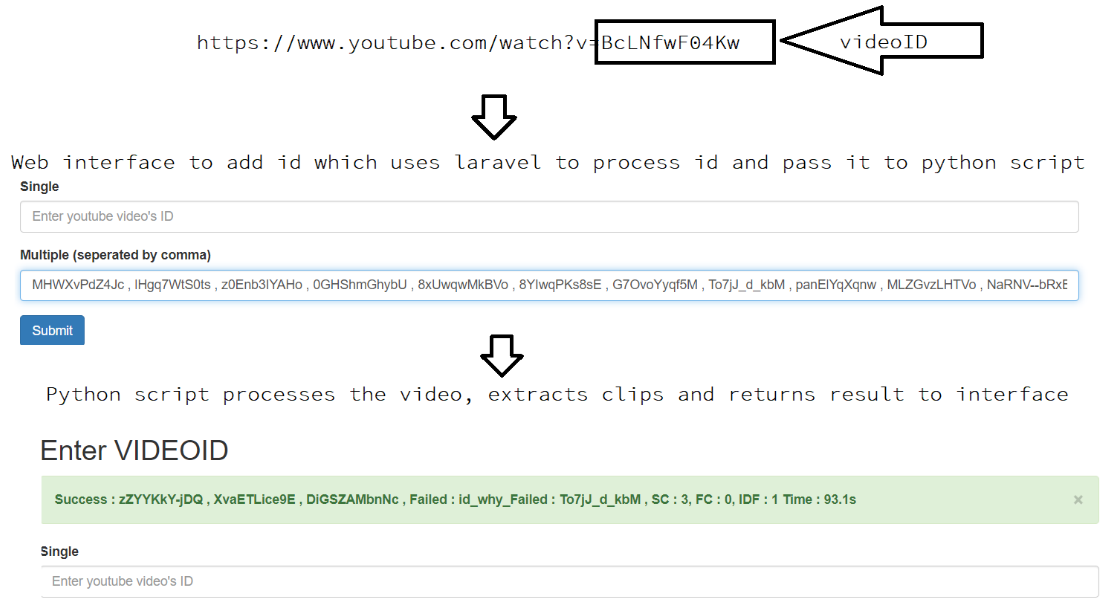
Video processing

<u>Step 1: Extraction of videos' clips from YouTube</u>

Technology used: Laravel (PHP) and Python

Library used: YouTube-dl (YouTube-dl is a Command-line program to download videos from YouTube.com and other video sites)



https://www.youtube.com/watch?v=BcLNfwF04Kw

videoID

Web interface to add id which uses laravel to process id and pass it to python script

Single

Enter youtube video's ID

Multiple (seperated by comma)

MHWXvPdZ4Jc , lHgq7WtS0ts , z0Enb3IYAHo , 0GHShmGhybU , 8xUwqwMkBVo , 8YlwqPKs8sE , G7OvoYyqf5M , To7jJ_d_kbM , panElYqXqnw , MLZGvzLHTVo , NaRNV--bRxE

Submit

Python script processes the video, extracts clips and returns result to interface

Enter VIDEOID

Success : zZYYKkY-jDQ , XvaETLice9E , DiGSZAMbnNc , Failed : id_why_Failed : To7jJ_d_kbM , SC : 3, FC : 0, IDF : 1 Time : 93.1s

Single

Enter youtube video's ID

Result is shown in interface as flash message and contains following:

Success = All successful processed id

Failed = All videos unavailable id

id_why_failed= id of all videos with unknown reason for failure

SC= Success count
FC= Failed count

IDF=I Don't know why failed count

Time for the process is in seconds

Time required for processing (internet speed and quality of video impacts the time):

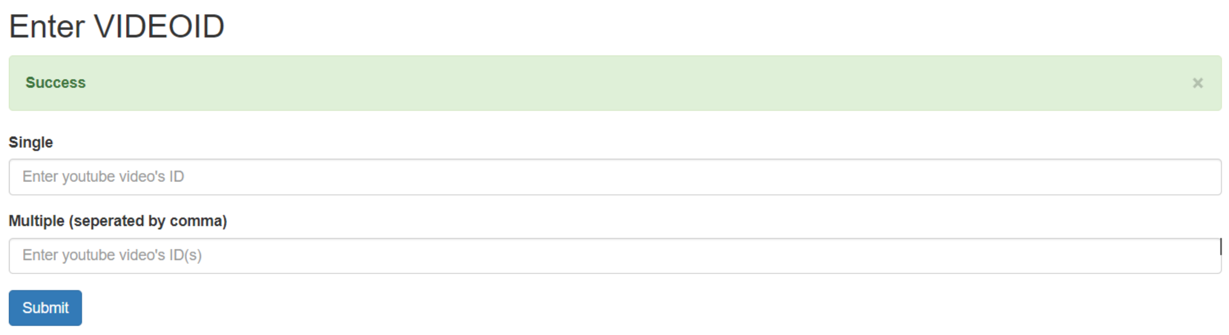
500 videos = 3 hrs.

