

# **HEVC watermarking techniques for authentication and copyright applications: challenges and opportunities**

## **ABSTRACT**

Recently, High-Efficiency Video Coding (HEVC/H.265) has been chosen to replace previous video coding standards, such as H.263 and H.264. Despite the efficiency of HEVC, it still lacks reliable and practical functionalities to support authentication and copyright applications. In order to provide this support, several watermarking techniques have been proposed by many researchers during the last few years. However, those techniques are still suffering from many issues that need to be considered for future designs. In this paper, a Systematic Literature Review (SLR) is introduced to identify HEVC challenges and potential research directions for interested researchers and developers. The time scope of this SLR covers all research articles published during the last six years starting from January 2014 up to the end of April 2020. Forty-two articles have met the criteria of selection out of 343 articles published in this area during the mentioned time scope. A new classification has been drawn followed by an identification of the challenges of implementing HEVC watermarking techniques based on the analysis and discussion of those chosen articles. Eventually, recommendations for HEVC watermarking techniques have been listed to help researchers to improve the existing techniques or to design new efficient ones.

**Keyword:** Authentication; Copyright; HEVC; H.265; SLR; Systematic review; Video; Watermarking