

## The Issues

Bullet time is a visual effect or visual impression of detaching the time and space of a camera from that of its visible subject. Its make famous by the Matrix movie. To make a high quality Bullet Time user usually require to purchase very good and expensive SLR HD cameras (> 120 qty), linked them up via proprietary network and synchronize them to fire the shot..

## Our Magic Solution

Use ONVIF HD cameras instead. Juz purchase ONVIF HD camera linked them up via local giga Ethernet network switch and our run Bullet Time ONVIF app!!!

Who said ONVIF camera must be only use for security industrial!!! It can be also uses for movie industrial too and have fun too!!! 😊

## **How it works**

Bullet Time ONVIF is a Windows Desktop App to allow user to create Matrix style movie shots using ONVIF cameras.

Bullet time (also known as frozen moment, the big freeze, dead time, flow motion or time slice) is a visual effect or visual impression of detaching the time and space of a camera (or viewer) from that of its visible subject. ([https://en.wikipedia.org/wiki/Bullet\\_time](https://en.wikipedia.org/wiki/Bullet_time)). Its make famous by the Matrix movie. (<https://www.youtube.com/watch?v=bKEcElcTUMk> )



To make a high quality Bullet Time user usually require to purchase very good and expensive SLR HD cameras (> 36 qty), linked them up via proprietary network and synchronize them to fire the shot.

Now with the advancement of ONVIF HD cameras, user can simply purchase them at low cost, linked them up via local giga Ethernet network switch and run the Bullet Time ONVIF app.

Who said ONVIF camera must be only use for security industrial!!! It can be use for movie industrial too 😊

The app will link up all the ONVIF cameras and user needs just need to fire the shots via simply clicking the Action!!! Button.

Upon clicking the Action!!! Button the app will perform a snapshot of the current video of each ONVIF camera video and save the image to the

sub folder named “capture”.

All the images file are named actionXXX.png where XXX is the camera number.

All user need to do is to merge all the images file using video editor application to generate the mpeg movie file.

There is also a free open source tool FFmpeg to perform the merging.

FFmpeg

<https://ffmpeg.zeranoe.com/builds/>

download the static standalone exe (ffmpeg.exe) and place them on the folder will do.

Execute the command

```
ffmpeg -i ./capture/action%03d.png -pix_fmt yuv420p output.mpg
```