1450 videos = 7 hrs.

63 videos = 20 minutes

4 videos = 1.5 minutes

For single video it just returns result as success upon successful extraction:



Though the entire software structure consists of various part two main part of php program and python program is as below:

NOTE: Program and software structure can be improved drastically, no architecture or standard is followed (except web interface uses MVC architecture), it is just bunch of “if-else” statements used to obtain desired result, program can be made more modular and understandable, however since its single person with not so much time and also focus is not to develop industry standard software no attention was paid towards software design.

PHP

```
    {

        $starttime = microtime(true);

        set_time_limit(36000);

        if ($request->multiple != null) {

            $result            = explode(",", $request->multiple);
            $id_collection     = [];
            $failed_collection = [];
            $idk_why_fail=[];
            foreach ($result as $id) {
                $process = new Process(['python',
'C:\Users\Invictus\PycharmProjects\videoprocessing\main.py', trim($id)]);
                $process->setTimeout(36000);
                $process->run();

                if (!$process->isSuccessful()) {
                    array_push($idk_why_fail, trim($id));
                    continue;
                }
                $output = $process->getOutput();
                $result = preg_split('/\r\n|\r|\n/', $output);
                if ($result[1] == "Failed") {
                    array_push($failed_collection, trim($id));} else {
                    array_push($id_collection, trim($id));
                }
            }
            $success_count = 0;
            $failure_count = 0;
            $idk_why_fail_count = 0;
            $success_id    = "Success : ";
            foreach ($id_collection as $id) {
                $success_id = $success_id . $id . " , ";
                $success_count++;
            }
            $success_id = $success_id . "Failed : ";
            foreach ($failed_collection as $id) {
                $success_id = $success_id . $id . ",";
                $failure_count++;
            }
            $success_id = $success_id . "id_why_Failed : ";
            foreach ($idk_why_fail as $id) {
                $success_id = $success_id . $id . " , ";
                $idk_why_fail_count++;
            }
            $success_id = $success_id . " SC : " . $success_count . ", FC
: " . $failure_count.", IDF : " . $idk_why_fail_count;
              /* do stuff here */
        $endtime  = microtime(true);
        $timediff = $endtime - $starttime;
        $success_id=$success_id." Time : ".round($timediff,1)."s";
            return back()->with('success', $success_id);

        } else {
            $id      = $request->single;
            $process = new Process(['python',
'C:\Users\Invictus\PycharmProjects\videoprocessing\main.py', $id]);
            $process->run();

            if (!$process->isSuccessful()) {
                throw new ProcessFailedException($process);
            }
            return back()->with('success', "Success");
        }
    }
```

Python:

```
# all required library imported

import cv2
import numpy as np
import youtube_dl
import sys
import math
import os
import re
from random import randint

if __name__ == '__main__':
    video_id = "To7jJ_d_kbM"
    # video_id = sys.argv[1]
    video_url = "To7jJ_d_kbM"
    # video_url = sys.argv[1]
    url = "https://www.youtube.com/watch?v=" + video_id
    directory = r'C:/xampp/htdocs/processed_image_python'
    ydl_opts = {}

    # create youtube-dl object
    ydl = youtube_dl.YoutubeDL(ydl_opts)
    # set video url, extract video information
    try:
        info_dict = ydl.extract_info(video_url, download=False)
    except:
        print("Failed")
        sys.exit()
    # get video formats available
    formats = info_dict.get('formats', None)
    length = math.floor(info_dict['duration'])
    title = info_dict["title"]
    regex = re.compile('[^a-zA-Z0-9()]')
    title = regex.sub('_', title)
    # print(formats)
```

```python
for f in formats:
    # print(f.get('format_note', None))
    if f.get('format_note', None) == '144p':
        url = f.get('url', None)
        break
    if f.get('format_note', None) == '360p':
        url = f.get('url', None)
        break
    if f.get('format_note', None) == '240p':
        url = f.get('url', None)
        break
cap = cv2.VideoCapture(url)

# check if url was opened
if not cap.isOpened():
    print('video not opened')
    exit(-1)

frame_rate = math.floor(cap.get(5))
# print(length, frame_rate)

os.chdir(directory)
if not (os.path.isdir(directory + "/" + title + "-" + video_id)):
    os.mkdir(title + "-" + video_id)
os.chdir(directory + "/" + title + "-" + video_id)

flag = 0
if length > 28740:
    length = 28740
gap = math.floor(length / 8)
# print(gap)
while True:
    # read frame
    ret, frame = cap.read()
    if flag == 0 or 1 or 2 or 3 or 4 or 5 or 6 or 7:
        point = ((flag * gap) + gap)
        cap.set(1, point * frame_rate)
    if flag == 8:
        break
    # check if frame is empty
    if ret:
        # cv2.imshow('frame', frame)
```

