

iVideo Editor with Background Remover and Image Inpainting

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Abstract - Inpainting is a technique for reconstructing damaged or defective areas by interpolating neighboring pixels. To eliminate undesired components from an image, utilize the Image Inpainting software. Photo to sketch, backdrop removal, and video editor are among the capabilities of iVideo Editor, an online tool. We'll change the original RGB values and assign them to grey, then invert and blur the image to make it into a drawing. Remove.bg API is an image editing service that removes the backdrop of people and product photos. Trim, merge, preview, and render are some of the tools available in a video editor.

Key Words: Image Processing, Background Remover, Photo to Sketch, Fast Marching method, Navier Stokes

1. INTRODUCTION

1.1 Image Inpainting

Image inpainting is the technique of filling in missing data in a specific region of the visual input. The procedure's purpose is to restore missing or damaged picture components to the point that the inpainted region is imperceptible to the untrained eye. The variety of applications ranging from the reconstruction of incomplete blocks caused by packet loss during wireless transmission to the removal/introduction of image objects such as stamped dates, logos, people, text and special effects on the scene, to the reversal of impairments such as cracks, scratches, and dirt in scanned photographs and digitized artwork images, to the removal/introduction of image objects such as logos, stamped dates, text, people, and special effects on the scene, to the removal/introduction of image object. The Color Filter is another component of this project. Color Filter refers to adding effects of RGB (RED|GREEN|BLUE) solid layers on top of the original layers of image. We can see the significance of the color combination in the real world. Color filtering is all about modifying the RGB components.

1.2 iVideo Editor

iVideo editor is a web app with features like photo to sketch, background remover and video editor. Web app is built using flask which is rapid and low-level python development framework. You'll need to modify the image if you want to make prints that go beyond plain records to capture the soul of individuals that stand alone as works of art. The creative

act of photographic printmaking revolves around image editing. Our app removes the background from your photos without lowering the quality. Photo to sketch converts input image to grey image using cvtcolor function of OpenCV, next invert image, blur image, invert blurred image, sketch, and display sketch. Remove. Bg API is a photo editing service that eliminates the backdrop of people and product photos. The output resolution is capped at 10 megapixels. For authentication, API keys are required. The process of modifying and arranging video clips is known as video editing. Most films and television shows, commercials, and video short stories, is structured and presented using video editing. Video editing software has significantly democratized video editing in recent years. Because video editing can be difficult and time-consuming, many technologies have been developed to help people with this task. Our iVideo editor is one such application. Web based video editor created using Moviepy and python. This provides features of trim using time zones in a video, preview video and file download to desired folder. Moviepy is a video editing module that may be used to do operations like as concatenations, cuts, processing, and effects. It supports the most popular media formats, including gif, and can read and write them.

2. Existing System

There are softwares such as Adobe Photoshop which provide image background removal option, image color effects. They have a selection tool which allow us to select a particular region and remove it. But these only work on high end laptops (8GB minimum required). And this also requires a skill and experience with cloning and effects in the photoshop. Similarly, video editing softwares like Adobe premiere pro require high end RAM and processor for previewing and rendering the trimmed clip.

3. Proposed System

In our project, we combined photo editing (inpainting, color filter, background remover, photo to sketch) features and video editing (trim, add, render and preview) features together with minimal requirements and less consumption of RAM. This is entirely automatic and doesn't require human intervention. Artificial intelligence is used by the Background Remover to determine the photo's subject, mask the image, and eliminate the background. We use the API of this AI tool.

4. Implementation and Methodology

4.1 Fast Marching

The Fast-Marching Algorithm starts at the region's edge and works its way in, filling everything in the edge first. A small neighbourhood must be painted around the pixel on the neighbourhood. The pixel in question is replaced by the normalised weighted sum of all known pixels in the area. The weights must be carefully chosen. Pixels close to the point, nearer to the normal of the boundary, and on the boundary contours are given more weight. When a pixel has been inpainted, it moves to the next closest pixel using this method. Because the Fast Marching technique ensures that pixels nearby to known pixels are inpainted initially, it is essentially a manual heuristic procedure.

4.2 Navier Stokes

Partially differential equations are used in this algorithm, which is based on fluid dynamics. Heuristic is the fundamental principle. It starts by exploring the outskirts of known & unknown locations (as edges are meant to be continuous). It persists isophones while matching gradient vectors at the inpainting region's edge (lines linking areas of similar intensity, related to how contours connect points of similar height). This is accomplished by employing fluid dynamics methods. To decrease the minimal variance within this area, colour is filled in after they are received.

