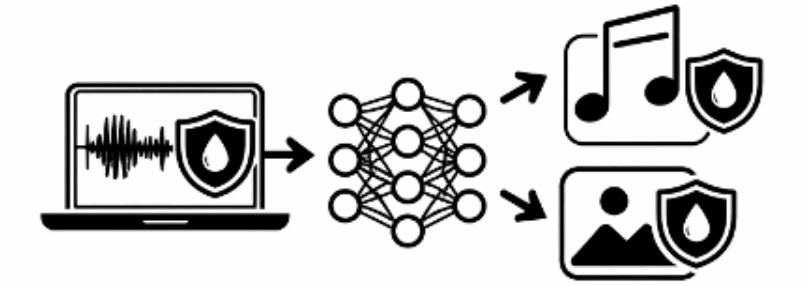
Machine Learning-Based Watermarking for Multimedia Signals



Digital watermarking is widely used to protect intellectual property and verify the authenticity of multimedia content. As digital audio and images are easily copied, modified, and redistributed, watermarking techniques embed hidden information into signals in a way that remains imperceptible to human users. However, ensuring that the watermark remains detectable after signal transformations such as compression, filtering, or noise addition remains a challenging problem.

Traditional watermarking approaches rely on signal processing techniques operating in frequency or transform domains. Recently, machine learning approaches have been proposed to automatically learn watermark embedding and extraction strategies. While these approaches show promising results, they often struggle to maintain both strong robustness against signal manipulation and high perceptual quality of the original content.

The goal of this thesis is to investigate machine learning techniques for watermarking different types of signals, initially focusing on audio and potentially extending to images. The student will study existing watermarking approaches and design ML-based watermark embedding and detection methods. The proposed approach will be evaluated based on two key performance indicators: imperceptibility of the watermark and robustness against common signal transformations.

Practicalities

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Nature of the work:	30% literature, 30% theoretical work, 40% software		
Number of students:	1		

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