Differences between the journal submission and the conference publication

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The following submission provides a significantly expanded version of the conference paper titled: "Extended Structural Balance Theory for Modeling Trust in Social Networks" which is accepted to appear in PST 2013 Conference on Privacy, Security and Trust.

The theory underlying both papers is the same. However, the journal submission provides an extensive rewriting of the experimental results reported in the conference submission, illustrating various properties of the proposed method.

- We introduce a number of small stylized graphs and show the results of convergence for these graphs. We discuss how our theory captures frequently hypothesized properties of trust with the help of these graphs.
- In the conference publication, we have only provided limited set of results using Stress Majorization (SM) which provides an exact solution to the problem. However, due to the underlying complexity of this algorithm, we were only able to test it on small samples of the underlying graphs studied. In this paper, we introduce a new version of Stress Majorization for sparse graphs (SM/SG) and use it to provide many new results that use the full network data. The following describes these new methods.
- We first show that SM and SM/SG have similar performance on the same sampled graphs. Then, we use SM/SG to test many different properties of our algorithm that were not illustrated in the conference publication. In particular, we show how the choice of the underlying graph, the choice of neutral edges impacts the result. We also illustrate how the performance of the algorithm is impacted by removal of edges from the graph. We show to which degree our method can predict the sign of edges that will be created in the future. We discuss the sensitivity to parameter choices.
- In addition, we add two studies to this paper that are crucial for illustrating the utility of the proposed method. The first one is the study of strong and weak edges. We introduce bi-directional edges with the same sign as strong and single directional edges as weak edges. We define neutral edges as those with conflicting signs. Using this graph, we show that our method is able to achieve superior performance for strong edges while providing similar performance for weak edges as before.
- The second crucial study involves justification of the method with external validation. We incorporate a study of ratings that is not used in the algorithm to illustrate the notion of convergence. We show how edges that change sign according to our theory also tend to change their ratings more than average. We show that the performance remains similar even when we consider strong and weak edges. We discuss how network structure can predict this change.
- All the results are discussed in great detail that was not possible due to the limited scope of the conference paper. We expand introduction and conclusion accordingly to further discuss the new findings.