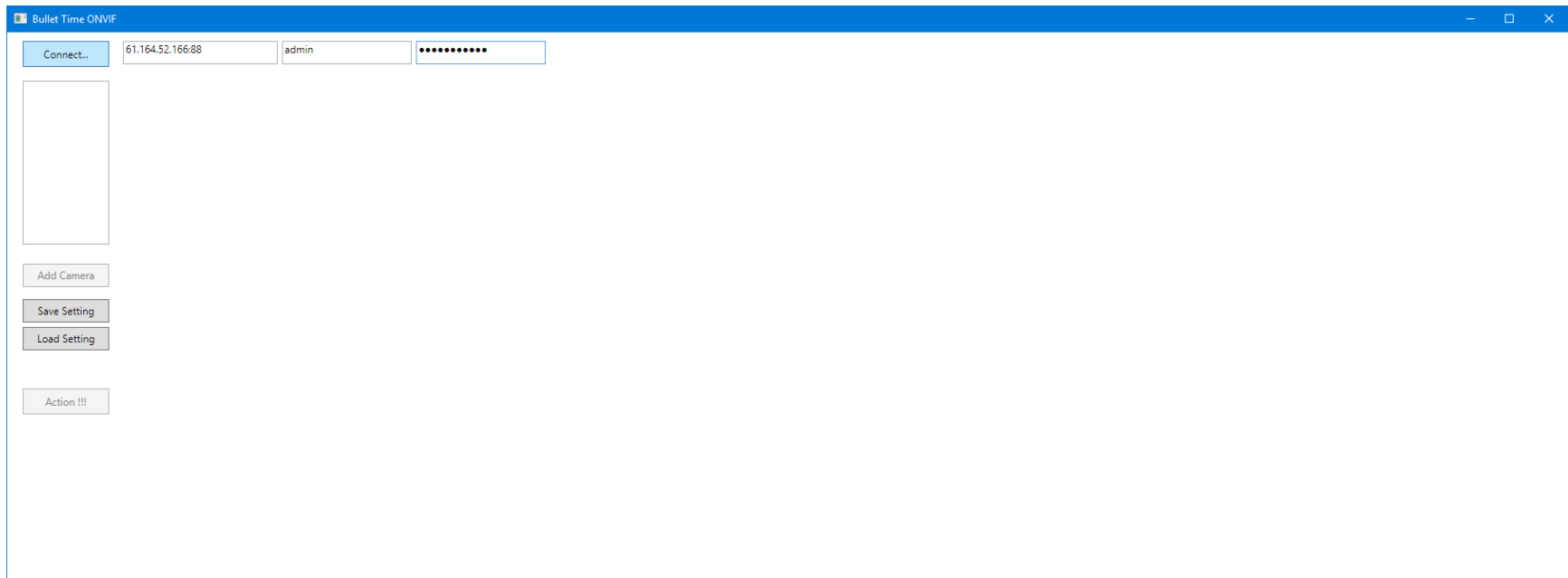
The app require the following library

VLC player

<https://www.videolan.org/vlc/download-windows.html>

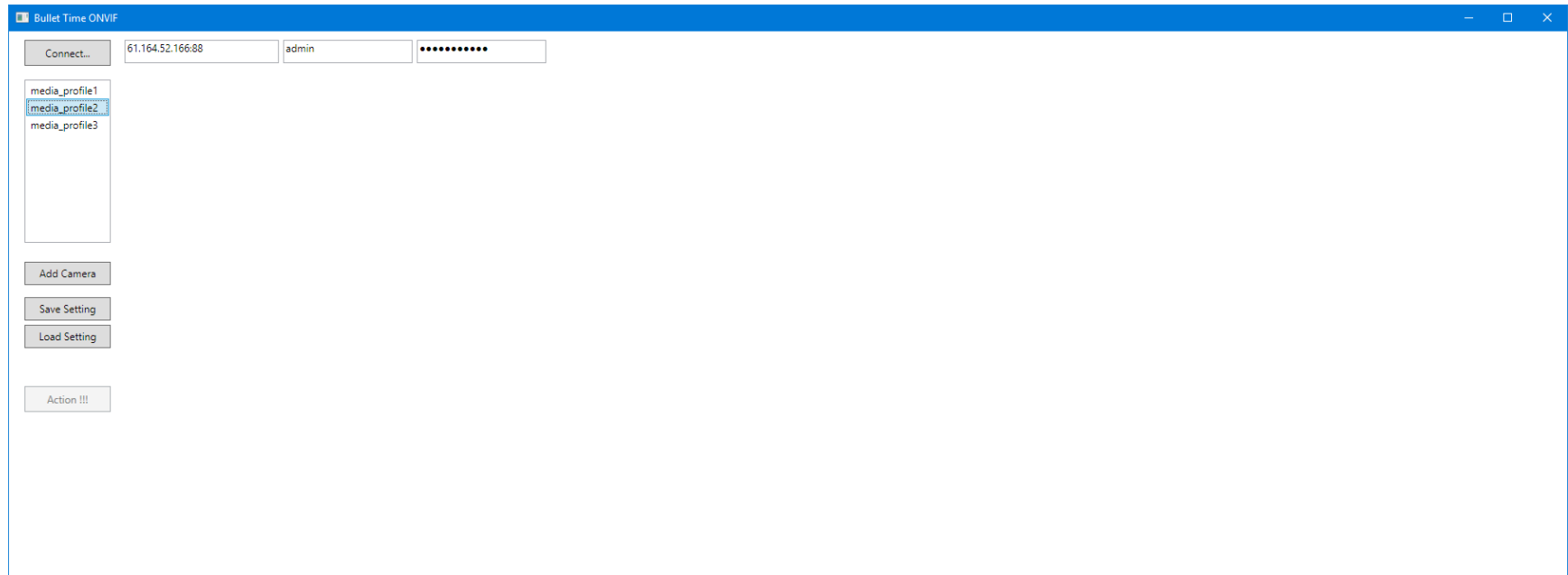
## Detailed Operation

Launch the app BulletTimeOnvifVideo.exe, enter the ONVIF camera's ip, user id and password and click connect button.



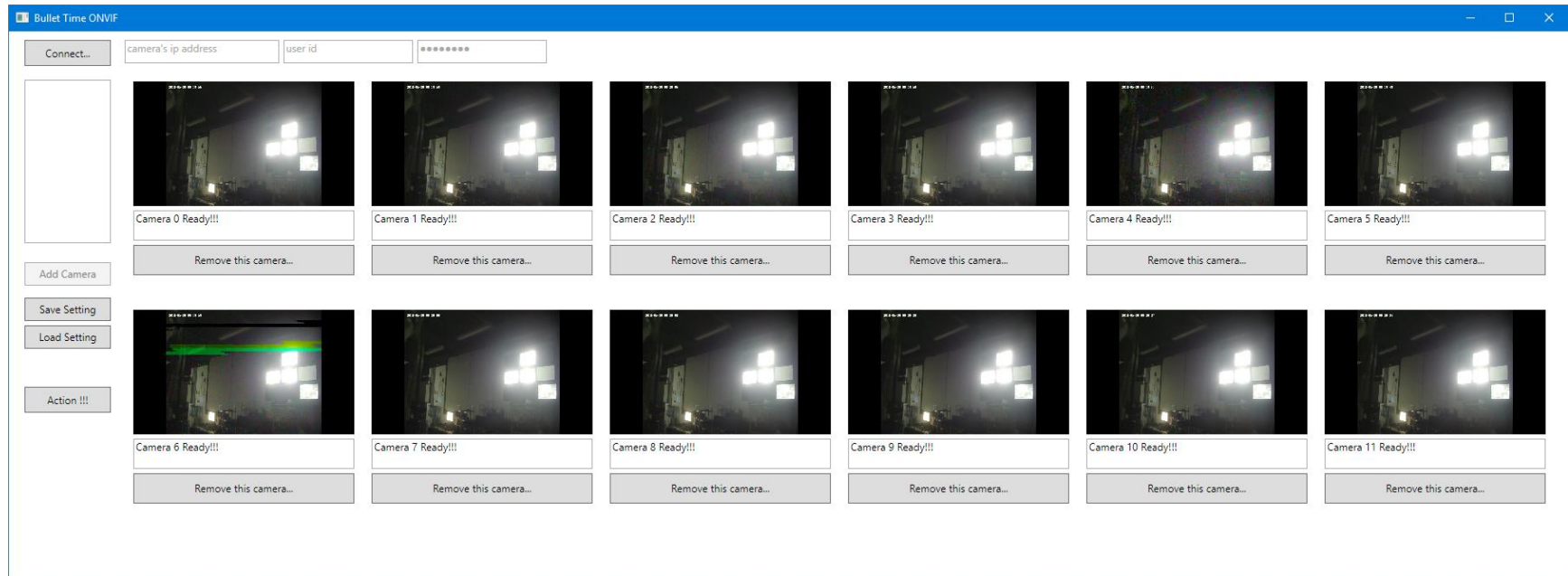
The screenshot shows a Windows application window titled "Bullet Time ONVIF". The window has a blue title bar with standard minimize, maximize, and close buttons. The main content area is white and contains a vertical sidebar on the left with several buttons: "Connect..." (highlighted in blue), "Add Camera", "Save Setting", "Load Setting", and "Action !!!". To the right of the sidebar, there are three input fields: the first contains the IP address "61.164.52.166:88", the second contains the username "admin", and the third contains a masked password represented by ten black dots. Below the "Connect..." button is a large, empty rectangular box, likely intended for a video feed or status information.

