Who is the Best Connected EC Researcher? Centrality analysis of the complex network of authors in evolutionary computation*

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Categories and Subject Descriptors

J.4 [**SOCIAL AND BEHAVIORAL SCIENCES**]: Sociology; I.6.5 [**SIMULATION AND MODELING**]: Model Development—*Modeling methodologies*

General Terms

Human Factors

The coauthorship graph (that is, the graph of authors linked by coauthorship of papers) is a complex network, which expresses the dynamics of a complex system. Only recently its study has started to draw interest from the EC community, the first paper dealing with it being published two years ago. In this paper we study the coauthorship network of EC at a microscopic level. Our objective is ascertaining which are the most relevant nodes (i.e. authors) in it.

We have defined our network using data taken from the DBLP. The network comprises 7712 authors, linked if they have coauthored a paper. The importance –i.e., centrality– of a node can be measured in different ways. The metrics we have considered are *betweenness* (the relative fraction of geodesics -i.e., shortest paths- between any two nodes i, j that pass through a node k), *closeness* (average distance to other nodes), *Bonacich's power* (a measure related to having many neighbors whose power is high too), and *eigenvector* (the centrality coefficients taken from the eigenvector associated with the dominant eigenvalue of the adjacency matrix). We have analyzed them both in isolation and combined within a Pareto-dominance approach (the first time this is done, to the best of our knowledge).

The result of our analysis indicates that there are some well-known researchers that appear systematically in top rankings. We also note that eigenvector centrality is likely to promote some authors due to "hitchhiking" effects. Computing the successive Pareto-fronts resulting from betweenness, closeness, and Bonacich's power, we obtain the following results: (front #1) K. Deb, D.E. Goldberg, (front #2) Z. Michalewicz, M. Schoenauer, (front #3) T. Bäck, A.E. Eiben, H. de Garis, D. Keymeulen, B. Paechter, M. Tomassini, X. Yao, (front #4) D.B. Fogel, J.J. Merelo, T. Higuchi, K.A. De Jong, L. Kang, E. Lutton, R.E. Smith, L.D. Whitley, (front #5) H.A. Abbass, H.-G. Beyer, J. Branke, M. Dorigo, T.C. Fogarty, H. Iba, M. Keijzer, E.G. Talbi, M.D. Vose.

All researchers appearing in these fronts are rather well-known in the field for their research excellence. Their appearance in one front or another does not represent therefore a scientific ranking (the quality and/or impact of papers is not reflected in the network), but a measure of their connectedness (and therefore their possible role in the interchange of information in that network) under three different measures.

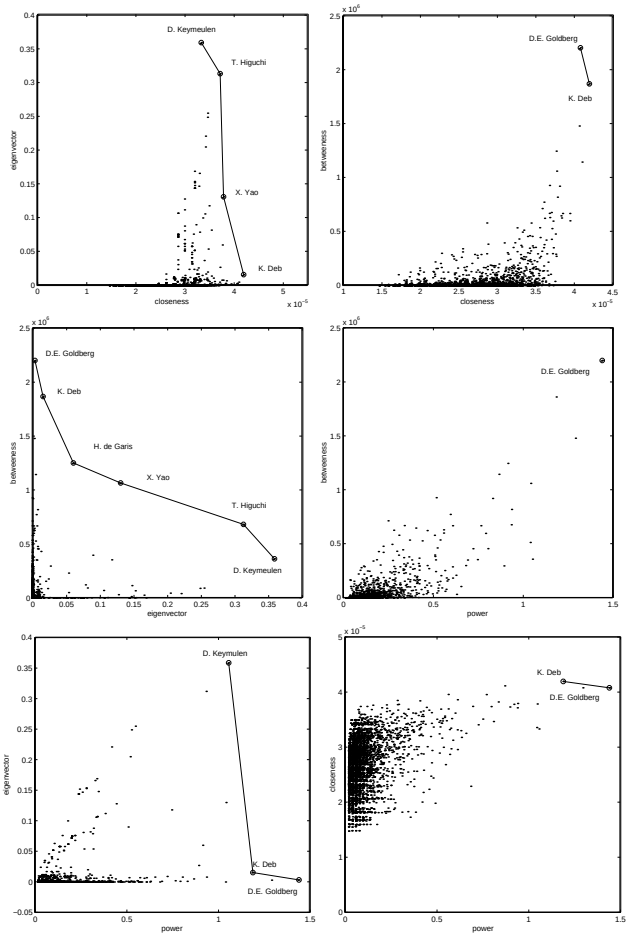

Figure 1. Pairwise scatter-plots for different centrality measures.

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