Abstract

The thesis provides a literature review of the research on algorithms for finding graph isomorphism i.e. algorithms for graph matching. The thesis presents four new methods for ascertaining graph matching, the methodologies are implemented in MATLAB and tested on various types of graphs and the results are satisfactory. All the methodologies have been framed based on newly devised theorems and corollaries. Comprehensive proofs have been provided for each of the theorems and corollaries. The first two methodologies proposed for graph matching make use of average shortest distance of a vertex to the other vertices and vertex degrees along with the spectral properties to check for isomorphism and find vertex correspondence. The first method employs the adjacency matrix representation of the graph whereas the second matrix uses the normalized adjacency matrix. The third methodology presents a novel assignment based methodology for graph matching. Genetic algorithm approaches are presented as the fourth methodology for graph matching. New chromosome representation and operators are defined and used in both simple genetic algorithm and steady state genetic algorithm, paradigms. A comprehensive comparison of the proposed methodologies is presented. The results are encouraging and the methodologies can be used in various applications.