Select the desire profile and click Add camera button.



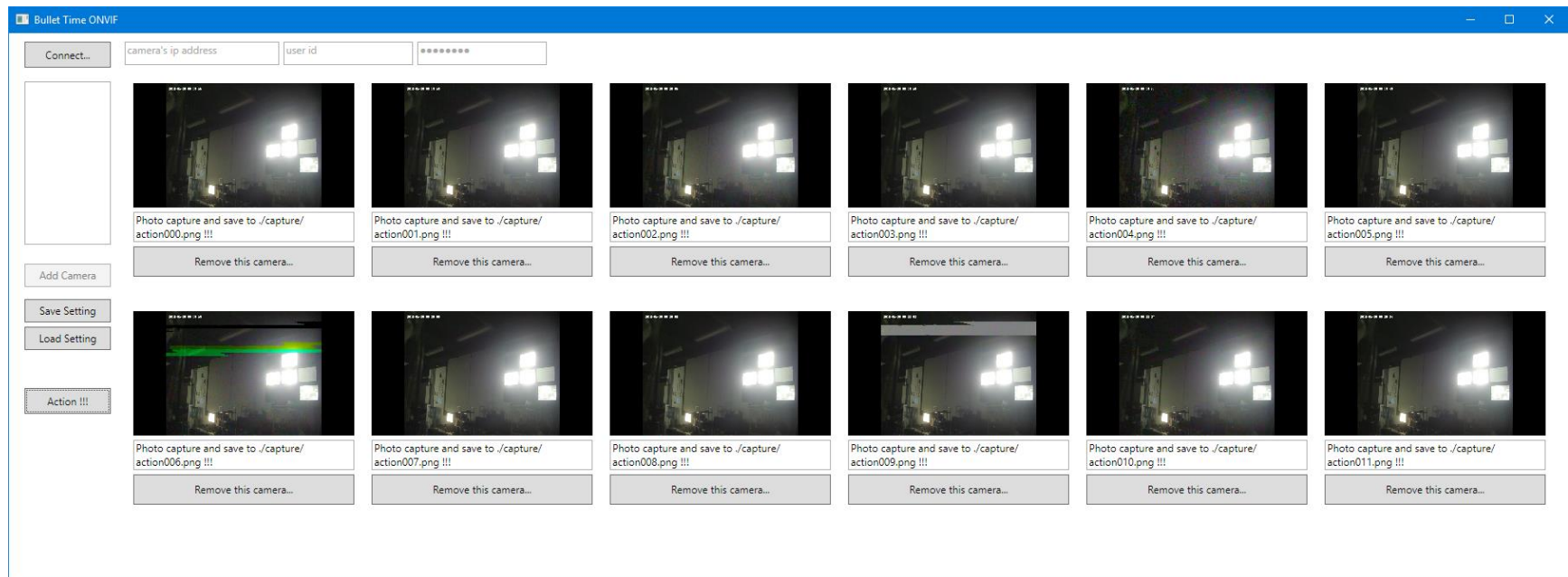
The screenshot shows a software window titled "Bullet Time ONVIF". At the top, there is a "Connect..." button followed by three input fields: an IP address field containing "61.164.52.166:88", a username field containing "admin", and a password field with masked characters. Below these fields is a list box containing three items: "media\_profile1", "media\_profile2", and "media\_profile3". The "media\_profile2" item is currently selected and highlighted. Underneath the list box are four buttons: "Add Camera", "Save Setting", "Load Setting", and "Action !!!".

Repeat the above 2 steps for all the rest of the ONVIF cameras.



You can save the setting for future use via the Save Setting button.

Click the Action !!! button to take the desire shots.



