Automatic Video Analysis and Compilation system AVACS

Rob A.W. Kemp, M.Sc.
Kemp@fel.tno.nl
TNO-Physics and Electronics Laboratory
P.O. Box 96864, NL-2509 JG, The Hague, Netherlands

ABSTRACT

The analysis of video observation tapes can be tedious and tiring work. An analysis system can relieve this burden and create a compilation tape autonomously. Working unattended AVACS creates a tape and a Compact Disk (CD) with only the images-of-interest.

Keywords: Time Lapse Video Analysis, Real-Time Image processing, Autonomous Image Analysis, anti-terrorism.

1. INTRODUCTION

Images from hidden observation camera's can be recorded on analogue or digital time-lapse recorders. One or more authorized people can do the analysis of these images, thus consuming multiple hours of their precious time. The quality of observation in this case depends on the alertness of the observer(s). When a period without much information passes by, the observers may be tempted to play the tape in a fast forward mode, thus risking skipping images. When an interesting image is found the master tape is often rewound a few seconds and then played again using jog/shuttle mode in order to verify the images. Tape wear is unavoidable.

2. OPERATION

Having a computer analyzing the tape can eliminate the above-described drawback. An algorithm based on the Smart Moving Object Detection and Classification Algorithm (SMODEC) is implemented in a Commercial Off The Shelf (COTS) image analysis system. This combination enables automatic analysis of a video-data in real-time. The user only needs to insert the master tape and the compilation tape into the recorders; enter a few parameters and the analysis may start. A locus (place of measurement) is used to denote the region of interest (e.g. a door). Figure 2 shows the main screen of AVACS with the locus.
AVACS will look in this area for specific objects-of-interest (e.g. persons or cars).

Figure 1, Sample image with locus

Using the master tape only once in playback-mode the wear and tear of the master tape is reduced. Further post-processing can be done on the compilation tape or on the images on CD. Having finished the analysis the compilation tape can be used for the actual analysis. Equipped with a high-speed CD-Writer AVACS can create a CD with the interesting images in minutes.

Reading the super-imposed filename on the images on the compilation tape and the filename on the CD makes the link between the images on this tape and those on the CD.

3. EQUIPMENT

As shown in Figure 2 AVACS uses a master recorder and a compilation recorder. Using a good-quality master recorder like (digital) Super-Video Home System (S-VHS) recorder results in stable images on the input of AVACS. The compilation recorder can be a good remote-controllable (by RS-232C) S-VHS recorder. AVACS currently uses the Mitsubishi™ HS-S8300 as a compilation recorder. AVACS initializes the recorder prior to the analysis and also controls the recording.
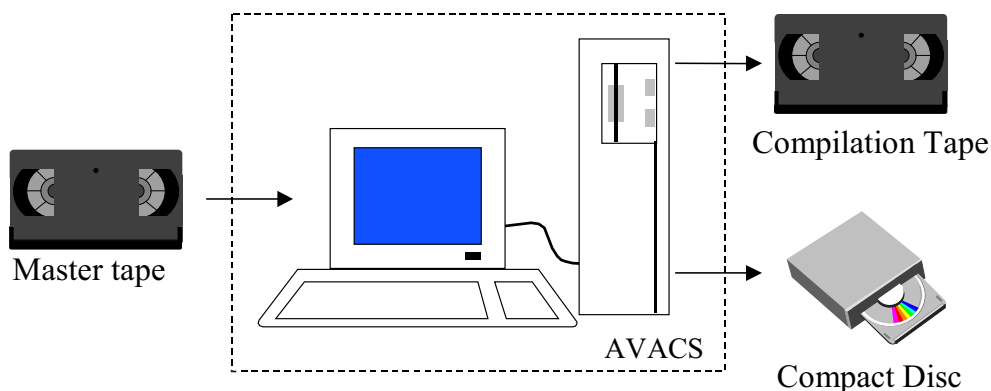
Figure 2, AVACS Block Diagram

AVACS itself consists of a good-quality image analysis system, which is tuned for the operation with the AVACS Graphical User Interface (GUI). A comprehensive manual (digital and in print) including trouble-shooting list and connection diagrams can make working with AVACS easy. AVACS is now in use with the Netherlands Police.

4. CONCLUSION

A high-performance image analysis system has been created for the analysis of time-lapse videotapes. Based on proven technology and thoroughly field tested the system analyses videotapes fast, reliable and efficient, thus yielding a fast return on investment.

5. ACKNOWLEDGEMENT