

Antipiracy Screen System

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Abstract - Film theft has such a profound impact on a wide range of economy that it is a crime in almost all countries. One major source of the movie piracy is camcorder piracy i.e., movies are recorded by portable devices inside theaters and then sold on internet and grey markets. Different techniques and strategies are explored to overcome the problem and secure the digital cinema content, some are based on spatiotemporal modulation of light, watermarking techniques, maximizing annoyance and temporal effects. This paper deals with a projection technique to avoid piracy in movie theaters. We aim to defeat camcorder piracy by severely degrading the visual quality of the recorded movie while making the interference signals invisible to the audience. Infrared emitters are installed in movie theaters to interfere with the camcorder and create glares in the recorded frames.

Index Terms: Camcorder, Antipiracy, Infrared Rays

I. INTRODUCTION

There is already frequent occurrence of copyright infringement and disclosure of personal information cases where digital cameras have been used for unauthorized photography pictures and images without permission.

Movie piracy has been discouraged in many countries. As per the survey, American motion picture industry lost 6.1 billion annually. India's film industry, said to be the largest globally with some 1,000 movies produced each year, earns around \$2 billion from legitimate sources such as screening at theatres, home videos and TV rights. But with \$2.7 billion, piracy earns 35 per cent more, and a way out has proved elusive. The major problem caused by movie piracy is internet traffic. As the main source for movie piracy is piracy by insiders it is of 77% possibly. Other 23% by camcorder piracy according to BBC news[1]. Movie piracy and video piracy is capturing a original motion picture through Several types of cameras which are having the similar CCD and COMS sensors in the camera device. It is the Duplication of Original Content. These copies sold for the lower price in 'grey market'. Final Duplicate copies are released before or on the same day on movie release in the theatres. These copies are shared online, DVD's, Tele-sync[2] and through other modes. In the new developed system, implementing camera jamming system by considering camera sensors like CCD (charge coupled device) and CMOS (complementary metal oxide semiconductor)[3]. Digital camera sensors are made to cut of wavelength of light which are below and above the visible light range. Visible light range is divided into three colors red, green and blue. The camera sensors are sensitive towards Infrared rays and red sensors are more sensitive towards the infrared light, followed by green and blue sensor. Due

to this the resulting image will be captured in purple color which is called pseudo coloring effect. Presently there are few methods which are implemented in movie theatres, none of these methods is successful in overcoming movie piracy. The following strategies and technologies are described in the next section.

II. EXISTING SYSTEM

I. M.Epstein and Stanton proposed a system by locating the camera and projecting scanning light beam disturbs the camera sensors from illegal video capturing [4]. The shining objects reflect light which is transmitted from the screen, the target is detected and the camera sensors are saturated by scanning light beam. The disadvantage of the system is miss catch of the illegal recording camera that might be any other glittering objects (e.g. earrings, necklaces) also reflect light. Also scanning light affects human eyes by scanning eye spectacles and causes injury to human eyes.

II. M.Nailmark presented an idea based on spatiotemporal modulation of light beam[5],[6]. The idea is of introducing non-permanent aliasing artifact during captured movie creating irregularity between projected frequency and camera sampling frequency .This modulation system must be designed more carefully so that movie will not contain artifacts which are noticeable for viewers, unlikely disadvantage of this technique is the artifacts can be removed by using simple method of low pass filtering.

III. Zhongpai Gao and Guangtao Zhai presented a DLP based concept of defeating camera piracy, which uses temporal psycho-visual modulation (TPMV)[8].This is

making use of difference in human eye acquisition of light and camera recording, the movie. The camera recording will be in discrete samples but the human perception of light will be in continuous form, by making use of this idea TPMV system is designed to block out the camera recording. Disadvantage of the system is which causes the rainbow effect [9]. Fortunately, not everyone see the rainbows.

III. PROPOSED SYSTEM DESIGN

This system prevents disclosure of private and personal information through unauthorized recording screens effectively by disturbing the acquisition functions of any camera making an illegal recording in the theatre.

