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Professor Saraju Mohanty awarded U.S. patent for digital video security methods

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Associate professor of computer science and engineering [Dr. Saraju Mohanty](#) (<http://www.cse.unt.edu/~smohanty/>) has been awarded a U.S. Patent for his [“Apparatus and Method for Transmitting Secure and/or Copyrighted Digital Video Broadcasting Data over Internet Protocol Network.”](#) (<http://assignments.uspto.gov/assignments/q?db=pat&pat=8423778>)

His invention provides comprehensive solutions for securing digital video, and it offers advantages for content providers like Netflix, digital television companies, Hollywood movie studios, their distributors and end-users, and private parties posting to YouTube or sending video files over the internet.

Dr. Saraju Mohanty, associate professor of computer science and engineering

“This method offers the option of real-time copyrighting built into the camera and applied while the video is created—a very unique capability,” Mohanty said. “It also offers better security for copyrighted video transmission using an array of protections, including invisible-robust watermarking.”

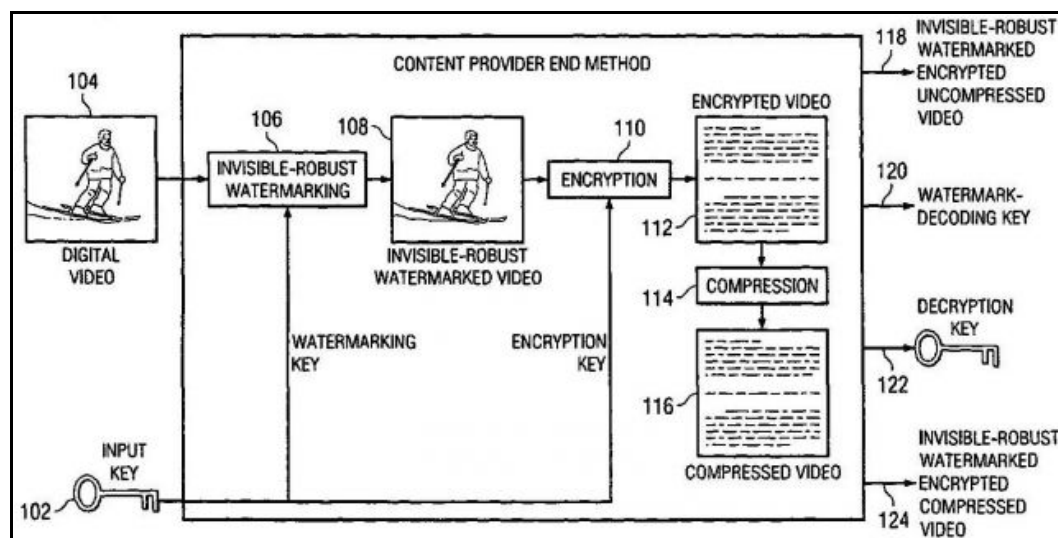
Mohanty’s system has applications for all levels of video creation, transmission, and receipt including determination of origin, creator, and ownership rights, ensuring authorized access, preventing illegal replication, facilitating content authentication, tamper proofing and detection, and the necessary apparatuses.



Currently, digital video can be protected by single-layer watermarking or encryption-based systems. Mohanty's patented invention, including seven different methods and apparatuses, combines watermarking, encryption, and scrambling to provide multi-layer security of transmitted video.

For example, a live broadcast from a football game can be watermarked with the broadcaster's logo, the audio converted to text, transmitted, and received on fans' screens with video, audio, subtitles, and logo in-tact. Or, digital video taken on a vacation can be transmitted at the compression, size, and quality desired, with layers of watermarking, encryption, and scrambling applied to protect the data. Watermarks can be visible-translucent, visible-opaque, or invisible-robust.

Diagram showing



Mohanty's Content Provider End Method

Watermarking usually refers to a translucent symbol or opaque logo appearing on an image that represents its creator or owner. Invisible-robust watermarking developed by Mohanty uses an algorithm to embed a watermark that changes the image's pixels so slightly that it is not visually detectable and can only be identified or removed using a specialized decoder.

He also designed three unique hardware apparatuses for content providers, distributors, and end-users, each containing a system of software interfaces, processors, encryption engines, encoders, and decryption keys to process data for transmission over the Internet Protocol (IP) network. The units can selectively control the components in use to conserve battery, and they provide a way to combine tasks currently relegated to separate devices into one electronic device.

“Digital video transmitted over the internet is susceptible to attacks and tampering,” Mohanty said. “This invention provides a way to protect video transmitted for a

variety of personal, business, or government purposes.”

Additional Context:

Dr. Mohanty is director of UNT's [NanoSystem Design Laboratory \(http://nsdl.cse.unt.edu/\)](http://nsdl.cse.unt.edu/) at the [Department of Computer Science and Engineering \(http://www.cse.unt.edu/site/index.php\)](http://www.cse.unt.edu/site/index.php), a group that conducts research in design and computer-aided design (CAD) for low-power high-performance nanoscale mixed-signal, mixed-discipline systems. Mohanty has been on faculty at the University of North Texas since 2004. He received his Ph.D. in computer science and engineering from the University of South Florida in 2003 and his Master's degree in systems science and automation from the Indian Institute of Science in Bangalore, India in 1999. He is the inventor of two U.S. patents.

-Amelia Jaycen, Publications Intern, Office of Research and Economic Development

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