ABSTRACT

Software is regarded as a vital part in all computer based systems. In a software development process, effective cost estimation is the most challenging activity. Software cost estimation is a crucial part of most software development. The accurateness of estimating the software project cost has a direct and major impact on the quality of the firm’s software investment decisions. Management cautiously considers costs and benefits of software before committing the required resources to that project or order for a contract. Accurately estimating a new software project is still a goal of every project manager. Unfortunately it is difficult to measure such preliminary estimation as it has only little information about the project at an early stage.

Cost estimation process comprises a number of organized steps that provide estimation with reduced error. The procedure used in estimation by analogy is not yet able to correctly handle the categorical data. The research introduces a new approach which is based on reasoning by analogy, fuzzy logic and linguistic quantifiers to estimate the effort when the software project is defined either by categorical or numerical data. To overcome the disadvantages of using Fuzzy and Analogy individually, a new method - Fuzzy Analogy, has been proposed to estimate the effort. Uses of fuzzy logic-based cost estimation models are more suitable if unclear or inaccurate information are considered. Fuzzy systems attempt to imitate the processes of the brain through a rule base.
This research introduces an optimized fuzzy logic based framework to handle the inaccuracy and uncertainty in the data at early stages of the project. The said framework is built upon an existing cost estimation model - Cost Constructive Model (COCOMO). The COCOMO model is an empirical model that was derived by collecting data from a large number of software projects.

An innovative approach has been launched in accordance with fuzzy logic coupled with the optimization task to boost effort estimation. Fuzzy logic-based cost estimation models have showed their mettle as the most efficient model for the cost estimation in software engineering. It is also resorted to the inclusion of the optimization algorithm in fuzzy which goes a long way in further boosting the estimation process. The optimization algorithm deployed in the novel technique is the Particle Swarm Optimization (PSO) algorithm. The performance of the proposed system is calculated using Mean Absolute Relative Error (MARE). The Implementation of the proposed approach is done in JAVA platform and the obtained results show that the proposed approach delivers better cost estimation comparing with the previous methods.