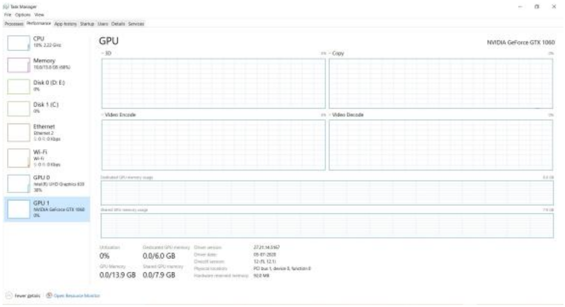
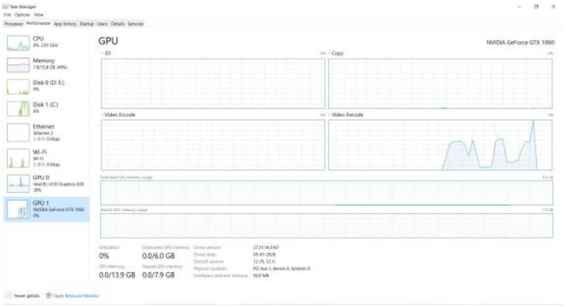
USING NVIDIA GPU-BASED HARDWARE ACCELERATORS TO DECODE VIDEOS

Here, we have also utilized the library FFMPEG along with OpenCV to decode the videos. This can be suggested by the graphs below. These images depict both results of decoding without GPU and with GPU. To achieve this several articles were referenced (which have been given below). Article [1 – 3] had been used to reference how to write and read videos for brushing up the concepts before proceeding with the task given. Group of codecs were referenced from article [4]. A brief trial had then been conducted to look into the efficacy of methods given to compile CUDA with OpenCV (from article [5]) but there were some problems encountered due to the inability to integrate CUDA Codecs given in the article [4]. Then, I looked into sequence encoding using H.264 from [6]. Finally, FFMPEG [7] had been compiled using CUDA support from [8]. Further, I studied how to integrate all 3 libraries (OpenCV, CUDA, FFMPEG) into 1 single program (from the repository in [9]). And finally, by referencing the pipelined decoder (nvdec, or cuvid) from [10], I was able to build the program. Here, article [10] played a major role in this code.





<u>ARTICLES REFERENCED</u>

1. https://docs.opencv.org/4.2.0/dd/d43/tutorial_py_video_display.html
2. https://www.learnopencv.com/read-write-and-display-a-video-using-opencv-cpp-python/
3. https://stackoverflow.com/questions/43940538/how-to-write-mp4-video-file-with-h264-codec
4. https://docs.opencv.org/master/d0/d61/group__cudacodec.html
5. https://www.pyimagesearch.com/2016/07/11/compiling-opencv-with-cuda-support/
6. https://stackoverflow.com/questions/59998641/decode-and-show-h-264-chucked-video-sequence-with-python-from-pi-camera
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8. https://developer.download.nvidia.com/designworks/ffmpeg/secure/Using_FFmpeg_with_NVIDIA_GPU_Hardware_Acceleration_v01.4.pdf?0r60e41ihHrWuaTPQ8YDXGeeUlUq63Kt7KFEjP7swDKQfDHvZPHwrJk0QDHhB4SyHQZOu5Z_BTzFA4ojcwJe1B74M3dK6kYfQi1cy44O-X9zZim9Pb0zC-uIogkm0s6j0mTIKXQS6zDrAAuE4q64Q-FTezoBFo656Z4VWSqpnGE5YY6yKABSQJD-KT6K43yNjTrg204
9. https://github.com/burningion/nvidia-accelerated-pytorch-ffmpeg-opencv
10. https://www.reddit.com/r/linuxquestions/comments/b4jxdb/how_could_i_interface_ffmpeg_with_opencv_in/