Enhancing the Security of Websites With Virtual Identification Code Steganography

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In the digital age when confidential information and events such as exams are being conducted via websites, unauthorized sharing of screenshots of these websites can have serious repercussions such as cheating which damage the mental health of students who prepare hard for exams, important data leaks for organizations and countries, or multi-billion losses to the economy in form of content piracy. Overlaying a pixel-level steganograph on the screen, which is uniquely generated for the user each time. User's details like IP, timestamp are to the server where it hashed using the SHA 256 yielding a 64 character long hexadecimal encoded message string. It is stored in the database and sent back to the browser where it is plotted with help of an imaginary reference grid. The y-axis shall correspond to the base16 values and the x-axis to the index of the character of the encoded message string., and a pixel is placed at the correct intersection accordingly. If any unauthorized screenshot is found, it can be decoded by the authorized personnel to trace back the details of the person who took the screenshot by iterating over possible intersections, and checking if the pixel appears or not. To verify the robustness of the technique for lossless images extensions such as PNG and BMP. It was further tested on 36 different website templates, 4 different Screen sizes, and 5 different browsers on which the technique was successfully performed with 100% accuracy. Additionally, the pixels are not easily visible by the human eye and do not affect the website design, and the increase in file size due to this technique is extremely low. Thus the technique will help in making websites more secure by allowing traceback of screenshots and discouraging unauthorized screenshots.

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