

Research Internship

“Autonomous cinematographic flock of drones”

Team

Mimetic. www.irisa.fr/mimetic/, Research Laboratory IRISA / INRIA Rennes

Keywords

Animation 3D, Virtual Cinematography, drones, coordination

Context

In gaining control, precision, ability to self-stabilize, and capacity to carry professional cameras, drones have become a new device in the filmmaker's tool box. However, besides basic automated features like "follow-me" (using GPS or visual target tracking), drones are lacking most cinematographic features. Recent approaches [1,2] have demonstrated the feasibility of empowering cinematographic drones with some form of cinematographic knowledge [3], using languages such as PSL (Prose Storyboard Language)[4], and providing filmmakers and also regular users with more expressive means to control drones than using joysticks. The research community also tackled the challenge of coordinating multiple drones for various purposes [7,8] but never investigated film-related applications.

Objectives

The objective of this internship is to work on novel means to control multiple drones using cinematographic features. While properties on framing have been implemented, little work has yet been conducted on the coordination of multiple drones for cinematographic purposes.

The work will first consist in studying existing approaches to drone coordination and propose new solutions to the specific task of framing multiple dynamic actors with multiple drones under complementary viewpoints. The coordination strategies will have to account for specific constraints such as drone intervisibility or generated air flows. Tests with real drones will be conducted using the motion capture setup in the Ker Lann campus.

Bibliography

[1] J. Fleureau, Q. Galvane, F-L. Tariolle, and P. Guillotel. 2016. Generic Drone Control Platform for Autonomous Capture of Cinema Scenes. In Proceedings of the 2nd Workshop on Micro Aerial Vehicle Networks, Systems, and Applications for Civilian Use (DroNet '16). ACM, New York, NY, USA, 35-40. DOI: <http://dx.doi.org/10.1145/2935620.2935622>

[2] Q. Galvane, J. Fleureau, F-L. Tariolle, P.Guillotel; Automated Cinematography with Unmanned Aerial Vehicles, Eurographics Workshop on Intelligent Cinematography and Editing, 23-30, 2016

[3] M Christie, P Olivier, JM Normand, Camera control in computer graphics, Computer Graphics Forum 27 (8), 2197-2218, 2008

[4] R Ronfard, V Gandhi, L Boiron, The prose storyboard language: A tool for annotating and directing movies, CoRR abs/1508.07593 (2015)

[5] C Lino, M Christie, Intuitive and Efficient Camera Control with the Toric Space, ACM Transactions on Graphics 34 (4), 82:1-82:12 (2015)

[6] Q Galvane, M Christie, C Lino, R Ronfard, Camera-on-rails: automated computation of constrained camera paths, ACM SIGGRAPH Conference on Motion in Games (2015)

[7] A Kushleyev, D Mellinger, C Powers, V Kumar, Towards a swarm of agile micro quadrotors, Autonomous Robots 2013

[8] Q Lindsey, D Mellinger, V Kumar, Construction of cubic structures with quadrotor teams, Proc. Robotics: Science & Systems VII 2011

Supervision

Marc Christie (Associate Professor, University of Rennes 1)

Quentin Galvane (Researche engineer, INRIA)

Contacts

Marc.Christie [at] irisa.fr, Quentin.Galvane [at] inria.fr

**CENTRE DE RECHERCHE
RENNES - BRETAGNE ATLANTIQUE**

Campus universitaire de Beaulieu
35042 Rennes Cedex France
Tél. : +33 (0)2 99 84 71 00
Fax : +33 (0)2 99 84 71 71

www.inria.fr