Hierarchical Block Matching Tutorial Exercise

Exercise

Estimate the number of operations required by a two-level integer-pel Hierarchical Block Matching Algorithm ($HBMA$). Compare it with the computations required by $EBMA$ algorithm, considering that each operation includes one subtraction, one absolute value computation, and one addition. The search range is halved at each level of $HBMA$ while block size does not change. For simplicity, ignore the computations required for generating the pyramid and assume integer-pel search. Repeat for a three-level $HBMA$ algorithm.

Notice: As shown in Figure 1, $HBMA$ algorithm derives a pyramid representation for the original and final frame. The base of the pyramid corresponds to the original frame resolution and the all other levels result from halving previous level's horizontal and vertical resolution. For L levels, level L corresponds to the original image.
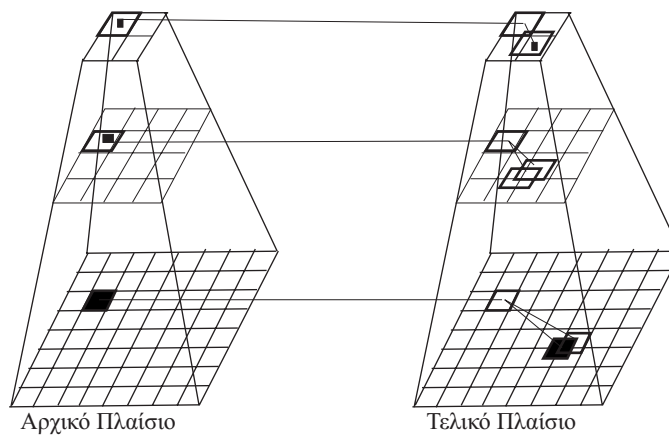

Αρχικό Πλαίσιο   Τελικό Πλαίσιο

Figure 1: Hierarchical Block Matching Algorithm (HBMA)