Cinematizing Daily Life

As the proverb goes “Truth is stranger than fiction”. Our daily life is filled with unexpected moments. Cinematized Reality is aiming to record those unexpected moments and create a movie as if it was created footage. However, nobody knows when the particular moment is going to take place, thus it is not guaranteed to capture the moment. Without a cameraman who works for 24 hours a day to capture your life, it is not possible to capture all the moments we desire to capture. On the other hand, photographic equipments, such as an environmental camera, can capture our daily life without sleeping or resting. However it might be difficult to make a strong impression on audiences since the film is not produced. Moreover, to browse multiple videos for long hours is surely exhaustive operation. “Grammar of the film language” describes rules of film making to produce easily understandable and attractive footage for audiences[Arijon 1991].

Cinematographic camera control is a principal technology of the rules. Virtualized Reality[Kanade et al. 1997] is a technique to generate 3D free viewpoint videos by merging multiple videos using a computer vision algorithm. The key concept of Cinematized Reality is to capture unexpected moments in our daily life by environmental cameras, and by applying Virtualized Reality technique, reconstructs film footage with a sequence of shots taken by virtual camera in the scene following the grammar of film language and applying expert knowledge.

Cinematographic camera control

Our proposed method aims to select a series of camera shots that is proper in the sense that it satisfies the grammar. The camera shots are stored in the shot knowledgebase and each shot consists of camera position, camera framing and camera action. The first shot is selected from among preserved shots in film knowledgebase. Then the method selects a suitable next shot from the knowledgebase that satisfies the restrictions of the grammar. When the method tries to select the next, there are often multiple alternative possible shots. In cases like this, the system refers to the casebase, which stored heuristic values of the past selections of film specialists’ mannerisms, and it selects the next shot.

To place a camera for making suitable shot, Cinematized Reality system must know positions of the target objects/actors. Our solution to this problem is the annotation to note the positions for notifying the system. The annotation is assumed to be made not only by human inputs but also by various sensor inputs such as IR sensors and pressure sensors.

Prototype system

A prototype of a Cinematized Reality system has been made and tested in a real environment; four to eight USB2 cameras surrounding the target space capture footage of an event. A separate PC is assigned to each camera to digitize the video and to perform image processing. The captured footage is gathered in a data server and 3D CG model of the objects is reconstructed to render virtual views. All PCs are connected via 100Mbps Ethernet. The figure shows some shots of synthesized video of Cinematized Reality.

Future work

In a real environment, creating complete 3D video at any viewpoint is very difficult. However, it is essential to locate cameras at any desirable viewpoint of a scene. To achieve a free viewpoint for virtual cameras, there are several Virtualized Reality methods to model 3D objects such as voxel, meatballs and Billboard-based visualization. Each method has its advantage and disadvantage according to the situation. To generate higher quality 3D video, combining these methods and utilizing the advantages of each is our next step.

References
