Refactoring Object Oriented Software through Community Detection Using Evolutionary Computation

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Abstract : An intrinsic property of software in a real-world environment is its need to evolve, which is usually accompanied by the increase of software complexity and deterioration of software quality, making software maintenance a tough problem. Refactoring is regarded as an effective way to address this problem. Many refactoring approaches at the method and class level have been proposed. But the extent of research on software refactoring at the package level is less. This work presents a novel approach to refactor the package structures of object oriented software using genetic algorithm based community detection. It uses software networks to represent classes and their dependencies. It uses a constrained community detection algorithm to obtain the optimized community structures in software networks, which also correspond to the optimized package structures. It finally provides a list of classes as refactoring candidates by comparing the optimized package structures with the real package structures.