Particle filter with binary gaussian weighting and support vector machine for human pose interpretation

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Abstrak

Human pose interpretation using Particle filter with Binary Gaussian Weighting and Support Vector Machine is proposed. In the proposed system, Particle filter is used to track human object, then this human object is skeletonized using thinning algorithm and classified using Support Vector Machine. The classification is to identify human pose,
whether a normal or abnormal behavior. Here Particle filter is modified through weight calculation using Gaussian distribution to reduce the computational time. The modified particle filter consists of four main phases. First, particles are generated to predict target?s location. Second, weight of certain particles is calculated and these particles are used to build Gaussian distribution. Third, weight of all particles is calculated based on Gaussian distribution. Fourth, update
particles based on each weight. The modified particle filter could reduce computational time of object tracking since
this method does not have to calculate particle?s weight one by one. To calculate weight, the proposed method builds
Gaussian distribution and calculates particle?s weight using this distribution. Through experiment using video data
taken in front of cashier of convenient store, the proposed method reduced computational time in tracking process until
68.34% in average compare to the conventional one, meanwhile the accuracy of tracking with this new method is
comparable with particle filter method i.e. 90.3%. Combination particle filter with binary Gaussian weighting and
support vector machine is promising for advanced early crime scene investigation.