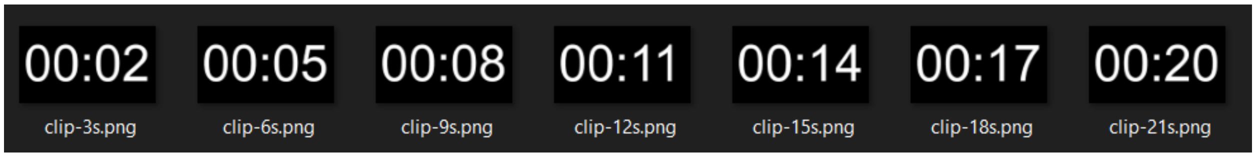
```python
            minute = point // 60
            print(minute, length, point)
            if length < 60:
                if flag == 0:
                    file_name = "-" + str(point) + "s.png"
                else:
                    print(file_name)
                    cv2.imwrite(f"clip" + file_name, frame)
                    file_name = "-" + str(point) + "s.png"
                if cv2.waitKey(30) & 0xFF == ord('q'):
                    break
            if length > 60 and 60 > minute:
                minute = point // 60
                print(flag)
                second = point - (minute * 60)
                if flag == 0:
                    file_name = "-" + str(minute) + "m-" + str(second) +
"s.png"
                else:
                    print(file_name)
                    cv2.imwrite(f"clip" + file_name, frame)
                    file_name = "-" + str(minute) + "m-" + str(second) +
"s.png"
                if cv2.waitKey(30) & 0xFF == ord('q'):
                    break
            if minute >= 60:
                # print(file_name)
                hr = minute // 60
                minute = (point - (hr * 60 * 60)) // 60
                second = point - ((minute * 60) + (hr * 60 * 60))
                cv2.imwrite(f"clip" + file_name, frame)
                file_name = "-" + str(hr) + "h-" + str(minute) + "m-" +
str(second) + "s.png"
                if cv2.waitKey(30) & 0xFF == ord('q'):
                    break
        else:
            break
        flag += 1
    cap.release()
    print("Success")
cv2.destroyAllWindows()
```

OUT OF 2028 VIDEOS: 1900 sucessfully processed, 115 videos unavailable for various reasons(channel removed or video removed or violated youtube guideline, etc), 12 videos output unknown.
12 videos may have been repeated or something, we can find out if it was repeated but for now if the video is already processed I have just overwritten previous file with new output, if we need confirmation of what happened with those 12, and may be more when we process 17000 videos, we can resolve the issue accordingly.

Some test samples are as follow:

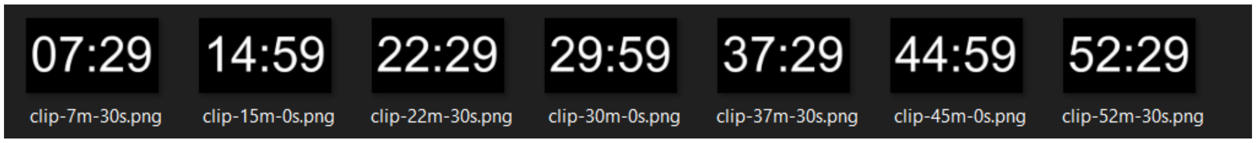
Testing on 30 s length video(video length 32 second):

url: https://www.youtube.com/watch?v=ot7aXVMtE_g



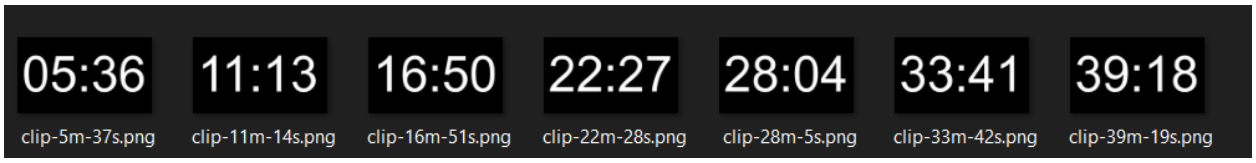
Testing on 1h length video(video length 1 hr 1 second):

url: https://www.youtube.com/watch?v=vdqcge_SPnc&t=5s



Testing on 45mins length video (video length 45mins 1second):

