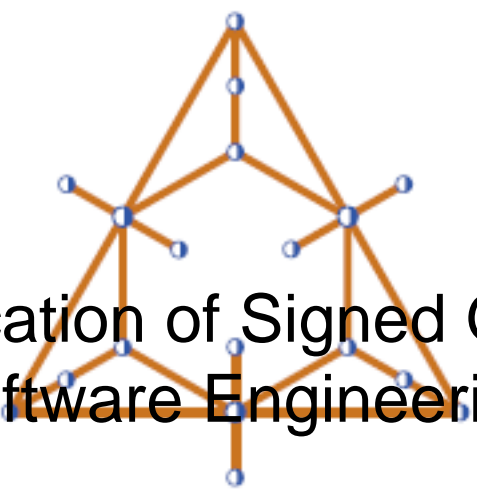


Bled'11 - 7th Slovenian International Conference on Graph Theory

Contribution ID : 57



An Application of Signed Graphs to Software Engineering

Content :

Signed graphs have found numerous applications in social network analysis, data clustering, statistical physics and portfolio management. In this paper we present a new application of signed graphs to software engineering. A component based software system is developed by integrating software components already available in the market. The aim is to select components that together achieve all system goals; where a component can potentially achieve more than one goals. The software developer would like to build the system from the fewest possible components in order to reduce the development effort and cost. A popular approach is to cluster software goals based on some criteria and select a single component for each cluster of goals. In this paper we introduce the concept of *goal graph* $G(V,E)$, which is a signed graph with vertices representing software goals and edges corresponding to positive or negative dependencies between goals. Each edge is assigned a positive or negative weight based on the strength of the dependency. The goal graph is then partitioned into $|V|-1, |V|-2, \dots, 3, 2, 1$ clusters by the usual signed graph clustering algorithm until we obtain the clustering with minimum error. We then validate the optimal clustering by checking the availability of components for all clusters. We present an application of our approach to a real-life software engineering project.

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Session classification : --not yet classified--

Track classification : General session

Type : Oral presentation