

# A COLLECTION OF 100 4K VIDEO SEQUENCES

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As mentioned before, we have used a large database of 100 openly available UHD training sequences for our training process. The sequences were downloaded from a variety of sources, more specifically, Netflix Chimera [1], Ultra Video Group [2], Harmonic Inc [3], SJTU [4] and AWS Elemental [5]. All the sequences were spatially cropped to UHD (if originally 4K resolution,  $4096 \times 2160$  pixels), converted to 4:2:0 chroma subsampling (if originally 4:2:2 or 4:4:4) and temporally cropped to 64 frames. We used 64 frames to reduce the time required to encode all the training sequences. In addition, each sequence contains a single scene (without scene cuts) and the majority of the test sequences have a frame rate of 60 fps and bit depth of 10 bits per sample. Further detailed specifications of all training sequences can be found in the tables in the next pages. To illustrate the variety of video content found in our training dataset, the figure below shows a sample frame of each training sequence.

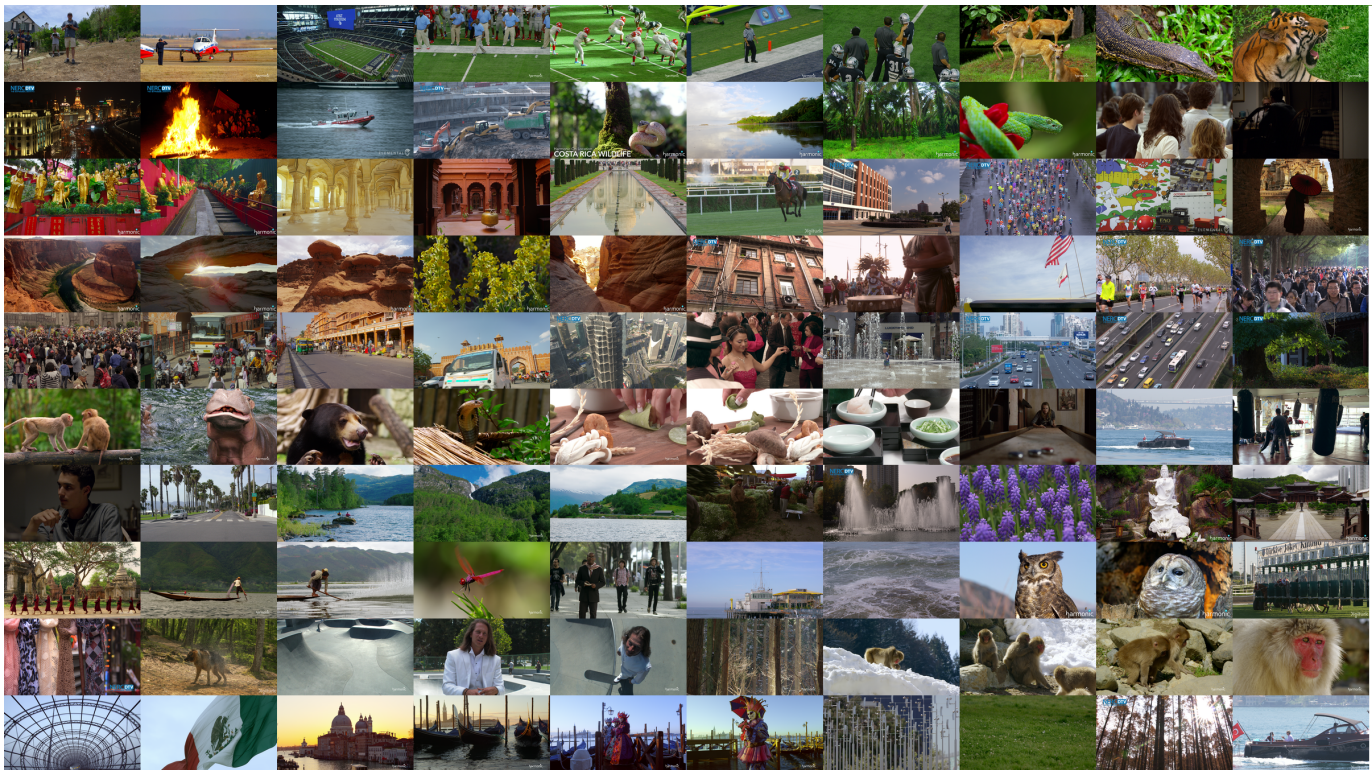


Fig. 1: Sample frame of each of the 100 training sequences.

## REFERENCES

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- [2] T. U. Ultra Video Group, <http://ultravideo.cs.tut.fi/>, [Online; accessed 2017-01-23].
- [3] Harmonic Inc 4K demo footage, <https://www.harmonicinc.com/4k-demo-footage-download/>, [Online; accessed 2017-05-01].
- [4] L. Song, X. Tang, W. Zhang, X. Yang, and P. Xia, “The sjtu 4k video sequence dataset,” in *Quality of Multimedia Experience (QoMEX), 2013 Fifth International Workshop on*. IEEE, 2013, pp. 34–35.
- [5] A. Elemental, [https://www.youtube.com/playlist?list=PLwIpNY17SOG\\_C5I76Tf46n6ImKssMn2kT/](https://www.youtube.com/playlist?list=PLwIpNY17SOG_C5I76Tf46n6ImKssMn2kT/), [Online; accessed 2018-07-02].

