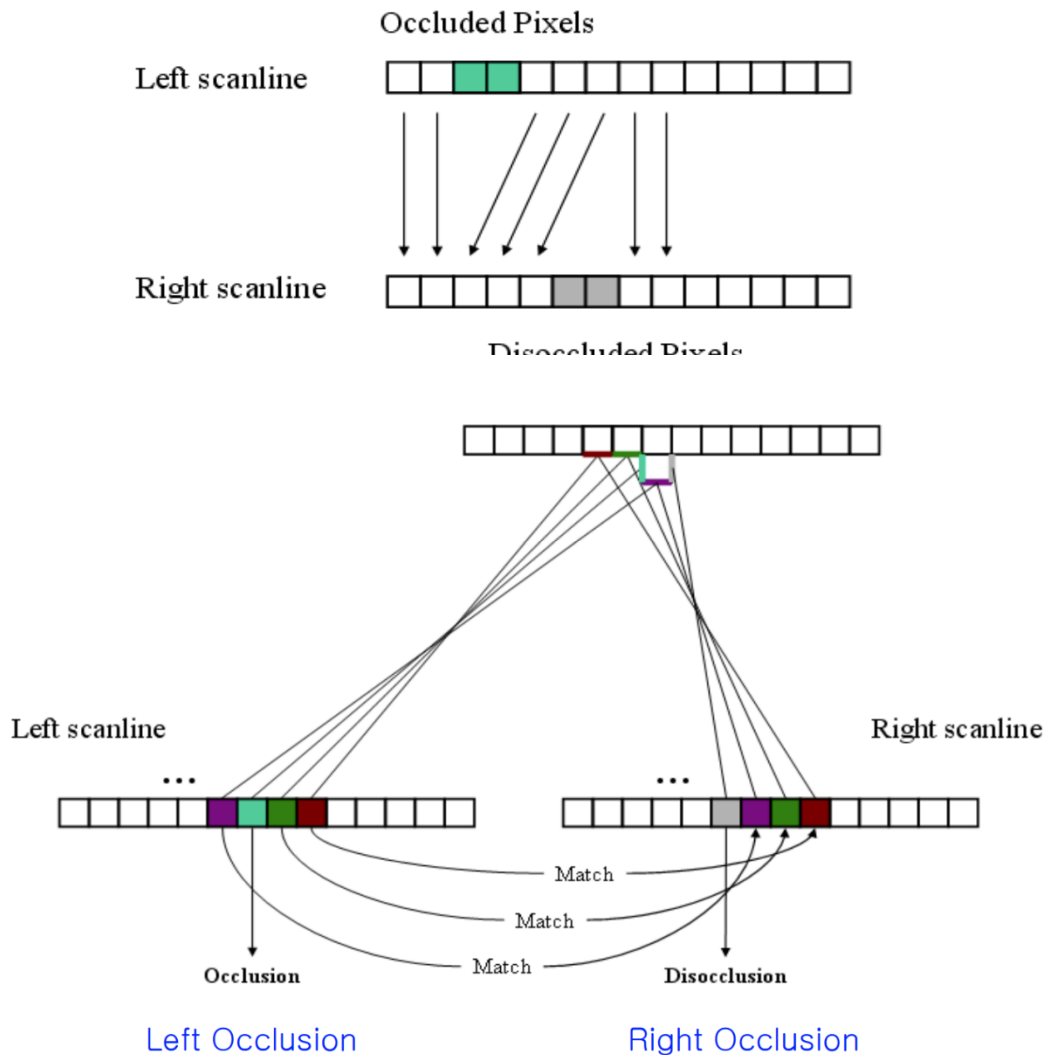


STEREO MATCHING

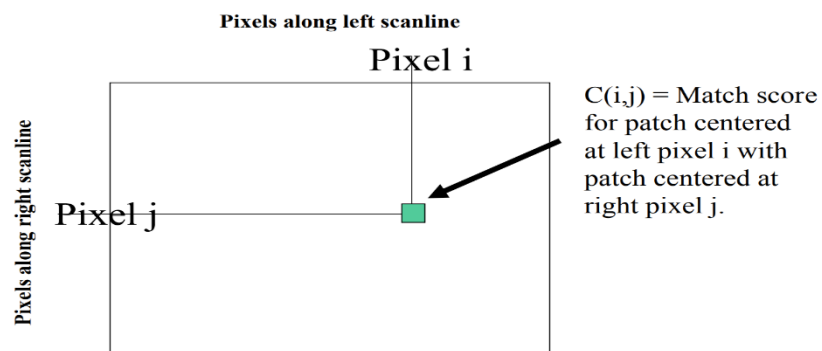
Matching points lie along corresponding epipolar- lines

