



# International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: [www.ijirccce.com](http://www.ijirccce.com)

Vol. 5, Issue 11, November 2017

## A Survey on Reduction of Movie Piracy using Automated Infrared System

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**ABSTRACT:** In recent times, piracy has been increasing rapidly and only in the last year, it has increased from 65% to 78%. Piracy is a big network.. Hence this yields us a mammoth opportunity to see a resolution for this big a problem and increase the attendance of audience in theatres thus diminishing the losses created. In our project, we use infrared blasters which give IR rays which are easily detectable by digital cameras. These IR blasters are inbuilt within the projector circuit, giving out IR light beams along with the visible rays of the movie projection. It is connected to a microcontroller which helps in altering the radiations frequency and wavelength characteristics. This is mainly done to neglect the use of infrared filters by a person while capturing the film using a camera. As infrared has a large bandwidth, a person would have to use a large number of filters to neglect the effect of IR, which is not feasible or possible.

**KEYWORD:** piracy; infrared; projector; bootleg; radiation; wavelength; microcontroller control.

### I. INTRODUCTION

Our project mainly focuses on reducing the piracy that happens in the cinema field. Mainly piracy in movies happens by capturing the movie played in theatre with a camera, processing the video and bringing out a better image. The objective of our project is to prevent people, from capturing videos of the movie played in the theatre, to reduce and curb piracy in the cine field. Even if we cannot eliminate fully, we can reduce the losses that occur due to piracy. For this purpose, we use infrared radiations as IR rays have the property of being detected by cameras, but not by human eye. So we use this property of infrared to prevent the camera from capturing the film. As direct infrared is dangerous to human beings, we use near infrared range, in the upper and lower side of the bandwidth.

### II. LITERATURE REVIEW

- The worldwide movie industry generates trillions of dollars each month. And through our solution, we could diminish the losses created by piracy for the first 15-30 days. Since we are increasing the profits for the industry as a whole(Every country) through our solutions we could charge a premium for the same.
- The movies are being captured in one country, processed in another country using an unidentified server to release the pirated version of a movie.
- Moreover, in recent times the digitization of movie prints using "Qube Cinema" technology has assisted in getting clear pirated version prints. This all happens during first 15-30 days after a movie is released, after which a clear copy will be available
- Generally, when it comes to preventing people from capturing pictures or videos at restricted, prohibited or secured area, camera detecting systems are primarily applied. The cameras are detected and are usually seized.
- In recent times, even infrared rays are being used to prevent taking videos. Apple inc. was granted a patent for developing a system which would prevent users from taking bootleg footages at concerts.



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- Likewise, in the US, a patent was given for using an IR projector to prevent leak of secret data from confidential military, police, business conference meetings. Though this idea and technology are young, its application and usage is varied and is quite necessary for the future.

### III. EXISTING SYSTEM

Technologies like electronic device jammers which jam the operation and functioning of the device itself. This in a way prevents the camera from capturing videos and pictures. However, in places where usages of other devices like cell phones, laptops, etc are necessary, this system fails to give the suitable environment. In recent times, even infrared rays are being used to prevent taking videos. Apple inc. was granted a patent for developing a system which would prevent users from taking bootleg footages at concerts. This system uses infrared projectors at 4 corners of the room, releasing IR rays, which prevents capturing of photos and videos.

### IV. PROPOSED SYSTEM

In our project, we use the property of light which is not visible to naked eyes, but the one's cameras can pick up, only visible light can be detected by human eyes. But light rays like IR and UV cannot be seen by our eyes, but cameras easily pick images of them. So while projecting the picture shows in theatres, we send original visible rays that help us see in theatres as movies along with a mix of other invisible light beams[1].The innovation in our project lies in the design, where we use IR burst a transmitter which is inbuilt within the projector which sends high intensity of infrared rays along with the movie projection. This whole infrared blaster and projector acts as one whole system in sync. Thus, unlike the previous case where if the IR system may or may not be operational. As we focus on prevention of piracy in cine field, it is highly necessary that the system operates along with the movie played. Hence integrating the IR system with the projector helps us achieve this objective.

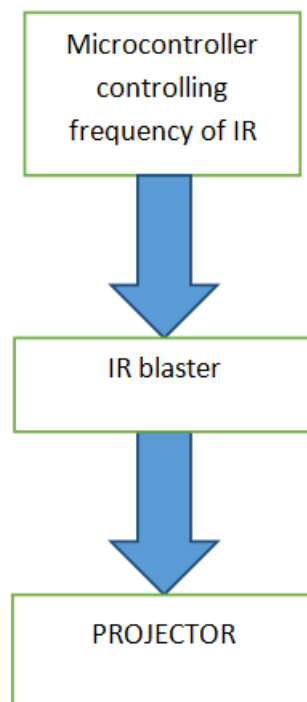


FIG.1 OVERVIEW OF PROCESS

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## A. DISTORTION OF THE IMAGE

An infrared blaster is inbuilt within the circuit which sends burst of IR radiations[2]. These infrared rays will travel along with the visible rays, hit the screen and get reflected back to audience. As human eyes can't pick up infrared the audience will watch the movies as it is, while the people recording the film using cameras will get distorted images in their camera. Hence, both the IR blaster and projector are one device in this case.



