World Academy of Science, Engineering and Technology
International Journal of Computer and Systems Engineering
Vol:8, No:08, 2014

An Improved Tracking Approach Using Particle Filter and Background Subtraction

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Abstract : An improved, robust and efficient visual target tracking algorithm using particle filtering is proposed. Particle filtering has been proven very successful in estimating non-Gaussian and non-linear problems. In this paper, the particle filter is used with color feature to estimate the target state with time. Color distributions are applied as this feature is scale and rotational invariant, shows robustness to partial occlusion and computationally efficient. The performance is made more robust by choosing the different (YIQ) color scheme. Tracking is performed by comparison of chrominance histograms of target and candidate positions (particles). Color based particle filter tracking often leads to inaccurate results when light intensity changes during a video stream. Furthermore, background subtraction technique is used for size estimation of the target. The qualitative evaluation of proposed algorithm is performed on several real-world videos. The experimental results demonstrate that the improved algorithm can track the moving objects very well under illumination changes, occlusion and moving background.

Keywords : tracking, particle filter, histogram, corner points, occlusion, illumination
Conference Title : ICIAS 2014 : International Conference on Intelligent and Automation Systems
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : August 25-26, 2014