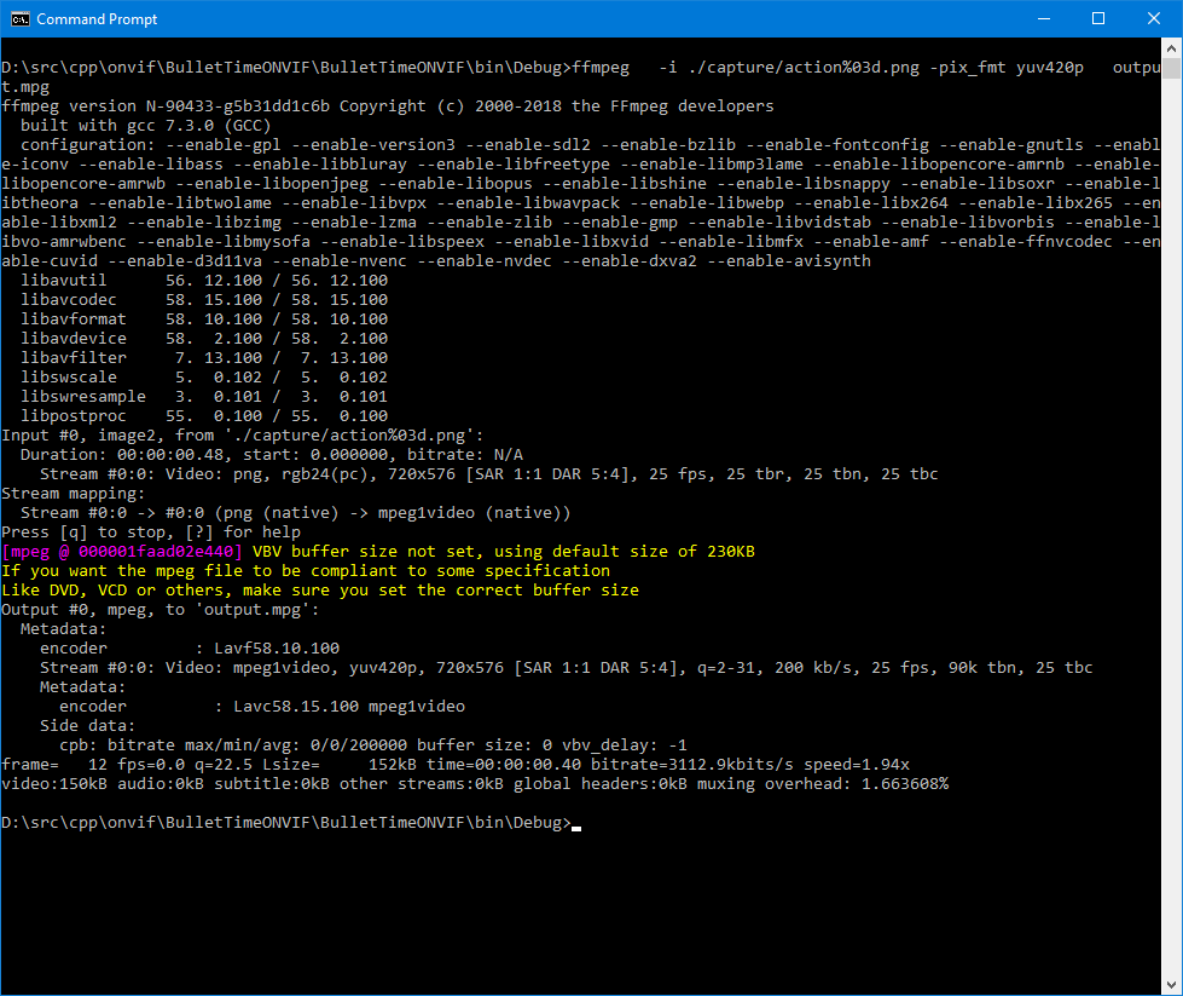
And all the camera images will be saved to “capture” sub folder located with the BulletTimeOnvifVideo.exe.

The images are named actionXXX.png where XXX is the camera number.

