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Obscene Video Recognition Using Fuzzy SVM and New Sets of Features

Regular Paper

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Abstract In this paper, a novel approach for identifying normal and obscene videos is proposed. In order to classify different episodes of a video independently and discard the need to process all frames, first, key frames are extracted and skin regions are detected for groups of video frames starting with key frames. In the second step, three different features including 1- structural features based on single frame information, 2- features based on spatiotemporal volume and 3-motion-based features, are extracted for each episode of video. The PCA-LDA method is then applied to reduce the size of structural features and select more distinctive features. For the final step, we use fuzzy or a Weighted Support Vector Machine (WSVM) classifier to identify video episodes. We also employ a multilayer Kohonen network as an initial clustering algorithm to increase the ability to discriminate between the extracted features into two classes of videos. Features based on motion and periodicity characteristics increase the efficiency of the proposed algorithm in videos with bad illumination and skin colour variation. The proposed method is evaluated using 1100 videos in different environmental and illumination conditions. The experimental results show a correct recognition rate of 94.2% for the proposed algorithm.

Keywords Obscene Video Recognition, 3D Spatiotemporal Features, Fuzzy SVM, Motion-Based Features, Video Retrieval

1. Introduction

Nowadays, the Internet has become an essential part of our life and children are not excluded. The Internet provides children many opportunities for learning, access to research, socializing, entertainment and can be an enhanced communication tool within families. However at the same time it can expose children to potentially negative content. Because of the fast rate of growth of Internet facilities, the amount of harmful content on the Internet is growing faster too. Therefore, uncontrolled access to the Internet gives rise to serious social problems. Harmful content on the Internet may include obscene text, images and videos; however, video content is more harmful. Therefore, harmful video content recognition plays a great role in ensuring safe access to the Internet.

Content filtering is a technique commonly used by organizations such as schools to prevent Internet users from viewing inappropriate web sites or content. In