Visual Enhancement of E-commerce Products

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Abstract – *Our project aims at providing a solution to display products in a smarter way in any e-commerce store. This solution can be particularly structured into two parts. The first phase would be to use Image processing to clean and make the images consistent across the e-commerce store. To improve the quality of the image, we will analyze the features of the image, like symmetry, clarity, object-camera distance, blur etc. Later, using AI to analyze these images and giving feedback to the clients suggesting them to click a better image of the product. Starting with conversion to a background consistent image, we will try to improvise the rest of the features as well. This will enable us to render good quality images which would be used to showcase products to their end-users. Also, the user will be given the option to allow the improvising changes or not, depending on his/her preferences, the images will be uploaded. This will allow the final decisions to be made by the user only, making our product totally user-oriented. The second part of the project is to generate an Augmented Reality (AR) model (view) of the product. AR is highly interactive technology and it helps in enhancing the perceptions of objects in the real world. This will help the end-users to actually view the products without physically going and checking them out. The pictures would be 3D rendered to form the AR model of the object. Also, it would be quite beneficial for the clients to showcase their products in a more visually appealing manner and thus increasing their market value. The AR model can be viewed by the end user on the mobile app. Also, it would be quite beneficial for the clients to showcase their products in a more visually appealing manner.*

Keywords - Foreground Extraction, GrabCut Algorithm, Background Removal, AI Rating System, Gaussian Model

1. INTRODUCTION

Online shopping has not only increased but it has become a trend. Huge websites like Amazon, Flip-kart, Jabong, eBay are top B2C firms. But whenever any seller wants to list their products on their website, they charge heavily for the same. This point is important because the same thing can be done by the seller itself if he/she has his/her own way of selling their products via the internet. This system empowers each individual who has any products in his arsenal by giving him/her a platform for displaying and describing his/her product in a fresh perspective. This makes his products accessible from any corner around the world. This system aims at providing each individual to have an opportunity to be an entrepreneur without having to share his profits with a third party.

2. AIM AND OBJECTIVE

The aim is to improve the visualization of e-commerce products using image processing, specifically, foreground extraction to enhance the features of the products. The main aim in this first step is to clear out noise and disturbances, and make the favorable qualities of the product even more visible to the end client. Secondly, we wish to highlight the flaws in any uploaded picture by the user, by giving the images rating based on artificial intelligence to, in the end, give suggestions on how the images could've been better.

3. CITING PREVIOUS WORK

A survey of existing image processing projects will let us know the various hurdles we may have to face in this project. The following systems are the most relevant from the many systems we surveyed.

3.1 Remove.bg

Remove.bg was launched in 2018. Since then, the developers have been working towards making it adaptable to apps like Photoshop or operating systems like Linux, Mac etc. It is a free online website that allows users to obtain a background-ridden image without having to select anything other than their image. The algorithm clears the image background in a matter of seconds and allows to download in png format in different resolutions. The simplicity of this site is its most favorable quality.

3.2 Auto Background eraser + Changer

Auto Background eraser + Changer app can replace your photo background with a new one by erasing it. The process is pretty simple. It requires you to import the pictures to the app from your pictures gallery and then edit and save. You can also share them on social media. It is a user-friendly and simple app. Images can be cropped out smoothly using refine edge and smooth edge features. You can crop the pictures automatically as well as manually.

3.3 Photo Background Remover

It has a batch operation tool to process multiple pictures at one go. You have the flexibility to move objects within a picture while creating a collage. You can select between the red or green marked brushes to specify whether you want to remove or keep an object/portion of the picture or not. Automatic background detection helps to remove the

background easily. It allows editing pictures with a simple cut and paste process.

3.4 Background Eraser

Background Eraser – Pic Editor can only remove the background of your picture and save its transparent version in PNG or JPG format. You can use the edited picture as a stamp along with other apps like PicsArt. It can save your edited images in PNG or JPG format. You can redo or undo the pictures while editing. You can make use of advanced erasing tools of this app, such as Target Color, Target Area, and Brush Tool.

4. PROPOSED SYSTEM

In our system we first take in the images of the products, from the client side and then using image processing we extract the foreground. The algorithm used is the GrabCut algorithm. In this there are two Gaussian models created, one for the foreground and one for the background.
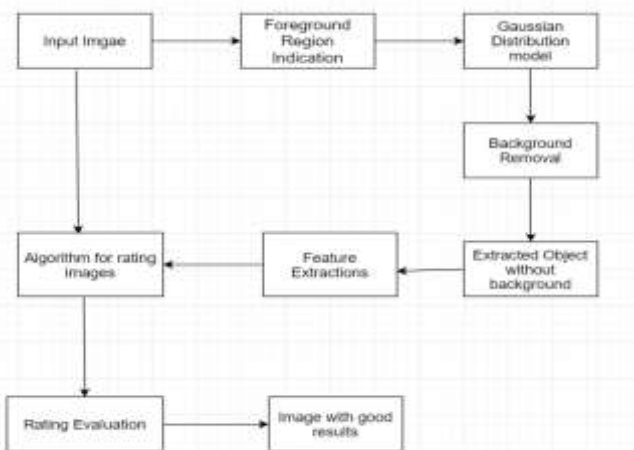

