Eliminating the storage wastage of CCTV cameras by motion detection

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Despite the ever increasing capacity of data storage mediums, there is a wider appeal for studies on efficient storage management to avoid the wastage of capacity due to unwanted data volumes. In line with the demand for research on capacity optimization, this study focuses on the efficient use of storage space by avoiding unwanted data with respect to the storage management in Closed-circuit television (CCTV) camera systems. Therefore, deviating from the common high end hardware solutions such as sensors, study introduces a software solution to store the video only when a motion occurs.

Comparison of video frames using image processing is used as the basic method to identify motion. The grayscale version of the each frame and the calculated absolute difference between the video frame and base image are used to identify the motion. A threshold filter is employed to eliminate the unnecessary effects due to noise. The value chosen for the threshold is dependent on the noisiness of the environment as it affects the sensitivity. The threshold value can be optimized statistically using a cost function based on the errors. In this study, a threshold values between 10 and 15 were found to be suitable for the laboratory environment which is considered as low noise indoor environment. Finally, an edge filter can be applied to identify the moving object in the video.

The study has utilized the advantages of gradual update (blending the base image with current video frame in a lower rate than actual changing rate of the current frame) of base image rather than using a static image to compare with the live image.

In a commercial perspective, this study focuses on a mechanism that can be used to transfer the live feed of CCTV cameras at a very high speed to an Android mobile phone which is connected to the same network.

According to the test results, the solution proposed in this study saves about 50% of storage space of CCTV cameras in an environment with limited motions while providing a very fast live streaming of the video footage. This would be an ideal storage solution for domestic CCTV camera systems which generally deal with limited motions.

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