Local-Prediction-Based Difference Expansion  
Reversible Watermarking

**ABSTRACT**

This paper investigates the use of local prediction in difference expansion reversible watermarking. For each pixel, a least square predictor is computed on a square block centered on the pixel and the corresponding prediction error is expanded. The same predictor is recovered at detection without any additional information. The proposed local prediction is general and it applies regardless of the predictor order or the prediction context. For the particular cases of least square predictors with the same context as the median edge detector, gradient-adjusted predictor or the simple rhombus neighborhood, the local prediction-based reversible watermarking clearly outperforms the state-of-the-art schemes based on the classical counterparts. Experimental results are provided.

**Index Terms—** Reversible watermarking, difference expansion, adaptive prediction, least square predictors.