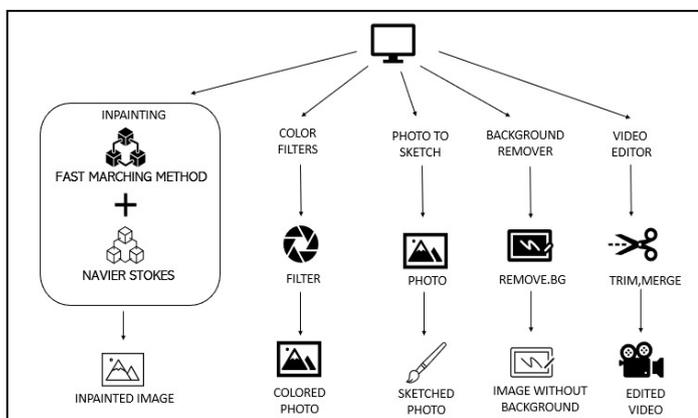


Fig -1: Architecture Diagram

4.3 Color Filters

The RGB color space is the most widely used; it is known as an additive color space because the three-color tones add up to provide the image color. The application of a color filter alters the appearance of an image or a portion of an image by modifying the shades and colors of the pixels in some way. Filters are used to enhance a photograph's brightness and contrast, as well as to add a variety of textures, tones, and special effects.

4.4 Photo to Sketch

For Photo to Sketch, use the cvtColor() function to convert the image to grayscale. This function converts the colour space of an input image. Then we can convert it to grayscale to get a black and white image of our output. The function bitwise not() performs per-element bit-wise inversion of the input, converting brighter regions to lighter and lighter regions to brighter, allowing us to easily find image edges. The function GaussianBlur() is used to reduce image noises and blurring smoothens the source image with the specified Gaussian kernel. The dodgeV2() function divides the grayscale image by the inverse of the blurred image, leaving only the highlights and the most prominent edges.

4.5 Background Remover

Remove.bg API is a photo editing service that eliminates the backdrop of people and product photos. The output resolution is capped at 10 megapixels. For authentication, API Keys are required.

4.6 Video Editor

Pillow is to images what MoviePy is to films. It has a variety of features for typical operations such as importing, editing, and exporting video files. It also allows you to place titles into videos and rotate them 90 degrees (horizontal and vertical flipping can also be implemented with this logic).

4.7 Flask

Flask is a microweb framework written in Python. It could be utilised to extend the functionality of an application as if it were constructed into Flask. For example, extensions for object relational mappers, form validation, upload handling, several open authentication protocols, and other framework-related tools are available. Applications like Pinterest and LinkedIn use the Flask framework.

