```
import cv2
from google.colab.patches import cv2_imshow
import matplotlib.pyplot as plt
import numpy as np


movie1 = cv2.VideoCapture("Movie_1_new.mp4")
movie2 = cv2.VideoCapture("Movie_2_new.mp4")
movie3 = cv2.VideoCapture("Movie_3_new.mp4")


def shot_detector(video):
    # Set the threshold for shot detection
    threshold = 7
    # Initialize variables
    frame_count = 0
    prev_frame = None
    shots = []
    dif = []
    start = True
    skip = True

    while True:
            # Read the next frame
            ret, frame = video.read()

            # If there are no more frames, break out of the loop
            if not ret:
                if shots != []:
                    shots[-1][-1] = frame_count
                break

            # Convert the frame to grayscale
            gray_frame = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

            # If this is not the first frame, compare it to the previous frame
            if prev_frame is not None:

                diff = cv2.absdiff(gray_frame, prev_frame)

                if np.average(diff) > 0.2 or not skip:
                    if len(dif) > 0:
                        if np.average(diff) - dif[-1] > threshold:
                            shots[-1][-1]=frame_count - 1
                            shots.append([frame_count, frame_count])
                    dif.append(np.average(diff))
                    skip = True
                elif skip:
                    shots[-1][-1] = frame_count
                    skip = False

            else:
                shots.append([frame_count, frame_count])
                start = False

            # Update variables
            frame_count += 1
            prev_frame = gray_frame

    return shots

def accu(output, truth):
    out_put = []
    truth_ = []
    correct = 0
    miss = 0
    false = 0
    for i in range(1, len(output)):
        out_put.append(output[i][0])
    for i in range(1, len(truth)):
        truth_.append(truth[i][0])
    for i in truth_:
        if i in out_put:
            correct += 1
        else:
            miss += 1
    for i in out_put:
        if i not in truth_:
            false += 1
    return correct, miss, false
```

```
o1 = shot_detector(movie1)
o2 = shot_detector(movie2)
o3 = shot_detector(movie3)
```

```
print("Video1_output: \n", o1)
print("Video2_output: \n", o2)
print("Video2_output: \n", o3)
```

```
Video1_output:
 [[0, 50], [51, 92], [93, 123], [124, 192], [193, 222], [223, 261], [262, 300], [301, 316], [317, 339], [340, 391], [392, 412], [413, 429], [430
Video2_output:
 [[0, 51], [52, 77], [78, 109], [110, 149], [150, 211], [212, 250], [251, 278], [279, 296], [297, 328], [329, 360], [361, 391], [392, 418], [419
Video2_output:
 [[0, 4], [5, 45], [46, 80], [81, 156], [157, 191], [192, 233], [234, 274], [275, 315], [316, 345], [346, 492], [493, 522], [523, 586]]
```

```
t1 = [[0, 50], [51, 92], [93, 123], [124, 192], [193, 222], [223,261], [262, 300], [301, 316], [317, 339],
      [340, 391], [392, 412], [413, 429], [430, 454], [455, 456], [457, 514], [515, 552], [553, 596],
      [597, 611], [612, 635], [636,659], [660, 686], [687, 711], [712, 735], [736, 763], [764,791],
      [792, 805], [806, 825], [826, 845], [846, 870], [871, 886], [887, 912]]
t2 = [[0, 51], [52, 77], [78, 109], [110, 149], [150, 211], [212, 250], [251, 278], [279, 296],
      [297, 328], [329, 360], [361, 391], [392, 418], [419, 482], [483, 513], [514, 525],
      [526, 541], [542, 566], [567, 585], [586, 615], [616, 641], [642, 693], [694, 728],
      [729, 757], [578, 776]]
t3 = [[0, 4], [5, 45], [46, 80], [81, 156], [157, 191], [192, 233], [234, 274], [275, 315],
      [316, 345], [346, 381], [382, 424], [425, 469], [470, 492], [493, 522], [523, 586]]
```

```
Movie1_accuracy = accu(o1, t1)
Movie2_accuracy = accu(o2, t2)
Movie3_accuracy = accu(o3, t3)
```

```
print("The num of correct, miss, false of Movie1: \n", Movie1_accuracy)
print("The num of correct, miss, false of Movie2: \n", Movie2_accuracy)
print("The num of correct, miss, false of Movie3: \n", Movie3_accuracy)
```

```
The num of correct, miss, false of Movie1:
 (29, 1, 2)
The num of correct, miss, false of Movie2:
 (22, 1, 2)
The num of correct, miss, false of Movie3:
 (11, 3, 0)
```