Foreground Image Removal Using CV

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***Abstract*—This project showcases the approach in removal of foreground Images using OpenCV in real-time, a powerful library for real-time computer vision. The method is inspired by the concept of green screening but instead removes the foreground object to create an invisible effect. The system captures the background frame and detects a predefined color in the video feed to generate a mask that segments out the color, replacing it with the background. This report details the implementation and results of the invisibility cloak effect.**

I. Introduction

The project it inspired from concept of an invisibility cloak, popularized by the Harry Potter series, has intrigued many. This project aims to create a real-world invisibility effect using Python and OpenCV. Unlike traditional green screening, which removes the background, this technique removes the foreground to make an object appear invisible. The primary steps include capturing the background, detecting the target color, creating masks, and generating the final output.

II. Methodology

A. Background Capture

The system captures the background frame for a few seconds before initiating the invisibility effect. This is achieved using the OpenCV library's video capture functionality. A background subtractor object is created to obtain the initial background frame.

B. Color Detection

The system continuously captures frames from the webcam and applies the background subtractor to get the foreground mask. Shadows are removed using a threshold, and morphological operations are applied to refine the mask.

C. Masking and Segmentation

Morphological operations are applied to remove noise and fill in the holes. An inverted mask is created to segment out the moving object from the frame. The static background frame pixels are shown only for the masked region, and the final output is generated by adding the segmented moving object and the static background.

III. Results

The final augmented output is generated by combining the segmented frames with the background, creating the illusion of an invisibility cloak. The results show effective removal of the predefined color, seamlessly blending with the captured background.

Figure 1 shows the frame when no movement is detected. Figures 2, 3, and 4 show the frames when movement is detected.

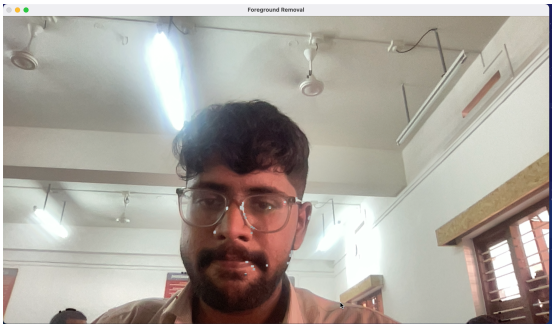

Fig. 1. Frame when no movement is detected

Fig. 2. Frame when movement is detected (1)

Fig. 3. Frame when movement is detected (2)

IV. Conclusion

This project successfully demonstrates an invisibility cloak effect using OpenCV. The approach leverages background sub-

Fig. 4. Frame when movement is detected (3)

traction, color detection, and image segmentation to achieve a visually appealing result. The implemented system effectively removes the predefined color and blends the segmented frames with the background. Future work could explore more sophisticated background subtraction techniques, support for multiple colors, and real-time performance optimization.

REFERENCES

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