Intuitive camera control with a physical device

Advisor

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Context

Animating a virtual camera is a difficult task because of the many degrees of freedom that must be controlled simultaneously and the lack of intuitive editing tools [1]. In this internship, we would like to tackle these two challenges by tracking a physical device representing the camera.

Objectives

The internship will pursue three complementary goals : First, tracking the movements of a hand- held miniature camera. Second, building intuitive tools to iteratively improve the recorded trajectory of the camera. Third, automatically generating alternative camera paths that will follow cinematographic rules to produce a plausible result.

The problems to be addressed in this work are as follows :

- Tracking of the degrees of freedom of a physical camera manipulated by the user using a new magnetic tracking device.
- Stabilization and approximation of the rigid motion of the camera, minimizing the twist of the camera to maintain the vertical direction as much as possible [3].
- Proposing an intuitive editing-loop to iteratively improve parts of the camera path using sketching or constraint-based re-recording approaches.
- Recognition and reproduction of common filmic idioms respecting established laws of cinematographic composition [4,5,6].
- Optionally, bind the produced tools with an augmented reality environment.

Work environment

In previous work, we have proposed simple B-spline interpolation methods to compute and stabilize camera movements based on cinematographic principles [2]. This work could be used as a starting point.

The implementation of this work will be organized as Unity assets. Note that a Unity experience is not mandatory, only a plus. During this work, the student will interact with ISKN, a local company proposing the tracking device.

Keywords

Virtual cinematography, tangible interaction, multimodal interaction.

References

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[5] Rémi Ronfard, Vineet Gandhi, Laurent Boiron. The Prose Storyboard Language: A Tool for Annotating and Directing Movies. *2nd Workshop on Intelligent Cinematography and Editing part of Foundations of Digital Games - FDG 2013.*

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