

Photographers Could Utilize Sudoku Tech To Copyright Images

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Image Credit: Thinkstock.com

where specific information can be embedded into the media and which can later be extracted to detect forgery or unauthorized usage while further proving authenticity and provenance.

This embedded information could include a company's logo or product serial number. More importantly, this form of digital watermark could be utilized in a way that does not distort or disrupt display of the image when used in its rightful place and is also imperceptible in use.

Khalid and his colleagues were able to embed a valid 9×9 Sudoku solution, which comprised a pixelated second image, to create a watermark that is evenly distributed within an image. This is able to resist automated cropping and noise additions by bots and other tools that often lift images for resale or future distribution via illicit databases.

Most viewers online see nothing but the original image, while the permutations of rows and columns in Sudoku solutions are used as invisible digital watermarks that are overlaid onto an image in a random distribution. Because this involves the permutation rules and the combinatorial number-placement, it would not require investigators or the authorities to have access to the original image. Based on the relationship between full and partially recovered watermarks, this approach could be able to discern whether a pirated image has the copyright owner's watermark.

Khalid and his colleagues found that in initial tests with 81 9×9 Sudoku solutions it would be possible to defeat more than 94 percent of attempts at cropping. When this number is increased to 256 16×16 Sudoku solutions the percentage increases even more. This is quite a step up from previous anti-cropping watermarks, which reportedly only achieved 75 percent resistance.

The results of Khalid's findings were published in the [International Journal of Grid and Utility Computing](#).

[Peter Suciu](#) for redOrbit.com – Your Universe Online

[Sudoku](#), the logic-based combinatorial number-placement puzzle, often challenges players, but now its layout could be used to solve another problem – theft of copyrighted images.

[Shamsul Khalid of the Universiti Tun Hussein Onn Malaysia, in Johor](#), and his colleagues have created a new watermarking technology that is based on the permutation rules that are used to solve the numerical puzzles known as Sudoku. This could result in a new system that could resist attempts to “crop” the [watermark](#) in more than ninety percent of attempts.

Images, photos and other graphics posted online can be easily copied or saved by plagiarists and others who simply ignore copyright rules. This has been a growing problem for photographers and others, who have long looked to add a watermark to reduce the risk that their images might be lifted and used on other sites without permission. The problem is that the watermark can affect the composition of a photo or image, and if placed at the side or bottom it can be easily cropped out.

Khalid has looked at the proliferation of digital multimedia content that is available online, and noted that content owners and service providers now need more robust copyright protection technology. One method that has been explored is digital watermarking