



A New Point-based Algorithm for Handling Occlusion in Automatic Sperm Tracking

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In this paper, we propose a new and efficient multiple object tracker which handles occlusion along the sequence of frames. Our point-based algorithm is designed for sperm tracking with variant motility and is developed in two steps, i.e., edge Generation and edge matching Extension. In Generation step corresponding detected points along the frames, which in fact represent the objects in each frame, are linked through edges to each other based on the distance and correlation criteria and in the Extension step, probable mismatched points are discovered and incomplete trajectories are precisely merged by means of comparing the frequency properties of a sperm direction signal. We evaluate our proposed method by comparison its results with those generated by existing commercial sperm analyzer software, the ground truth and the common particle filter tracker. We took advantage of real semen samples with variant sperm data for deriving our result which we got from the Royan Infertility Clinic. The evaluation demonstrates that our simple approach tracks objects with very high precision and is completely robust against occlusion and misdetection. Results illustrate that our approach is worth to be in commercial area.