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YAN Chun-man, GUO Bao-long, WU Xian-xiang

Doi : [10.7321/jscse.v2.n2.1](https://doi.org/10.7321/jscse.v2.n2.1)

Abstract . For improving the performance of the Particle Swarm Optimization (PSO), two major strategies are used, one is the parameter modifying method, and the other is the population diversity method. For these two methods, the first one obtains the balance between the local search ability and the global search ability of the PSO by using the parameter adjusting and the parameter adding or parameter reducing, in that it has less effect on the algorithm complexity and has attracted a great of attentions. One of the well-known improved PSO algorithms of the parameter modifying method is inertia weight PSO, by introducing the inertia weight, the performance of the original PSO is improved greatly. Experimentally, we find that the performance of the algorithm can be improved more when adding a constraint factor to the inertia weight. In this paper, we empirically study the effects of the constraint factor on the performance of the inertia weight PSO. Based on the experimental results, we obtain the optimal selection of the constraint factor and extend the ability of the inertia weight PSO.

Keyword : Swarm Intelligence; Particle Swarm Optimization (PSO); Inertia weight

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Wei Sun, Xu Zhang, Yunyi Yan

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Abstract . Considering that the robust real-time tracking of non-rigid objects is difficult to realize, We present an objects detecting and tracking method based on mean-shift particle filter (MSPF) and support vector machine (SVM). The proposed algorithm uses the mean-shift vector of the tracking object to update the state transition matrix of particle filter algorithm, and we define the criterion of the particle degradation, to improve the conditions of degradation, the particles will be re-distributed as Gaussian distribution. Because of the real-time update of the particle motion parameters, the prediction accuracy of target motion parameters is improved. Under the condition of target conflicting and partially covering, the proposed algorithm is still tracking effectively. Apply SVM to relevance feedback of object detecting and tracking, the experiments results show that the method can overcome the shortness of the traditional methods, effectively improve the tracking speed and precision. The results of the experiment indicate that the average processing time per frame of the proposed algorithm is reduces by about 21% comparing with the classical ones, while the efficiency of particle increases by about 32%.

Keyword : Image process; Object tracking; Particle Filter; Mean shift; SVM

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