The way this technology works is that one component flashes an infrared light in a particular pattern. This approach reduces costs, heat and power use.

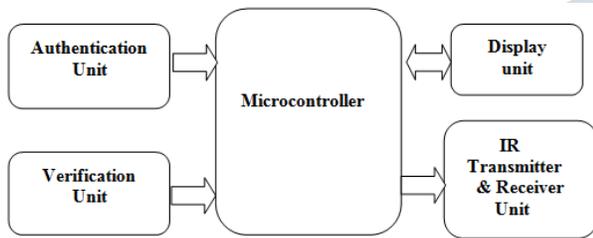


Fig. 1 Block diagram of the proposed antipiracy system.

IV. DESCRIPTION

A smart card is used which serves the purpose of authentication. The comparator then verifies authenticated user. The password is then verified by the use of microcontroller 89C51, output of which activates the IR transmitter unit. Hence, the signals are transmitted by these IR LEDs placed behind the screen along the parameter of screen. IR Receiver at the projector receives this signal and switches on thus, playing a movie on the screen. IR signals from the screen disturb the acquisition function of any camcorder piracy without disturbing the human eyes. Technically, near infrared rays combines with the visible light with small portion. The visible light ranges from 400nm-700nm, infrared rays ranges from 700nm-1000nm. Near infrared ranges from 700-780nm where the camera lenses are designed to cut-off. Lower rays 400nm, higher range of rays more than 700nm, but these designs will not be accurate at near rays ranging

700nm-780nm wavelengths. The range of infrared rays defeat the camera sensors the recording.

V. IMPLEMENTATION

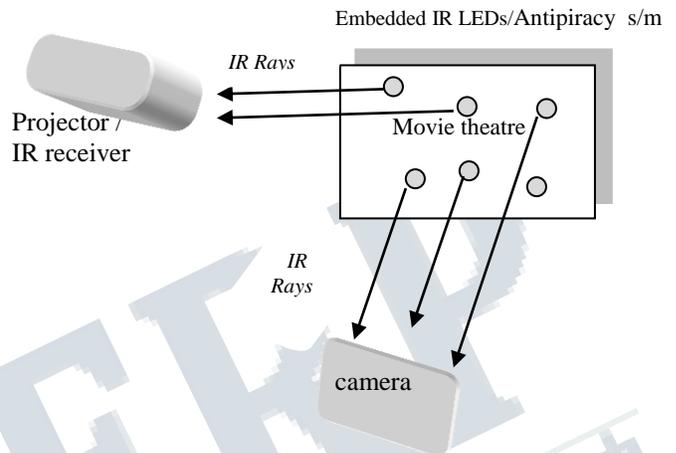


Fig 2. Demonstration setup.

AUTHENTICATION UNIT- the smart card that is possessed by the respective theater officer consists of information which is checked with preloaded reference information stored in the comparator. The digital output of the comparator is passed on to the driver which is used to drive the relays which in turn actuate the microcontroller.

VERIFICATION UNIT- On switching on the Microcontroller the keypad gets activated for the password to be entered. If the password is verified the controller output is given to the driver through the buffer which provides impedance matching between them.

MICROCONTROLLER- Since the output from the microcontroller is low, driver amplifies the signal and actuates the relays to control the IR LEDs.

IR TRANSMITTER & RECEIVER UNIT –

The signals that are transmitted by IR LEDs placed behind and also along the perimeter of the screen are emitted towards the audience.

The IR Receiver at the projector receives the signal and switches on thus, playing the movie on screen. IR signals from the screen disturb the acquisition function of any camcorder piracy without disturbing the human eyes.

**International Journal of Engineering Research in Electronics and Communication
Engineering (IJERECE)
Vol 4, Issue 5, May 2017**

VI. CONCLUSION

In this paper, we proposed a technique to avoid camcorder piracy in a movie theatre. This technique can visually destroy the recorded movie contents while achieving visual transparency of added interference signals to the theatre audience. Anti-piracy is achieved and artifacts in the pirated video are obvious.

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