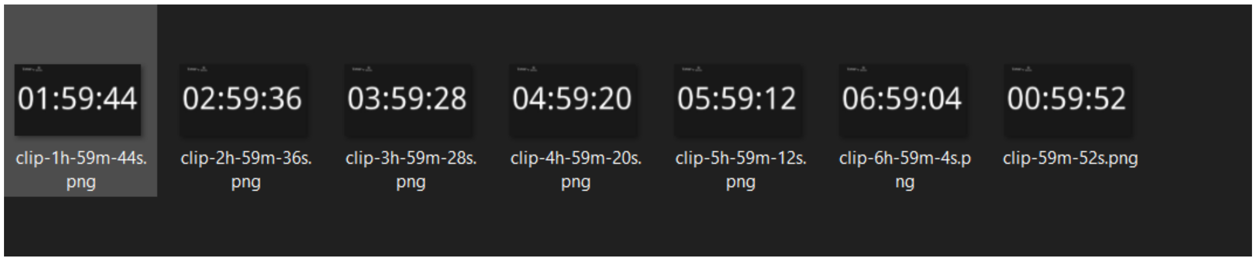
url: https://www.youtube.com/watch?v=Hfs-oNEiEf0&t=50s



Drawbacks:
If video is above length of 8hrs, gap between clips may not be even and 7 clips on interval of each hour is extracted. Can be resolved with few lines of code but since I found only one video among 2000 videos to be above 8hrs, at the moment the case is as it is.

Testing on 10hrs length video (video length 10hrs 9second):

url: https://www.youtube.com/watch?v=CyIhcyCOCkk



List of unavailable videos:

| MTOv6StMBfg | 4JkgmQIH7PM | xanfG5Rx2cU | lkM3omotHrw | sS0BF5709sA | rqyL4p-RznQ | yigurOl5Iuw | bQ_pjt0nwuE | i3RleekJEZo | NqdbOnJFNDA | MhMpIfa2o_0 | Yqk-VJmIOzc | URRaFK48c70 | VrSSIS45_n4 | tEnrIS8Vnm4 | MTYduB6Ru-Q | MVfDJfz2bCo | RewfjV8oMps | ed62wnXcIeI | hIykqE8DQNo | z6vs0EAPPbQ | _mNPMx8Ofos | 3Z32zfRdFVM | 5fkz4jLj9Yw | h4v66YoW_nM | 95r6MANBl6k | UQrqA-3eUgk | Lg84120HHi8 | aOockEyQb0g | SD-eO-nxeOw | Ldht0W6gE8Q | p26SScjre8o | w1WalIOFx3Y | WtMHJdzrSk8 | -hy4wpkbHOI | KemAh8vVm4g | ttArYumMlns | rMkRpfjCqkc | CIoQkIqdQW0 | S4Rq76KxMi0 | o8ujMT5F6RM | m-ERmE_ydz4 | RsfzmsUjjKc | 7kNcssyd9sM | hwOPCS98T8A | F4y6l_rEqDY | nNrS2WollZo | EvkKXfxTMLg | fHepi2Jc9NI | lK5ZhlJ1CA4 | zlgSNSc2Lts | 6_IjYfJAit4 | 2lFqF4jNJzk | UUZ-UbjbXvc | hhbXDUAKRTY | kuib8EfNf2s | J5_SGgqHGwE | ggqyc-SJRZM | cl03NPNUD5A | 9XiEnvVLJ9k | ph_vyHrG69k | EHH23yF65lc | N7aG2BglJwg | MbKVtdkdigs | EtIJNbvLzZI | 6J-dlIB0F1M | Ni2d1DpNNRY | L5oh43bZSnU | gbxr7Pw1e_8 | n9b3lGcS8PE | sHb5KRSTlgs | ZBTzNMgQjc8 | PAsp559Zglo | uaAOoYvO5dU | tnkfcxHKQsc | 2rr86xfkEB4 | m0Qy2spPnnA | _yh3Fy7zjNg | 06bzv1Vw7TU | IJaV_Fk3xSY | -ZwPbMkEFV8 | OwHFbX3QFLM | EtWskvBmHBo | yxhaaqE8-0k | N4fNK-gm6lY | JmLCjNfFoCo | p5PJV_z5P20 | m5x9UmRXnG8 | RQ8QUsX53zs | UWXy9PTmgkM | bbEuJo_VLCE | fT7e75KxGaw | EvbXbaK3P2U | 8HHQ7rPfzjE | xuEw2J_4rxM | UniEWbqhoIY | vWUW9qjFzrM | rp3kK4DNu3o | P1ENqSS-i2I | 9uZ2jh7VYSE | gpVwT9tHWYw | pOWmWvQ4ff0 | p-YCjBBCMcc | MqCQmjSGXnc | id9CzIfKlaU | rytZZa1OLxA | _cARoyGHFPQ | gpzlXQOdkYg | vipMF4wRlrE | o8Act9ZvRZQ | H8nTITJxrCc | aMAxk9pNA8I | yw9_ufUZ0s0 | 3xqEByeVsbM | EahiV8y3pBY |