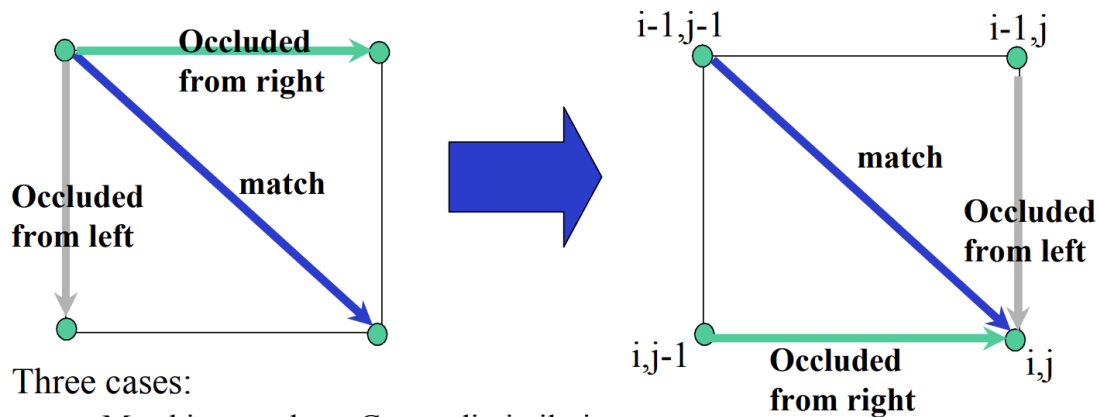
For each epipolar line in the left image compare every pixel on same epipolar line in right image, pick pixel with minimum match cost



First we introduce the concept of DSI.

The DSI for one row represents pairwise match scores between patches along that row in the left and right image.

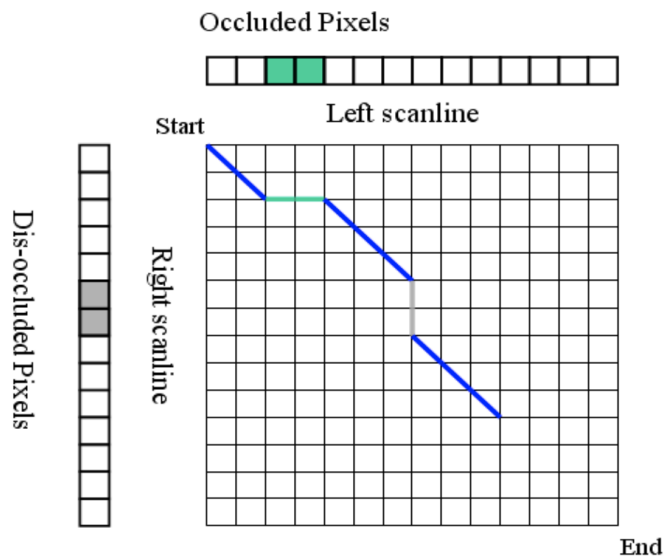




Three cases:

- Matching patches. Cost = dissimilarity score
- Occluded from right. Cost is some constant value.
- Occluded from left. Cost is some constant value.

$$C(i,j) = \min([C(i-1,j-1) + \text{dissimilarity}(i,j), \\ C(i-1,j) + \text{occlusionConstant}, \\ C(i,j-1) + \text{occlusionConstant}]);$$



Dynamic programming yields the optimal path through grid. This is the best set of matches that satisfy the ordering constraint

We want one with lowest “cost” (Lowest sum of dissimilarity scores along the path)

We go forward from the upper left to construct the optimal path of the cost matrix checking the previous step. At each point on the path we have three choices: step left, step down, step diagonally.

We go backwards to construct the optimal path of the disparities matrix. lowest “cost” (Lowest sum of dissimilarity scores along the path. Local errors may be propagated along a scan-line and no inter scan-line consistency is enforced.