TABLE I: Specification of the 100 video sequences used for training. Legend: NFX - Netflix, HAR - Harmonic Inc, UVG - Ultra Video Group, ELE: Elemental.

| Sequence Name            | Res. | Frame rate | Bit depth | Chroma | Number frames | Source |
|--------------------------|------|------------|-----------|--------|---------------|--------|
| Aerial                   | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Air-Acrobatics-Scene1    | UHD  | 60         | 10        | 420    | 64            | HAR    |
| American-Football-Scene2 | UHD  | 60         | 10        | 420    | 64            | HAR    |
| American-Football-Scene3 | UHD  | 60         | 10        | 420    | 64            | HAR    |
| American-Football-Scene4 | UHD  | 60         | 10        | 420    | 64            | HAR    |
| American-Football-Scene5 | UHD  | 60         | 10        | 420    | 64            | HAR    |
| American-Football-Scene6 | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene1           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene10          | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene11          | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene3           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene5           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene7           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Animals-Scene9           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Asian-Fusion-Scene3      | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Asian-Fusion-Scene5      | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Asian-Fusion-Scene7      | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Barscene                 | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Bosphorus                | UHD  | 120        | 10        | 420    | 64            | UVG    |
| Boxingpractice           | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Bundnightscape           | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Campfireparty            | UHD  | 60         | 10        | 420    | 64            | SJTU   |
| Coastguard               | UHD  | 60         | 10        | 420    | 64            | ELE    |
| Constructionfield        | UHD  | 60         | 10        | 420    | 64            | SJTU   |
| Costa-Rica-Scene1        | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Costa-Rica-Scene2        | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Costa-Rica-Scene3        | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Costa-Rica-Scene4        | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Crosswalk                | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Dinner-scene-Scene1      | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Dinner-scene-Scene2      | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Drivingpov               | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Fjords-Scene1            | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Fjords-Scene2            | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Fjords-Scene3            | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Foodmarket-Scene1        | UHD  | 60         | 10        | 420    | 64            | NFX    |
| Fountains                | UHD  | 60         | 10        | 420    | 64            | SJTU   |
| Honeybee                 | UHD  | 120        | 10        | 420    | 64            | UVG    |
| Hong-Kong-Scene1         | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Hong-Kong-Scene2         | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Hong-Kong-Scene3         | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Hong-Kong-Scene4         | UHD  | 60         | 10        | 420    | 64            | HAR    |
| India-Buildings-Scene2   | UHD  | 60         | 10        | 420    | 64            | HAR    |
| India-Buildings-Scene3   | UHD  | 60         | 10        | 420    | 64            | HAR    |
| India-Buildings-Scene4   | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Jockey                   | UHD  | 120        | 10        | 420    | 64            | UVG    |
| Library                  | UHD  | 60         | 10        | 420    | 64            | SJTU   |
| Marathon                 | UHD  | 60         | 10        | 420    | 64            | SJTU   |
| Mobile                   | UHD  | 60         | 10        | 420    | 64            | ELE    |
| Myanmar-Scene3           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Myanmar-Scene4           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Myanmar-Scene5           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Myanmar-Scene6           | UHD  | 60         | 10        | 420    | 64            | HAR    |
| Myanmar-Scene7           | UHD  | 60         | 10        | 420    | 64            | HAR    |

| <b>Sequence Name</b>    | <b>Res.</b> | <b>Frame rate</b> | <b>Bit depth</b> | <b>Chroma</b> | <b>Number frames</b> | <b>Source</b> |
|-------------------------|-------------|-------------------|------------------|---------------|----------------------|---------------|
| Narrator                | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Pierseaside-Scene1      | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Pierseaside-Scene2      | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Raptors-Scene1          | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Raptors-Scene2          | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Readyssetgo             | UHD         | 120               | 10               | 420           | 64                   | UVG           |
| Red-Rock-Vol3-Scene1    | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Red-Rock-Vol3-Scene3    | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Red-Rock-Vol3-Scene4    | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Red-Rock-Vol3-Scene5    | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Red-Rock-Vol-Scene6     | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Residentialbuilding     | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Ritualdance             | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Rollercoaster           | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Runners                 | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Rushhour                | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Scarf                   | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Shakendry               | UHD         | 120               | 10               | 420           | 64                   | UVG           |
| Skateboarding-Scene12   | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Skateboarding-Scene7    | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Skateboarding-Scene8    | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Snow-Monkeys-Scene1     | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Snow-Monkeys-Scene2     | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Snow-Monkeys-Scene3     | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Snow-Monkeys-Scene5     | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Snow-Monkeys-Scene6     | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Squareandtimelapse      | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Streets-Of-India-Scene1 | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Streets-Of-India-Scene2 | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Streets-Of-India-Scene3 | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Tallbuildings           | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Tango                   | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Toddlerfountain         | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Trafficandbuilding      | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Trafficflow             | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Treeshade               | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Tunnelflag-Scene1       | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Tunnelflag-Scene2       | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Venice-Scene1           | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Venice-Scene2           | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Venice-Scene3           | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Venice-Scene4           | UHD         | 60                | 10               | 420           | 64                   | HAR           |
| Windandnature-Scene1    | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Windandnature-Scene2    | UHD         | 60                | 10               | 420           | 64                   | NFX           |
| Wood                    | UHD         | 60                | 10               | 420           | 64                   | SJTU          |
| Yachtride               | UHD         | 120               | 10               | 420           | 64                   | UVG           |