GNXSHIELD™ Anti-Piracy Technlogy

CONFIDENTIAL

CHICAGO, Illinois, May 12, 2004 – GnxShield Corp, a subsidiary of the Gnxpert Corp, performed today a test run of anti-piracy procedures for movie theaters. The developed technology targets 75% of a piracy market and focuses on protection of a theatrical movie release.

The Market needs

Majority of stolen movies distributed through illegal DVD market and unauthorized internet downloads come from recordings made in movie theaters with the help of simple consumer devices such as camcorders and video cameras. There is a possibility of using unauthorized private screenings at night in the movie theaters specially to capture an image from the screen. $16 Billion dollar industry maintain its own DVD manufacturing factories and distribution chain where material entry point located mainly at the movie theater premises.

Competitor's failure

Latest competitor's technologies fail because of human factor and/or cumbersome equipment. Movie theater owners unwilling to install secure devices at each screen or unable to provide qualified service and labor. Even recently announced infrared screen coating technology could be easily cracked by using cheap filters. Miniature size and sophistication of recording devices prevents protection assurance and make it almost impossible to track each person in every movie theater around the world.

Recording devices

CCD chips have been used widely in camcorders since the 1970s. The CCD serves in a camcorder to convert the image (light) coming in from the lens into an electronic signal, which can be processed by the camcorder's digital signal processor into digital information which can then be record to tape, DVD or flash media. CMOS chips serve the same function in camcorders as CCD chips. Both chips are packed with a matrix of pixels and represent the initial dot-like or line-like pattern. The key difference between a CCD chip and a CMOS chip, is that the CCD chip sends all of the "stored up" pixel energy to a processor outside of the chip where it is converted to voltage, while each pixel on a CMOS chip is able to do this process on it's own. Another way of putting it is that a CCD puts out a signal as electricity, whereas a CMOS chip puts out a signal as computer bits and bytes. The biggest advantage of CMOS chips is that they can be timed and clocked variably. This allows CMOS chips to perform at any frame rate and also work either as a progressive scan chip or an interlaced chip. CMOS chips are able to switch between 24 frames progressive, 60 frames interlaced, and any frame rate for that matter much more easily than CCD chips can. Another advantage of CMOS chips is that they eliminate the vertical white line smear problem sometimes found with CCD chips.

Technology breackthrough

GNXshield challenge was to create an anti-piracy technology that doesn't require additional equipment in movie theaters. Prevention of unauthorized recording made by putting dynamically generated patterns on the film itself with a subliminal message visible only in the camcorder or camera. For the regular viewer the image on the screen will remain clear and crisp while the pirates will face distorted image in analog or digital recording device.

Feasibility test

The purpose of the first "Survival Test" was to analyze an interaction between computer generated simple patterns and a film projection in the movie theater. Using a Definity film printing equipment of the Digital Film System company GNXshield created 30 second 2k resolution sequence, printed on the 35 mm intermediate Kodak film and projected on two different sizes of the movie theater screen. Two camcorder cameras were used to capture pattern interaction: Cannon XL-2 CCD camera and Sony CMOS camera to meet two types of most used chips in recording devices. Used several camera modes: 24, 29.9, 60 frames per second / progressive scan and interlaced. During film projection at the Elk Grove Movie Theater cameras were placed at different distance from the screen to test how the pattern interaction will be changed depending on location.

The main results of the screening were concluded successfully:

Unusual patterns and distortion appears in the cameras at certain distance from the screen. Such distance and effect were measured for future calculation and unification of the patterns. Perforation of the screen itself didn't cause an additional interference for a regular viewer. Defocusing of the camera lenses didn't clear the security patterns until the full blur of the image was reached during the recording.
Dot based subliminal messages were magnified by the camera chips and it survived blurriness of the image. Such messages visible only in recording device demonstrated dynamic changes and simple animation. Tilting cameras to the right and left even strengthen the effect. The resolution of the film will be increased from initial test 2k up to 15 k that will create even more possibilities to create real-time computer generated dynamically changed anti-piracy patterns.

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