

Cost Function Description:

This function takes in the detected objects and calculates the cost of potentially linking them between consecutive frames.

Parameter Descriptions:

Use linear motion position propagation: If checked, particle positions are first propagated to the next frame before searching for potential links. In this case, each particle can have any of three motion models:

- (1) Motion “forward” with constant velocity.
- (2) Motion “backward” with opposite velocity.
- (3) Random motion, i.e. no position propagation.

“Forward” and “backward” are arbitrary directions, and are simply the opposite of each other.

Only “random motion” is used, i.e. no position propagation, when this option is unchecked.

Checking/unchecking this option will be propagated to the cost function of Step 2.

Search radius: Define **Lower Bound** and **Upper Bound**. NOTE: The lower bound does NOT mean that a particle has to move at least that number of pixels, it simply sets a lower bound on the search radius. The particle can still move anywhere from zero pixels up to its search radius.

Multiplication Factor for Search Radius Calculation: Factor by which displacement standard deviation is multiplied to estimate search radius.

Check “**Use nearest neighbor ...**” to use particle density, in addition to motion, to estimate search radius. If unchecked, only motion is used.

Plot histograms of linking distances: If checked, the histogram of linking distances up to the specified frames will be plotted. This option can be used to check whether the search radius upper bound is reasonable or too small. A chopped off histogram means that the search radius upper bound is too small. HOWEVER, a histogram smoothly decaying to zero does not imply that good tracking has been achieved – one should check the tracking results by making static and dynamic plots of the tracks to make the final decision on the search radius lower and upper bounds.