



The
University
Of
Sheffield.

Research &
Innovation
Services.

KTA Collaborative R&D Awards Case Study

Compressed domain video watermarking

Project Partners

Department of Electronic and Electrical Engineering, University of Sheffield
Dr Charith Abhayaratne, Lecturer,
Communications Group

ZOO Digital Group plc
www.zoodigital.com

Overview

Watermarks are embedded into digital video content for copyright protection, source and usage tracking, branding, broadcast monitoring, authentication and security.



Preliminary EPSRC funded work had developed a robust and imperceptible video watermarking technology that did not affect visual quality when applied to uncompressed formats. Through this KTA funding, the team applied this knowledge to industry to explore its efficacy on more widely used compressed digital video such as MPEG.

Collaborating on the project was Sheffield-based SME, ZOO Digital Group plc who wants to use such watermarking technology in its video-based consumer products and services for global media clients, including broadcasting corporations and Hollywood studios.

As well as demonstrating that the watermarking technology could be successfully applied to compressed digital video formats without compromising on quality, the project also found that adopting the technology can lead to reduced costs and improved efficiency in the tracking process.



Activities

Focusing on compressed video formats, the feasibility study evaluated the technology's application to MPEG-2 and MPEG-4 coded video using the decoding re-encoding approach. The viability of adapting the technology to embed partially decoded MPEG-2 bitstreams was also explored.

Both of the project's main objectives were achieved. On applying the embedded watermarking technology to film studio DVDs, no effect on the visual quality of the watermarked content was found following repeated decoding and re-encoding. The effect of single and multiple watermarking was also evaluated in terms of change of visual quality, bit rates and robustness to different compression rates. This initial study showed that the proposed digital watermarking was highly effective under a wide range of conditions, and has helped to reduce costs in the tracking process by improving efficiency of detection.

Outcomes

From the outset, Dr Abhayaratne and ZOO Digital intended the feasibility study to be the basis for extending their collaboration and attracting further funding to advance the technology. It allowed a solid working relationship to be established and boosted the competitiveness of the company's products.

Next steps

The video watermarking technology is being developed further through a two-year project funded by the Technology Strategy Board (TSB) employing the same researcher to ensure continuity of knowledge exchange. Commercialisation discussions are also investigating other areas for its exploitation.

Stuart Green, CEO of Zoo Digital said: "To extend the capabilities of our product set into the area of data protection it became clear that we needed to innovate in the fields of digital watermarking and fingerprinting. We sought the expertise of Dr Abhayaratne and his team and through the KTA were able to build a prototype of an innovative new application. The success of this project was instrumental in securing further collaborative R&D funding from the TSB."

Contact us

T: 0114 2221331

E: KTAenquiries@sheffield.ac.uk

KTA website: www.sheffield.ac.uk/ris/kta

EPSRC website: www.epsrc.ac.uk

Twitter: www.twitter.com/ResearchatSheff

Films: www.researchatsheffield.co.uk

EPSRC

Engineering and Physical Sciences
Research Council