

Complexity Study ¹

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The goal of this simulation is to demonstrate the speed of the proposed algorithm compared with the full search block matching algorithm. Given a particular frame of a video sequence, the computation time of motion estimation will mainly depend on the size of the macro blocks. This is intuitive: if the size of each block is larger, then there will be less number of blocks, and hence less motion vectors to be estimated. However, when the block is larger, then within each block more computation is needed.

Fig. 1 shows the complexity curves of full search algorithm and our proposed algorithm. As seen, the computing time of both algorithms drops when the block size increases (hence number of blocks decreases). If we compare the running time of the two algorithms, we will see that the proposed method uses much less time than full search. Note that we picked a particular frame of a sequence, fixed the size of the image, and vary the block size.

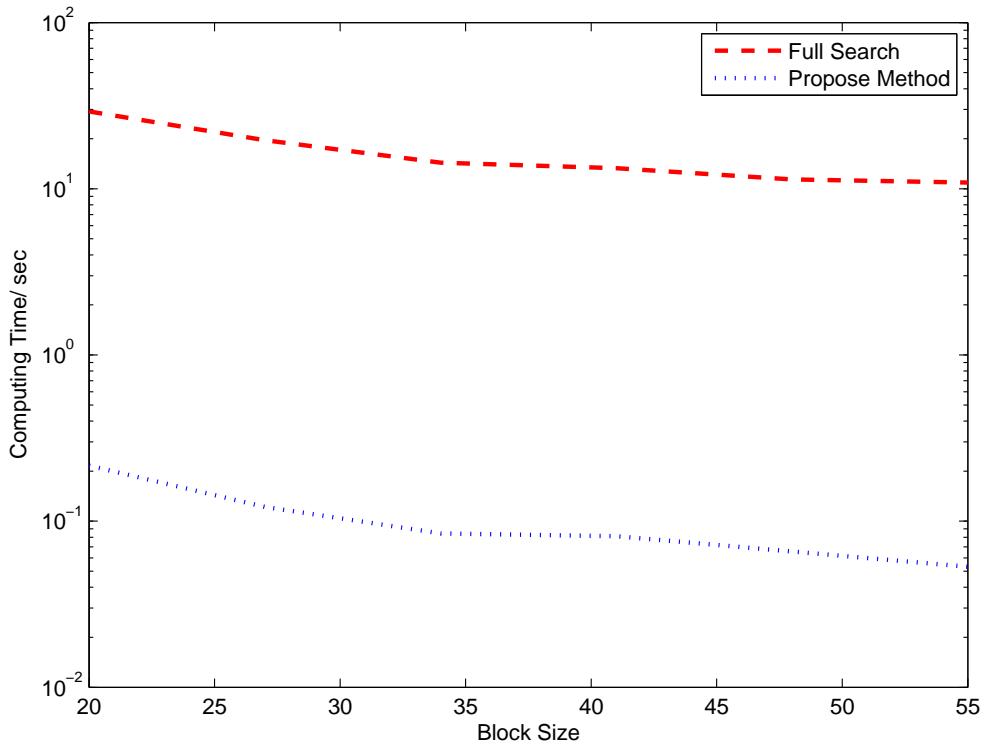


Figure 1: Complexity comparison between full search algorithm and the proposed algorithm.

The simulation is based on a 280×280 image (New York). The algorithm is run on MATLAB (Windows xp 32 bit), Intel qual core 3GHz, 3GB RAM.

¹This note is a supplementary document for the submitted paper titled “Subpixel motion estimation without interpolation”.