Video Surveillance: Keeping the Human in the Loop

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ABSTRACT

With the growing quantity of security video, it becomes vital that video surveillance software be able to support security personnel in monitoring and tracking activities. We have developed a multi-stream video player that plays recorded and live videos while drawing the users' attention to activity in the video. We will demonstrate the features of the video player and in particular, how it focuses on keeping the human in the loop and drawing their attention to activities in the video.

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General Terms: Algorithms, Design, Human Factors.

Keywords: Video surveillance, video analysis, multicamera playback, security cameras, video interfaces.

INTRODUCTION

Video surveillance systems are widespread and common in many environments. Yet, limited human attention and the number of video streams constrain the cost efficiency and effectiveness of such systems. Much of the current research in video surveillance focuses on algorithms to analyze video and other media from multiple sources to automatically detect significant events [1]. However, automatic algorithms do not always correctly identify events so that keeping the human in the loop is crucial. Interfaces are needed that make the overwhelming quantity of video more meaningful and direct the attention of security personnel to important video content.

MULTI-STREAM VIDEO PLAYER

Our multi-stream video player can display dozens of synchronized video streams. Users can seamlessly switch between live and recorded video. A multi-scale timeline permits easy navigation through recorded video or real-time video and provides access to detected activities. A map display visualizes the locations of cameras (see Figure 1).

The left side of the player interface shows a traditional security camera interface at low frame rates. The main player area displays one or more video streams at higher frame rates and resolutions. The size of a video stream display indicates its relative importance. Skipping to a different position in the timeline will synchronously move all video displays to the same playback position.

The timeline provides access to the recorded video and lets the user switch to live video. A non-linear scale transitions between a detailed linear scale for the video near the current playback position and a coarse linear scale for the video far from the playback position. Detected activities such as people entering the building are visualized along the timeline and provide access to the corresponding time and camera.

A map interface component provides security personnel with the location and field of view of each camera. Cameras being shown in the main player are color coded. Since many regions of buildings look similar, this is important for determining the location being shown and the geographic relations between different video feeds.

Because our infrastructure does not allow the demonstration of several live video streams at a conference location, we will demonstrate the video player with several recorded video streams and important events detected in that video.

REFERENCES

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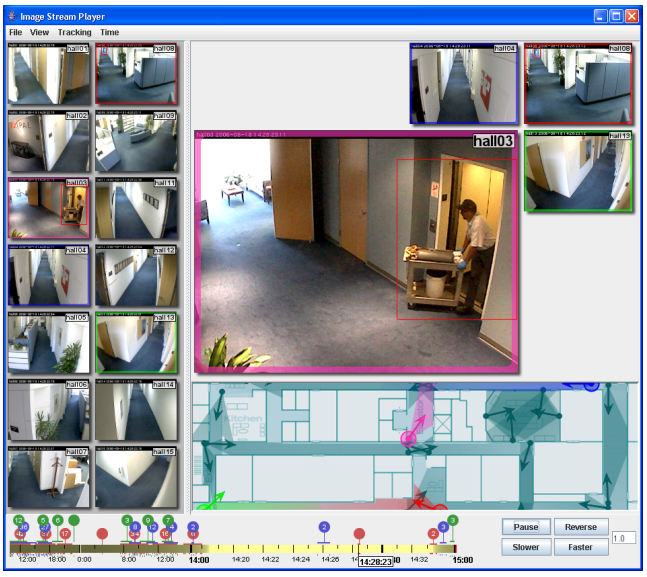

Figure 1: Video player with map and timeline.

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