Merge the images files using the free open source tool Ffmpeg tool available from <https://ffmpeg.zeranoe.com/builds/> and copy it to the BulletTimeOnvifVideo.exe folder.

Execute the command in command prompt.

```
ffmpeg -i ./capture/action%03d.png -pix_fmt yuv420p output.mpg
```



```
Command Prompt
D:\src\cpp\onvif\BulletTimeONVIF\BulletTimeONVIF\bin\Debug>ffmpeg -i ./capture/action%03d.png -pix_fmt yuv420p output.mpg
ffmpeg version N-90433-g5b31dd1c6b Copyright (c) 2000-2018 the FFmpeg developers
  built with gcc 7.3.0 (GCC)
  configuration: --enable-gpl --enable-version3 --enable-sdl2 --enable-bzlib --enable-fontconfig --enable-gnutls --enable-l
e-iconv --enable-libass --enable-libbluray --enable-libfreetype --enable-libmp3lame --enable-libopencore-amrnb --enable-
libopencore-amrwb --enable-libopenjpeg --enable-libopus --enable-libshine --enable-libsnappp --enable-libsoxr --enable-l
ibtheora --enable-libtwolame --enable-libvpx --enable-libwavpack --enable-libwebp --enable-libx264 --enable-libx265 --en
able-libxml2 --enable-libzimg --enable-lzma --enable-zlib --enable-gmp --enable-libvidstab --enable-libvorbis --enable-l
ibvo-amrwbenc --enable-libmysofa --enable-libspeex --enable-libxvid --enable-libmfx --enable-amf --enable-ffnvcodec --en
able-cuvid --enable-d3d11va --enable-nvenc --enable-nvdec --enable-dxva2 --enable-avisynth
  libavutil      56. 12.100 / 56. 12.100
  libavcodec     58. 15.100 / 58. 15.100
  libavformat    58. 10.100 / 58. 10.100
  libavdevice    58.  2.100 / 58.  2.100
  libavfilter     7. 13.100 /  7. 13.100
  libswscale     5.  0.102 /  5.  0.102
  libswresample  3.  0.101 /  3.  0.101
  libpostproc   55.  0.100 / 55.  0.100
Input #0, image2, from './capture/action%03d.png':
  Duration: 00:00:00.48, start: 0.000000, bitrate: N/A
  Stream #0:0: Video: png, rgb24(pc), 720x576 [SAR 1:1 DAR 5:4], 25 fps, 25 tbr, 25 tbn, 25 tbc
Stream mapping:
  Stream #0:0 -> #0:0 (png (native) -> mpeg1video (native))
Press [q] to stop, [?] for help
[mpeg @ 000001faad02e440] VBV buffer size not set, using default size of 230KB
If you want the mpeg file to be compliant to some specification
Like DVD, VCD or others, make sure you set the correct buffer size
Output #0, mpeg, to 'output.mpg':
  Metadata:
    encoder      : Lavf58.10.100
  Stream #0:0: Video: mpeg1video, yuv420p, 720x576 [SAR 1:1 DAR 5:4], q=2-31, 200 kb/s, 25 fps, 90k tbn, 25 tbc
  Metadata:
    encoder      : Lavc58.15.100 mpeg1video
  Side data:
    cpb: bitrate max/min/avg: 0/0/200000 buffer size: 0 vbv_delay: -1
frame= 12 fps=0.0 q=22.5 Lsize= 152kB time=00:00:00.40 bitrate=3112.9kbits/s speed=1.94x
video:150kB audio:0kB subtitle:0kB other streams:0kB global headers:0kB muxing overhead: 1.663608%

D:\src\cpp\onvif\BulletTimeONVIF\BulletTimeONVIF\bin\Debug>
```



Ta Da!!! Enjoy Bullet Time shooting!!! 😊

### **Further Improvement**

Incorporate built in image merging and MP4 movie generation function into the app. Instead of using external open source tools/commercial tools

**Thank you**