5. RESULTS

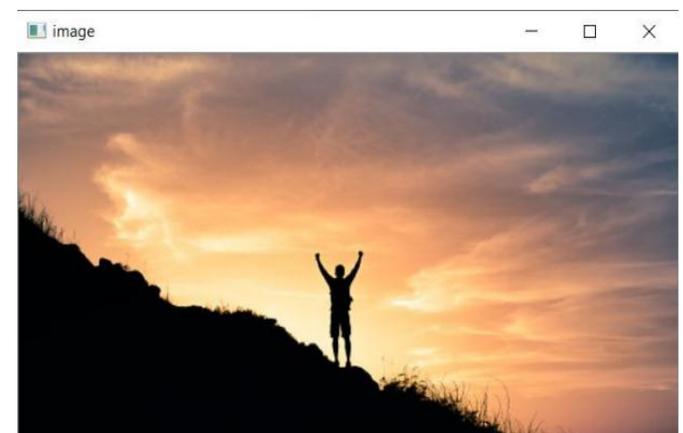


Fig -2: Image inpainting app

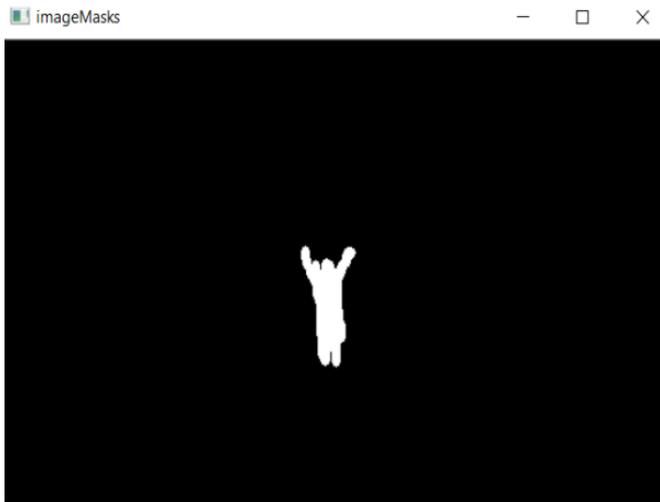


Fig -3: Masking unwanted section



Fig -4: Inpainted image using Fast Marching methodology

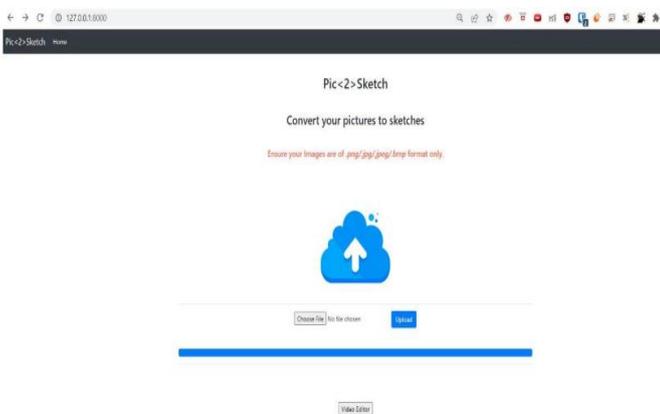


Fig -5: iVideo Editor Home page

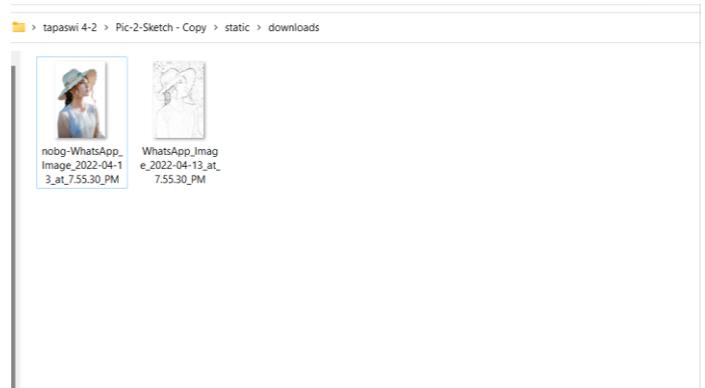


Fig -6: Background removed image and sketched image

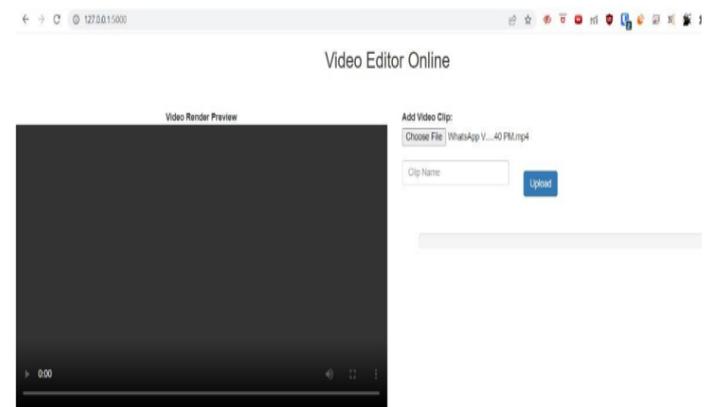


Fig -7: Video Editor

6. CONCLUSIONS AND FUTURE WORK

Remove.bg API internally uses machine learning to detect edges of the subject, there by distinguishing it from the background. So, the portrait picture without background can be obtained by replacing this layer with empty pixels. Many filters are required to convert image into pencil sketch, but our webapp converts it automatically using OpenCV. Video editor is being developed using flask because it is a small-scale application and MoviePy module was used to perform editing. This can decrease the burden on RAM from opening heavy softwares like adobe premiere pro for small operations like Trim, preview, and rendering. For image size compression, the existing tools reduces the size compromising on quality. In future, we would like to add Image size compression feature without losing quality.

REFERENCES

- [1] Alexandru Telea, "An Image Inpainting Technique Based on the Fast-Marching Method", Vol 9, 10.1080/10867651.2004.10487596, Journal of Graphics Tools, Eindhoven University of Technology, 2004

- [2] Bertalmio, M. & Bertozzi, Andrea & Sapiro, G.. (2001). Navier-Stokes, fluid dynamics, and image and video inpainting. Proc. IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit. 1. I-355. 10.1109/CVPR.2001.990497, 2001.

- [3] Converting Images to Pencil Sketch :
“<https://www.askpython.com/python/examples/image-s-to-pencil-sketch>”.

- [4] API for background Removal :
“<https://www.remove.bg/api>”.

- [5] Video Editor :
“<https://www.geeksforgeeks.org/introduction-to-moviepy>”.