What you like: Video Analytics and Conferencing

Real-time Object Detection and Tracking

In the last decade, real-time object detection and tracking attract more and more attention in the pattern recognition and computer vision research domain. A video stream taken by a camera that is to be processed frame-by-frame in real-time, the movement of various objects within the camera's field of view will be depicted. The long-term object tracking can be approached either from tracking or from detection perspectives: tracking methods are intended to estimate the object motion and fastly produce smooth trajectories; detection-based approaches try to identify the object location in every frame independently. To enable long-term tracking we have to handle scale and illumination changes, background clutter, partial occlusions and a number of other problems.

In this master project a survey of state-of-the-art object detection and tracking technologies especially the TLD (Tracking Learning Detection)-tracker should be conducted. A new tracking framework should be developed based on an existing TLD implementation and the functionality should be extended by using multiple-camera and for tracking multiple-object. An evaluation of system accuracy and performance limits will complete the project result.

Required Knowledge:

- Basic knowledge in video processing, computer vision, pattern recognition

- Programming in C/C++

- Experience with OpenCV as a plus

Expected Results:

- Fast and feasible algorithms

- A running prototype for multiple-object tracking using multiple-camera

- System accuracy and performance evaluation

Konzeption und Implementierung eines WebRTC-basierten Media-Servers

Tele-Board is a digital whiteboard system allowing creative teams to work together over geographical and temporal distances. A Java-based whiteboard client serves as the main user interface by presenting a virtual whiteboard surface. Every whiteboard client connects to a server, while changes made on one location will be automatically synchronized to all other locations. The whiteboard client also offers some rudimentary video conferencing functionality.

Currently the Java client is being redeveloped based on HTML5 technology, providing interoperability also between tablets, smart phones, and regular computers. Therefore, a browser-based video conferencing component is required. Web real-time communication

(WebRTC) is a relatively new API in modern browsers, enabling real-time audio/video communication without plugins. The current WebRTC peer-to-peer use-case is not well suited for group video conferencing. Specifically, central recording is not possible. The overall goal of this project is to develop a media server providing a star configuration combined with recording functionality.

The master project task comprises conception and implementation of a WebRTC-based media server for the Tele-Board software system. The server has to enable efficient group video-conferencing and content recording. In addition, compatibility with current browsers should be ensured. Functionality shall be integrated into the HTML5 Tele-Board whiteboard client.

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