FIG 2. PROCESS DEPICTION

We use an IR burst transmitter in our project. IR of low intensity will be of no use as they won't blur the video recorded by the individual. For this purpose, we use an IR burst transmitter of high intensity. These IR transmitters are capable of altering the frequency and wavelength of the IR beams. For this purpose, LED with variable frequencies are connected to the IR burst transmitter. In any case, we can't use an IR blaster which gives out direct infrared as they are harmful to human beings. The best application would be to use near infrared light. Usage of infrared has one particular drawback of that yet[3].

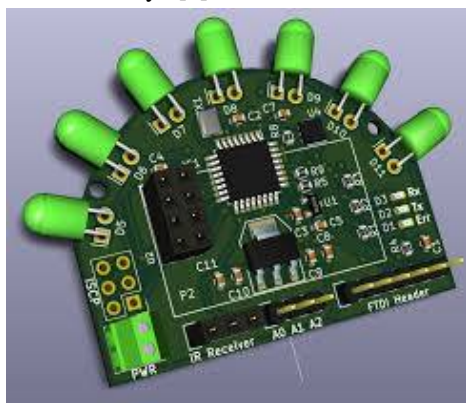


FIG 3. IR BURST TRANSMITTER



FIG 4. UFO PROJECTOR

It produces a heating effect. Fortunately, in theatres, we can negate this effect using air conditioners. Moreover, as the theatre screens are white (i.e. They absorb less heat) and reflecting on nature, no harm occurs to the screen and the audience. The projectors most commonly used nowadays are cube projectors and UFO projectors. Both these projectors are similar in structure. They are projector systems that use E-cinema platform delivery. For this, they use point to point or end to end transfer of video using satellite system. This system has a proper algorithm to filter and improve the quality of audio and video of the movie. As it's a satellite based digital system, it doesn't require film rolls and negatives to play the film. Since the inception of its use, its application has become wide spread where and theatres across the globe are using them universally. It is highly difficult to put in a separate circuit of the IR blaster within the

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projector[4]. Hence, using this design, a new projector must be developed to produce usage of IR blaster and projector in sync to prevent capture of images and video.



Fig 5. QUBE PROJECTOR



Fig 6. Arduino UNO microcontroller

## B. CHANGING OF WAVELENGTH AND FREQUENCY

The IR blaster in the projector is connected to a microcontroller which changes the characteristics of the light such as the frequency and wavelength at regular intervals of time. Our goal is to keep the time interval as small as possible. The main purpose of this particular operation is to prevent the person capturing the image or video from filtering out the IR rays by the usage of infrared filters. The filters for infrared that are commercially available are only for a small bandwidth. However the IR rays in itself are of large bandwidth. Even though we can't use direct IR, usage of near infrared in upper and lower sides of bandwidth will be most than enough for the task. When the wavelength of the IR rays changes, the person capturing the image or video will have to use a separate set of filters due to the restriction of filtering capacity of commercial filters. If the person capturing the image or video has multiple filters, he might be able to filter the rays. To prevent this, we change the frequency and wavelength at very small intervals, either by using the IR blasters of different frequency or by using IR blasters which are capable of changing their frequency[5]. This will make it impossible for the person to keep changing the filters for such short intervals. Else the person would have to use stacks of filter which is also not possible.

A microcontroller like Arduino UNO Rev 3 by Arduino is a cheap development microcontroller board for 25USD\$. It consists of a 20MHz ATmega328P processor allows UNO Rev 3 to be small and developer friendly. It consists of 32 KB of In-System Self-Programmable Flash program Memory. It also has 1KBytes EEPROM and 2KBytes Internal SRAM. In general, it is powered by a 5-volt source like a USB port and in general, it has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analogue inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller.

## V. FUTURE SCOPE

- Not stopping at theatres alone, we intend to go beyond theatres to protect general public's privacy by creating camera jammers.
- This will prevent taking unauthorized videos for eg: people keep cameras in private places and leak them in the internet, thus, intruding people's privacy.
- This will also prevent leaking of confidential information from private board meetings or government organizations where installing electronic jammers is not feasible.



ISSN(Online): 2320-9801  
ISSN (Print) : 2320-9798

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## VI. CONCLUSION

- In the current world, where piracy is ruining the income and the lives of people working in cine field, it is highly necessary to prevent this illegal business and provide the people who work for all entertaining the world with the proper profit they deserve.
- Though we can't totally eliminate piracy immediately, we can surely reduce it and our project is a small step towards it.
- Capturing of bootleg videos and pictures from restricted area can be reduced using the application of infrared system.

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