

# Digital Movies Tracking Using Scene-Based Watermarking System

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**Abstract**—Digital watermarking can be used to prevent the illegal piracy of copyrighted digital video content. However to be successful as one of the application in the digital cinema, it must be imperceptibly embedded, reliably retrieved, secure against illicit removal. This paper proposes a novel watermarking technique for digital motion content in light of scene change detection using the discrete wavelet transform (DWT). To reduce the computational time, a watermark has been embedded in scene-changed frame. The scene-changed frames are detected by successive estimation of statistical measure technique, where the correlation is utilized as a measure. The performance of the proposed system has been analyzed using the mean square error, normalized correlation, bit error rate, and the similarity index. Empirical results reveal that the proposed method is greatly improved in comparison with the customary techniques in terms of the imperceptibility, recovery after the show capture with camcorder, speed and robustness under various attacks, such as the noise addition, Gaussian low pass filtering, geometrical shift, sharpening, and video attacks in the application of digital cinema. Since an illegal copy of the movie obtained by camcorder affects the geometrical features, in particular, the system has been tested and found to be resilient against geometrical attacks under various conditions.

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## 1. INTRODUCTION

Digital advanced interactive media applications enable the users to build and share out, digital substance to others. Hence, there is a necessity to secure the digital substance of the rights holders and trace illicit substance providers [1]. The motion picture industry utilizes the advanced digital technology to circulate and venture motion pictures. To secure the copyright, a forensic marking system has been defined by digital cinema initiatives (DCI) [2].

Digital watermarking is an inactive security tool. Piracy has turned into an expanding issue of the digital media sharing over Internet administrations or numerous storage technologies. The method that shows potential to conflict with the piracy of copyrighted digital content in movie is a forensic watermark having DCI specifications; it ought to contain the data about film playback including theater name, date and time. In the motion picture, the data about when and where the film playback is inserted as a watermark. A video surveillance method might be utilized as an individual ID framework. This procedure for identifying the pirates is represented in Fig. 1.

### 1.1. Origin of the Problem

In this digital age, the movie industry suffers great losses. Almost all the movies are illegally downloaded and distributed over the internet before their official use. Camcorder is used for recording the movie in theater. Therefore, to protect from piracy, a copy protection system is required.

### 1.2. Related Works

The camcorder robbery turned into a substantial problem, because of the advances in camcorders. As indicated by the Motion Picture Association information, the motion picture industry experiences the yearly

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

## ADDITIONAL INFORMATION

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