HARRY POTTER'S INVISIBILITY CLOAK

Using Python and OpenCV

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AIM: To create **invisibility effect** behind a garment similar using Python and OpenCV similar to the one shown in the Harry potter movies (inspired by Harry Potter's invisibility cloak)

ALGORITHM:

Initialize Camera and Libraries

- Import necessary libraries (cv2,numpy,time).
- Initialize the camera using cv2.VideoCapture(0).

Capture Background

- Define a function to capture the background:
    - Print a message asking the user to move out of the frame.
    - Read a series of frames (e.g., 30 frames) from the camera.
    - Store each frame in a list.
    - Compute the median of the frames to create a static background.

    - Return the background image.

Create Mask for Cloak Effect

- Define a function to create a mask:
    - Convert the current frame from BGR to HSV color space.
    - Define color ranges in HSV for the cloak (e.g., blue color range).
    - Create a binary mask where the color of the cloak is detected.
    - Apply morphological operations (opening and dilation) to refine the mask.
    - Return the refined mask.

Apply Cloak Effect

- Define a function to apply the cloak effect:
    - Invert the mask to get the non-cloak areas.
    - Create the foreground image by applying the inverted mask to the current frame.
    - Create the background image by applying the mask to the background.
    - Combine the foreground and background images to produce the final result.

Main Loop

- Print OpenCV version for verification.
- Capture the background frame using the defined function.
- Define HSV color ranges for the cloak.
- Start a loop to continuously process video frames:
    - Capture the current frame from the camera.
    - Generate a mask for the cloak.
    - Apply the cloak effect using the mask and the background.
    - Display the result in a window.
    - Exit the loop if the 'q' key is pressed.

Cleanup

- Release the camera and close all OpenCV windows.

PYTHON CODE:

C:\Users\asbha\.spyder-py3\temp.py

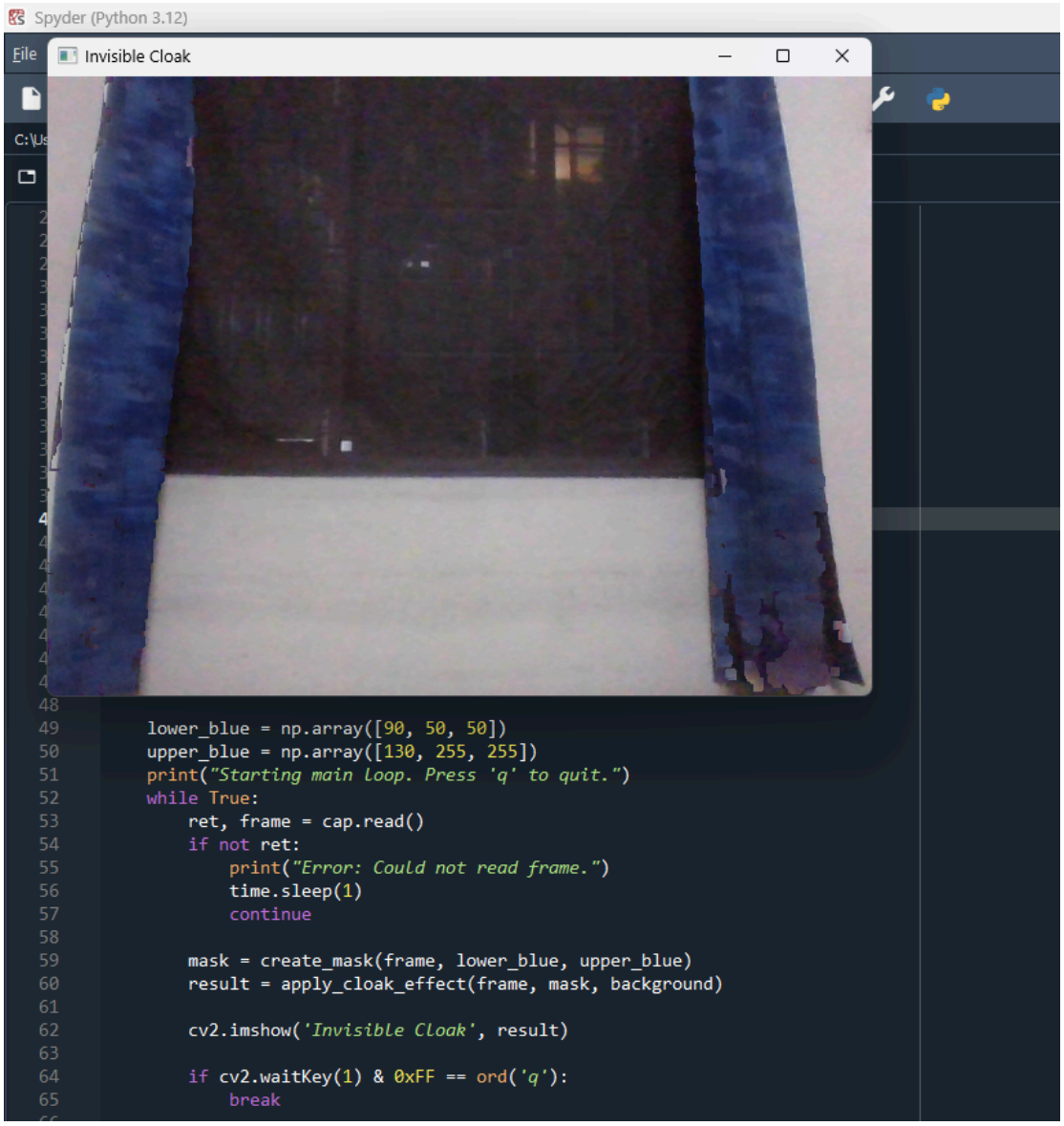
temp.py* × py3compat.py ×

```python
import cv2
import numpy as np
import time

def create_background(cap, num_frames=30):
    print("Capturing background. Please move out of frame.")
    backgrounds = []
    for i in range(num_frames):
        ret, frame = cap.read()
        if ret:
            backgrounds.append(frame)
        else:
            print(f"Warning: Could not read frame {i+1}/{num_frames}")
        time.sleep(0.1)
    if backgrounds:
        return np.median(backgrounds, axis=0).astype(np.uint8)
    else:
        raise ValueError("Could not capture any frames for background")

def create_mask(frame, lower_color, upper_color):
    hsv = cv2.cvtColor(frame, cv2.COLOR_BGR2HSV)
    mask = cv2.inRange(hsv, lower_color, upper_color)
    mask = cv2.morphologyEx(mask, cv2.MORPH_OPEN, np.ones((3, 3), np.uint8), iterations=2)
    mask = cv2.morphologyEx(mask, cv2.MORPH_DILATE, np.ones((3, 3), np.uint8), iterations=1)
    return mask

def apply_cloak_effect(frame, mask, background):
    mask_inv = cv2.bitwise_not(mask)
    fg = cv2.bitwise_and(frame, frame, mask=mask_inv)
    bg = cv2.bitwise_and(background, background, mask=mask)
    return cv2.add(fg, bg)

def main():
    print("OpenCV version:", cv2.__version__)

    cap = cv2.VideoCapture(0)

    if not cap.isOpened():
        print("Error: Could not open camera.")
        return
```

