

Supplementary Document for GameCodec: Neural Cloud Gaming Video Codec

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1 AirSim-test Dataset

This section provides the details to use the AirSim tool [1] to recapture the AirSim-test dataset used in our experiment. Specifically, we used pre-built binary files with precompiled environments provided by AirSim. To collect the data, we used its *Multirotor*, which is a drone simulation, as an actor to traverse the scene and capture data. There are multiple cameras attached on the drone to facilitate capturing multiple views at the same time. We used *front_center* camera for our experiments.

Our AirSim Configuration:

- SimMode: Multirotor
- Image Width: 1280
- Image Height: 704
- Enable Weather: True

Rain: 0.25

Snow: 0.25

Fog: 0.25

Dust: 0.25

MapleLeaf: 0.25

(in Africa environment, we lower all the above values to 0.15 to increase visibility of the scene)

Camera Poses We provide the camera poses we used to capture the dataset in the attached *[environment].csv* files in which each file corresponds to one environment.

2 Experiment Details

This section provides the details commands we used to encode the videos with the variations of HEVC [1] (including HM-SCC, HM, and FFMPEG) and AVC [2] codecs:

HEVC-SCC (HM-SCC, RGB444)

```
./HM-16.21+SCM-8.8/bin/TAppEncoderStatic -c ./HM-16.21+SCM-8.8/cfg/
encoder_lowdelay_P_main_scc.cfg -i ./[file_name]_ref.rgb --
InputBitDepth=8 --InputChromaFormat=444 --
InputColourSpaceConvert=RGBtoGBR --SNRInternalColourSpace=1 --
OutputInternalColourSpace=0 -wdt 1280 -hgt 704 -fr 30 -f 150 -o
./[file_name].rgb -b ./[file_name].bin -q [qp] > ./[file_name].
log
```

HEVC (HM, YUV420)

```
./hm/trunk/bin/TAppEncoderStatic -c ./hm/trunk/cfg/
encoder_lowdelay_P_main.cfg -i ./[file_name].yuv --InputBitDepth
=8 -wdt 1280 -hgt 704 -fr 1 -f 150 -o ./[file_name].yuv -b ./[
file_name].bin -q [qp] > ./[file_name].log
```

HEVC (FFMPEG, YUV420)

```
ffmpeg -y -pix_fmt yuv420p -s 1280x704 -r 1 -i [file_name].yuv -c:v
libx265 -preset medium -crf [crf_value] -tune zerolatency -x265-
params "verbose=1" [file_name].mkv 2> [file_name].log
```

AVC (FFMPEG, YUV420)

```
ffmpeg -y -pix_fmt yuv420p -s 1280x704 -r 1 -i [file_name].yuv -c:v
libx264 -preset medium -crf [crf_value] -tune zerolatency -x264-
params "verbose=1" [file_name].mkv 2> [file_name].log
```

References

- [1] Shital Shah, Debadeepta Dey, Chris Lovett, and Ashish Kapoor. Airsim: High-fidelity visual and physical simulation for autonomous vehicles. In *Field and Service Robotics*, 2017. URL <https://arxiv.org/abs/1705.05065>.
- [2] Gary J. Sullivan, Jens-Rainer Ohm, Woo-Jin Han, and Thomas Wiegand. Overview of the high efficiency video coding (hevc) standard. *IEEE Transactions on Circuits and Systems for Video Technology*, 22(12):1649–1668, 2012. doi: 10.1109/TCSVT.2012.2221191.
- [3] T. Wiegand, G.J. Sullivan, G. Bjontegaard, and A. Luthra. Overview of the h.264/avc video coding standard. *IEEE Transactions on Circuits and Systems for Video Technology*, 2003.