



# Adaptive Pixel Pair Matching Technique for Data Embedding

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**Abstract** — This paper proposes a new data-hiding method based on pixel pair matching (PPM). The basic idea of PPM is to use the values of pixel pair as a reference coordinate. The PPM search a coordinate in the neighborhood set of this pixel pair according to a given message digit. The pixel pair is changed to the searched coordinate to conceal the digit. Exploiting modification direction (EMD) and diamond encoding (DE) are two data-hiding methods proposed recently based on PPM. The capacity of EMD is 1.161 bpp and DE prolongs the payload of EMD by embedding digits in a larger notational system. The designed method offers lower distortion than DE by providing more compact neighborhood sets and allowing embedded digits in any notational system. The proposed approach always has lower distortion for various payloads compare to optimal pixel adjustment process (OPAP) method. Experimental results reveal that the proposed method not only provides better performance than those of DE and OPAP, but also is secure under the detection of some well-known steganalysis techniques.

**Keywords**—Diamond encoding (DE); adaptive pixel pair matching (APPM); exploiting modification direction (EMD); least significant bit (LSB); optimal pixel adjustment process (OPAP); pixel pair matching (PPM).

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