**Question:**

You are Palermo, one of the main characters in Money Heist, Bank of Spain. Although you were not part of the Royal Mint of Spain heist, you were an acquaintance of Berlin and The Professor prior to that. You collaborated with Berlin for coming up with the Bank of Spain heist and you both presented the plan to The Professor, who was uncertain about it. You were the man in charge at the bank, but your volatile personality soon caused tensions with the rest of the group and Tokyo assumed command, and you were tied sling with other hostages. There was a camera hidden in the hall and you need to escape from there, thus you need to make something so that camera cannot detect you. Write a python program to make an Invisible Cloak.

Steps to be followed:

1. Capture and store the background frame [This will be done for some seconds]

2. Detect the red colored cloth using color detection and segmentation algorithm.

3. Segment out the red colored cloth by generating a mask. [Used in code]

4. Generate the final augmented output to create a magical effect. [video.mp4]

**Solution logic:**

As per the problem statement there is a hidden camera and need to escape from them, so the idea is that we will use a red color cloth as out invisibility cloak for that will replace the current frame pixels corresponding to the cloth with the background pixels to generate the effect of an invisibility cloak

Step –

1. To capture the video and store the background frame. This will be done in 30 sec, for this I am using simple computer vision techniques in **OpenCV.**
2. In the program, cap.read () method enables us to capture latest frame (stored in variable background) with the camera and it also returns a Boolean (True/False stored in ret). If frame is read correctly, it will be True. So I can check end of the video by checking this return value.
3. cap.isOpened() Returns true if cap is initialized. Just like I got the frames for background I try to recieve current frames in the while loop using ret, img = cap.read() and then flip the image using img = np.flip(img,axis=1).
4. Here, to detect the red colored cloth using color detection and segmentation algorithm. I will first determine the region covered by the cloth (determine pixels corresponding to red color). To detect red color we use the HSV color space
5. Using HSV (Hue-Saturation-Value) color space I can distinguish between different colors much accurately than I can in RGB color space.
6. Setting range of HSV values for red color detection. Set Range for lower red in mask1 and Range for upper range in mask2.
7. Removes small regions of false detection which will avoid random glitches in the final output using morphologyEx() function.
8. Finally, replacing pixels corresponding to cloak with the background pixels