Particle Filter Supported with the Neural Network for Aircraft Tracking Based on Kernel and Active Contour

Authors : Mohammad Izadkhah, Mojtaba Hoseini, Alireza Khalili Tehrani

Abstract : In this paper we presented a new method for tracking flying targets in color video sequences based on contour and kernel. The aim of this work is to overcome the problem of losing target in changing light, large displacement, changing speed, and occlusion. The proposed method is made in three steps, estimate the target location by particle filter, segmentation target region using neural network and find the exact contours by greedy snake algorithm. In the proposed method we have used both region and contour information to create target candidate model and this model is dynamically updated during tracking. To avoid the accumulation of errors when updating, target region given to a perceptron neural network to separate the target from background. Then its output used for exact calculation of size and center of the target. Also it is used as the initial contour for the greedy snake algorithm to find the exact target's edge. The proposed algorithm has been tested on a database which contains a lot of challenges such as high speed and agility of aircrafts, background clutter, occlusions, camera movement, and so on. The experimental results show that the use of neural network increases the accuracy of tracking and segmentation.