Parameter Learning for the Automatic Generation of Aesthetically Pleasing Drone Videos

Project description

Research proposed several quadrotor camera tools to design aerial video shots executed by a quadrotor with a gimbal and a camera. Therefore, users specify keyframes in time and space and based on them an optimizer generates quadrotor camera trajectories \[1, 2\]. Recent work has shown that besides spatial keyframe positions the camera dynamics on a trajectory are crucial to produce aesthetically pleasing aerial video. Based on this finding an optimization scheme has been proposed that only requires keyframes defined in space to generate a variety of spatially equal trajectories with different camera dynamics, solely depending on values of weight parameters.

The goal of this thesis is to learn the weights of this optimization scheme in order to generate camera dynamics which result in aesthetically pleasing footage. Therefore, students should design and conduct a crowd-sourcing experiment where participants are asked for perceived aesthetics of virtual aerial videos generated with different weight parameters (and keyframe timings). Based on the results of the study a machine learning pipeline to learn parameters given user-specified keyframes should be implemented. To evaluate the model, the perceived aesthetics of videos generated with inferred parameters will be compared with a baseline.

Keywords

Parameter learning, preference learning, trajectory generation

Context

The goal of this project is to develop a machine learning pipeline which learns weight parameters (and timings) for an existing quadrotor camera optimization scheme given user-specified keyframes.

Work packages

- Literature survey on state-of-the-art methods for parameter and preference learning
- Design and execution of a crowd-sourcing study to get preference data on aerial videos
- Implementation of a machine learning pipeline to learn parameters for a quadrotor camera optimization scheme
- Test and evaluate the system
- Analyze results and write up the thesis

Required skills

- Solid knowledge in machine learning (and optimization)
- Highly motivated and independent

Type: SA/BA/MA
Time period: Starting from January 2018
Internal supervisors: Christoph Gebhardt, Otmar Hilliges