

Lab 4

The basis of the mean-shift tracker is a kernel based histogram creation function. You will need to implement this. This function takes a position or offset as parameter and will then calculate the histogram for an area of *width* x *height* pixels. This means finding the proper bin for each pixel and looking up the weight from the kernel function. This function needs to be completed before you can start on the mean-shift tracker. **Note: these kernel weights mentioned here are values of the kernel function $k()$. Assuming that this weight is w would be a mistake.**

For the tracking phase you calculate the kernel based histogram for the target. Then for each new frame you calculate the histogram at the last known position of the target, this is the candidate histogram. The kernel and histogram are centered around the position.

For the mean-shift step you will calculate for a region of *width* x *height* pixels, centered on the candidate position a combination of formula 10 and 13 from the paper to get a new y .

After performing this formula, you obtain the new location you need to move to, which will get you closer to the target. The following step in the paper is sort of a hack to compensate for too large shifts. The algorithm sometimes calculates a step that will move beyond the target. Subsequent mean-shift steps will lead to the optimal position, but it is computationally cheaper to solve this in another way: See if the position halfway between the calculated new position and the original position is a better match (Bhattacharyya), if it is: take this position as new position and repeat.