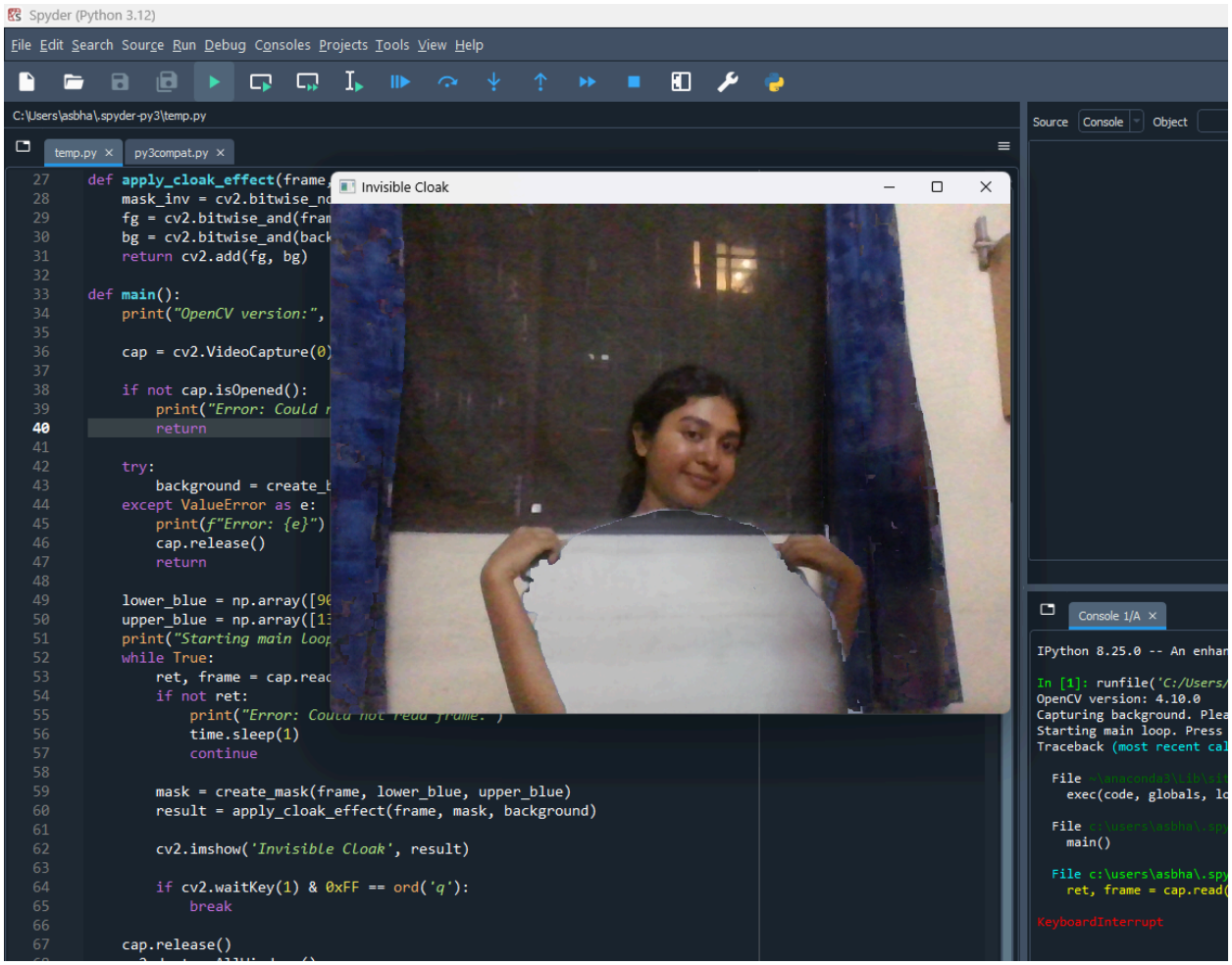
```
41
42      try:
43          background = create_background(cap)
44      except ValueError as e:
45          print(f"Error: {e}")
46          cap.release()
47          return
48
49      lower_blue = np.array([90, 50, 50])
50      upper_blue = np.array([130, 255, 255])
51      print("Starting main loop. Press 'q' to quit.")
52      while True:
53          ret, frame = cap.read()
54          if not ret:
55              print("Error: Could not read frame.")
56              time.sleep(1)
57              continue
58
59          mask = create_mask(frame, lower_blue, upper_blue)
60          result = apply_cloak_effect(frame, mask, background)
61
62          cv2.imshow('Invisible Cloak', result)
63
64          if cv2.waitKey(1) & 0xFF == ord('q'):
65              break
66
67      cap.release()
68      cv2.destroyAllWindows()
69
70  if __name__ == "__main__":
71      main()
72
```

OUTPUT:

Firstly, the camera captures the background so we move out of the frame.



This is my background.



By using a blue garment upon myself I have showcased the invisibility effect.
Thus the blue garment that I used is my invisibility cloak.

CONCLUSION: Thus displayed invisibility cloak effect using Python and OpenCV.