A PSO-based model to increase the accuracy of software development effort estimation

Abstract

Development effort is one of the most important metrics that must be estimated in order to design the plan of a project. The uncertainty and complexity of software projects make the process of effort estimation dif?cult and ambiguous. Analogy-based estimation (ABE) is the most common method in this area because it is quite straightforward and practical, relying on comparison between new projects and completed projects to estimate the development effort. Despite many advantages, ABE is unable to produce accurate estimates when the importance level of project features is not the same or the relationship among features is dif?cult to determine. In such situations, ef?cient feature weighting can be a solution to improve the performance of ABE. This paper proposes a hybrid estimation model based on a combination of a particle swarm optimization (PSO) algorithm and ABE to increase the accuracy of software development effort estimation. This combination leads to accurate identi?cation of projects that are similar, based on optimizing the performance of the similarity function in ABE. A framework is presented in which the appropriate weights are allocated to project features so that the most accurate estimates are achieved. The suggested model is ?exible enough to be used in different datasets including categorical and non-categorical project features. Three real data sets are employed to evaluate the proposed model, and the results are compared with other estimation models. The promising results show that a combination of PSO and ABE could signi?cantly improve the performance of existing estimation models.