Search algorithms for block matching

Full search

Each block within a given search window is compared to the current block and the best match is obtained.

Logarithmic search

1. Pick an initial step size. Look at the block at the Centro the search are and the four blocks at a distance of s from this on the X and Y axes. (the five positions form a + sign)
2. - If the position of best match is at the centre, halve the step size.
   - If however, one of the other four points is the best match, then it becomes the centre and step 1 is repeated.
3. When the step size becomes 1, all the nine blocks around the centre are chosen for the search and the best among them is picked as the required block.

3(n)-step search

1. An initial step size is picked. The centre block and eight blocks at a distance of step size from the centre (around the centre block) are picked for comparison.
2. The step size is halved. The centre is moved to the best matched point.
3. Steps 1 and 2 are repeated till the step size becomes smaller than 1.

4-step search

1. Start with a step size of 2. Pick nine points around the search window centre. Find the best matched point. If this point is found to be the centre of the searching area go to step 4, otherwise go to step 2.
2. Move the centre to the best matched point. The step size is maintained at 2. The search pattern, however depends on the position of the previous minimum distortion.
   - a) If the previous minimum point is located at the corner of the previous search area, five points are picked
   - b) If the previous minimum distortion point is located at the middle of the horizontal or vertical axis of the previous search window, three additional checking points are picked.

   Locate the point with the minimum distortion. If this is at the centre, go to step 4 otherwise go to step 3.
3. The search pattern strategy is the same, however it will finally go to step 4.
4. The step size is reduced to 1 and all nine points around the centre of the search are examined.

Conjugate search

1. Start from center point, find best match between this point & its 2 horizontal neighbours
2. Search 1 point in the direction of best match & examine
   - If no change in best match in horizontal, repeat for vertical
   - When no change in vertical, select the point as best match.