Figure 1: Block Diagram

4.1 GrabCut Algorithm

GrabCut is an image segmentation method based on graph cuts. Starting with a user-specified bounding box around the object to be segmented, the algorithm estimates the color distribution of the target object and that of the background using a Gaussian mixture model. This is used to construct a Markov random field over the pixel labels, with an energy function that prefers connected regions having the same label, and running a graph cut based optimization to infer their values. As this estimate is likely to be more accurate than the original, taken from the bounding box, this two-step procedure is repeated until convergence. Estimates can be further corrected by the user by pointing out mis-classified regions and rerunning the optimization. The method also corrects the results to preserve edges. These regions need to be marked on the image. Based on this the algorithm identifies the foreground and the background. The background pixels

are marked as black colored pixels and the foreground pixels are marked as it is. In this way, the foreground gets separated from the background.
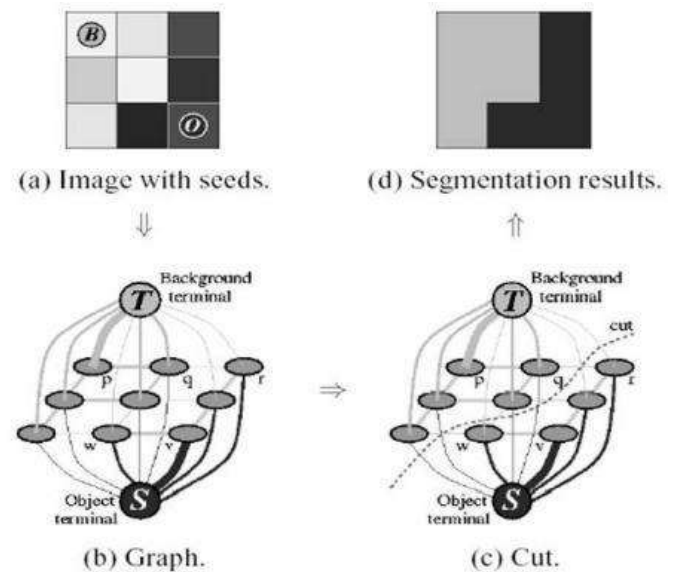

(a) Image with seeds.   (d) Segmentation results.

(b) Graph.   (c) Cut.

Figure 2: GrabCut Concept

4.2 NIMA Image Rating Algorithm

Google recently introduced NIMA (Neural Image Enhancement Model), a deep convolution neural network[6]. NIMA is trained to predict which images would be considered would be considered technically or aesthetically attractive by a user. It is able to generalize objects based on their categories despite many variations, similar to object recognition networks. It can be used to score images reliably with high correlation to human perception, and also in other labor intensive and subjective tasks such as intelligent photo editing, optimizing visual quality for an improvised user engagement, or to minimize perceived visual errors within an imaging pipeline. Assessment of image quality and aesthetics has been a persistent issue in the field of image processing and computer vision. Image quality assessment deals with measuring pixel level degradations such as noise, blur, compression artifacts, etc., whereas the aesthetic assessment captures semantic level characteristics associated with emotions and beauty in images. Instead of classifying images as a low/high score or regressing to the mean score, the NIMA model produces a distribution of ratings for any given image, on a scale of 1 to 10, with 10 being the highest aesthetic score associated with an image. Hence, it turns out to be a better predictor of human preferences when measured against other approaches. Then these extracted images are passed through the image rating algorithm NIMA (Neural Image Assessment). This algorithm works on the images to give a certain rating to the image. First the algorithm is trained using image characteristics like symmetries, blurriness, etc. Based on the image quality the images are given a score and then further decided whether to carry the image

to the next stage or to discard the image and ask the provider to give a better image.

5. RESULT

Thus, we have done image processing and made an artificial intelligence rating system for this term. The motive is to improve the visualization of e-commerce products and result in better conversion to sales. We have focused on image processing, specifically, foreground extraction of the products and further rating the images to give suggestions on how the images could have obtained even higher ratings.

Figure 4: Image Processing Output

Figure 5: NIMA Output

6. CONCLUSION

Our further goal is to make an Augmented Reality system that would allow the end client to have a three-dimensional (3D) view of the products providing an all new way to observe what they are paying for. This section of the project may have its challenges as to modelling it seamlessly but if done right, this new feature can change the way we observe, visualize and buy anything online.

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