

MBE 4068 Individual final year project 2012-2013

Motion detection using multiple cameras

(Motion capture A)

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Category: In-house

Project description

Motion of human or any physical objects can be detected using a computer vision system. One typical example is the human motion capture system used extensively in movie filming (*e.g.* Avatar). To record a character's movement, a motion actor typically wears a black full-body jacket attached with multiple yellow balls. Multiple cameras are then used to take shots of the actor from different angles in order to reconstruct his motion and map to a virtual character, say, drawn by computer graphics software.

We propose to implement this motion capture strategy with a relative economical setup. Multiple (four) webcams, instead of the high-end film-taking cameras, will be used in this project. A computer program should be developed to capture and convert movements of arbitrary objects (which can be a human mounted with positioning labels) into quantitative parameters (*e.g.* point-to-point distance and joint orientation). After the project completion, the student should be able to re-establish the motion capture system oneself easily for future use in his/her own career, or just for fun.

Preliminary sub-tasks

The followings are very brief tasks breaking down the overall objective into multiple achievable sub-goals. They are yet unconfirmed, but are listed to provide an idea of what the works are about.

- Capture images using webcams and store the images in a computer..
- Feature extraction of the acquired images using image processing techniques.
- Estimate the feature point positions in the physical space.
- Reconstruct the human gestures based on a sufficient number of feature points.

Technical contents

These are the components that the selected student is expected to acquire (mainly provided by the supervisor), therefore only minimal or no prerequisite knowledge of the candidate is required.

- Knowledge on computer vision, image analysis and processing
- Interface programming using C++ (for the webcams)
- Graphic user interface developed using Visual C++

Students are welcome to contact the supervisor for details of the project.