. 2.) Line highlights. 3.) Four square shape highlights
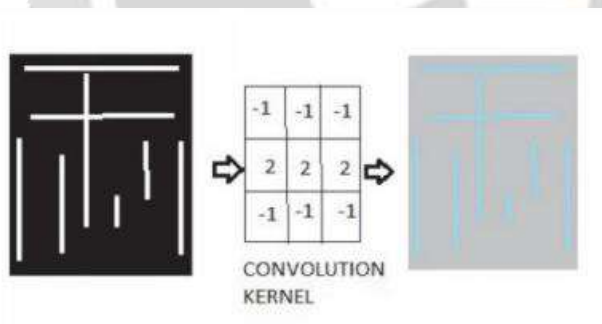
ADA Boost

Ada-Boost is an AI calculation used to distinguish highlights present in a specific sub window. Subsequent to discovering all the highlights, to distinguish specific article weighted aggregation of every one of these highlights are considered to check object is available or not. Ada-Boost calculation supports the way toward discovering the classifier. It is only the summation of all the feeble learning classifier. Frail learning classifier predicts the article recognized has a place with which class. Solid classifier is comprised of summation of all feeble learning classifier. Solid classifier gives the supreme worth, which gives the trust in that characterization. In each feeble classifier is each example is appointed some weight equivalent to the current blunder on that example. Ada-Boost is utilized to discover the edge as per the single rectangular item includes that different out sure and negative preparing tests as per the weighted blunder. Each feeble classifier can recognize half of the positive highlights. Remaining highlights can be recognized with the assistance of chain of feeble classifiers.
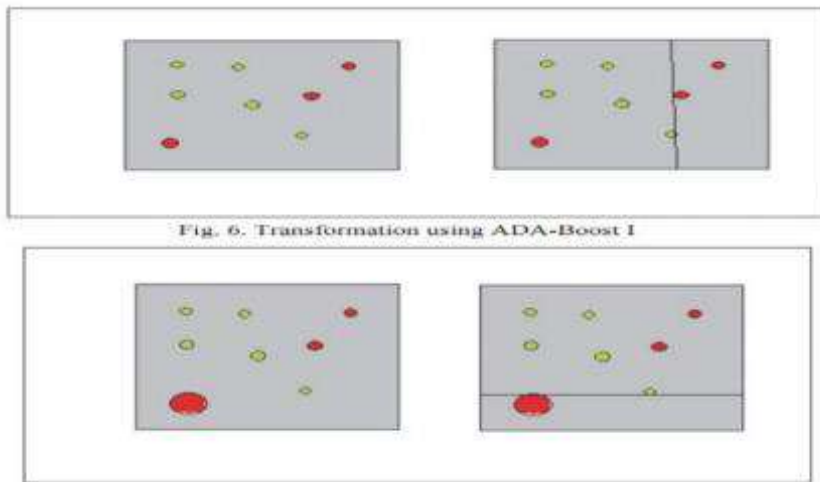
Fig. 6. Transformation using ADA-Boost I

Cascading Classifiers

While planning a solid classifier it is important to think about number of highlights, stages and edge of the classifiers. Arrange a similar picture with various window size is overhead as far as time and energy. Regardless of whether the picture contains some certain highlights however it might contain more negative highlights. Thus the calculation ought to be adequately effective to catch negative highlights and dispose of it. For this reason proficient classifier ought to be made with all solid classifiers. It is troublesome and tedious to acquire it in a direct manner. So new method came to presence known as course of classifiers. It contains all solid classifiers masterminded in course structure.

On the off chance that first classifier distinguishes the article, at that point it pass the sub window of a picture to the following classifier else it disposes of the entire picture. Contribution to the classifier is as sub window. At that point at next stage classifier again checks for positive highlights in a picture. Accordingly course of classifiers is shaped to quick and effective identification of positive highlights in a picture. Falling classifiers has degenerate tree structure. Falling classifiers are appeared in beneath schematic portrayal.
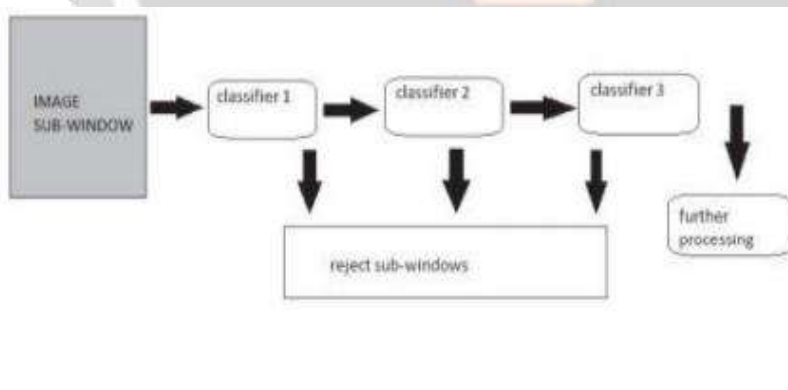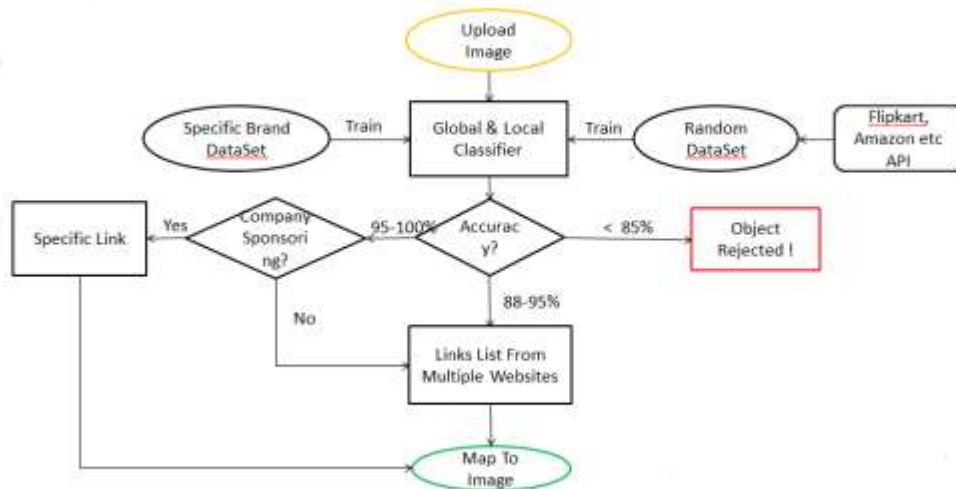
Evidence of pattern flow:

Fig 2: Illustrates the concept design of proposed solutions.

Conclusion

Information is very crucial in the sales and marketing environment. The lack of information may mislead the buyer or may cause heavy loss for the manufacturer. It's the human tendency to forget the product's name, which is necessary to find the information online. Therefore the use of Computer vision algorithms is done in order to track the object and the logos on them and identify the products.

Based on this identification a token number is associated with them which is passed via REST API to object storage where the xml file containing the product information is stored. The web scraping tools are used further to get the required information from the xml file and display it in text format on the product itself including the website URL from which it can be ordered. Since the user ratings and all the properties are shown the product quality can be judged convincing the user to buy them. They can be used in the real life scenario where a user may like some product in real-time and can obtain the information by just scanning the logo and the product shape. Hence this on-demand information delivery can be promising and can boost the sales of the product.

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