Cinematography Generation using a Reference Video

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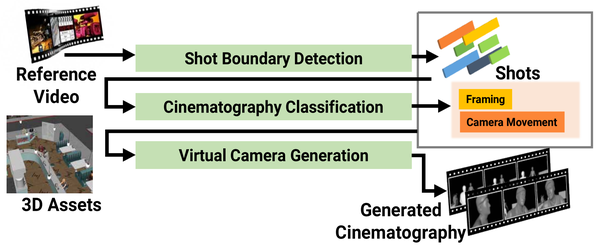
PACIFIC GRAPHICS 2019

Research Idea

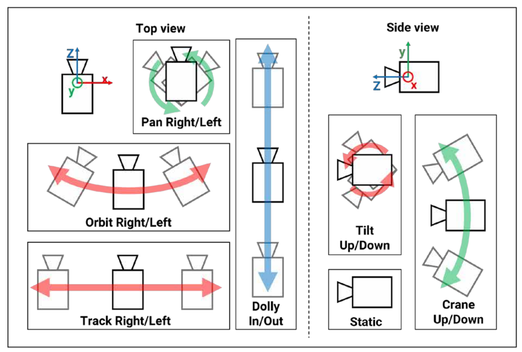
Delivering cinematography in virutal environment is a challenging task due to the high degree of freedom of virtual camera. In this work, we propose a method to generate a cinamatography based on a given reference video.

Overview

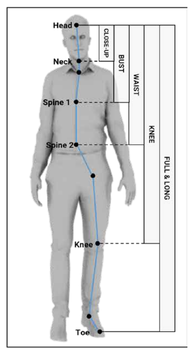
Given an unprocessed video, we segment the video into a sequence of shots. Framing and camera movement types are classified from each shot. Using the analyzed information and the staged 3D assets, the virtual cinematograpy is generated in 3D w.r.t. the reference video



Cinematography Primer



camera movement

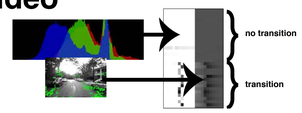


framing

Methods

Shot Boundary Detection

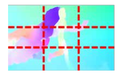
SVM Classifier
input: colour and motion vector of consecutive frames
ouput: transition points of the video



Cinematography Classification

Framing Classifier using OpenPose [CHS18]
input: reference video
ouput: framing type

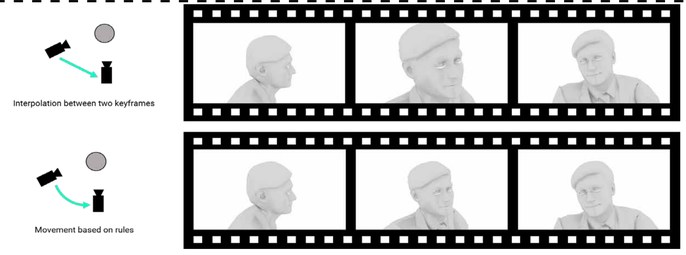
Camera Movement Classifier using MLP
input: motion vector of the video
ouput: camera movement type



Virtual Camera Generation

Framing Generation [LC15]
position the camera using the classified framing and the skeletal parts of the 3D subject

Camera Movement Generation
interpolate the camera using the classified camera movment



Results

10 shots from Back to the Future (1985)

panning left camera movement from Back to the Future (1985)

References

[CHS18] CAO Z., HIDALGO G., SIMON T., WEI S.-E., SHEIKH Y.: OpenPose: realtime multi-person 2D pose estimation using Part Affinity Fields. In arXiv preprint arXiv:1812.08008 (2018).
[LC15] LINO C., CHRISTIE M.: Intuitive and efficien t camera control with the toric space. ACM Transactions on Graphics (TOG) 34, 4 (2015), 82.

This research is supported by Ministry of Culture, Sports and Tourism(MCST) and Korea Creative Content Agency(KOCCA) in the Culture Technology(CT) Research & Development Program 2019.