An Estimation of Distribution Particle Swarm Optimization Algorithm*

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We present an estimation of distribution particle swarm optimization algorithm that borrows ideas from recent developments in ant colony optimization which can be considered an estimation of distribution algorithm. In the classical particle swarm optimization algorithm, particles exploit their individual memory to explore the search space. However, the swarm as a whole has no means to exploit its collective memory (represented by the array of previous best positions or pbests) to guide its search. This causes a re-exploration of already known bad regions of the search space, wasting costly function evaluations. In our approach, we use the swarm's collective memory to probabilistically guide the particles' movement towards the estimated promising regions in the search space. Our experiments show that this approach is able to find similar or better solutions than the canonical particle swarm optimizer with fewer function evaluations.