The community structure of word association graphs

András Bóta[a], László Kovács[b], Miklós Krész[c], András Pluhár[d]

[a]University of Szeged, Institute of Informatics
`bandras@inf.u-szeged.hu`
[b]University of West Hungary, Department of Applied Linguistics
`klaszlo@btk.nyme.hu`
[c]University of Szeged, Gyula Juhász Faculty of Education
`kresz@jgypk.u-szeged.hu`
[d]University of Szeged, Institute of Informatics
`pluhar@inf.u-szeged.hu`

Abstract

One of the defining characteristics of small-world networks is that their edge distribution is globally and locally inhomogeneous: nodes form dense groups inside the networks and these groups are called communities [1]. While the traditional definition of communities only allows disjoint subsets of nodes, the detection of overlapping communities became a prominent research subject in recent years [2]. In this presentation we will use the hub-based overlapping community detection method of Bóta et al. [3] to examine and compare the community structure of two word association graphs based on two different languages: English and Hungarian. The English network was created from the University of South Florida word association norms [4]. The Hungarian network was constructed by László Kovács using data collected from internet users [5]. We will examine, around which specific words are communities formed – for example category names and words with general meanings. We will also examine if these specific words and their associated groups are similar in the English and Hungarian networks.

Keywords: network science, community, community detection, word associations

MSC: 05C82, 91F20

References

[1] NEWMAN, M. E. J., GIRVAN, M., Finding and evaluating community structure in networks. *Phys. Rev. E*, 69(2):026113, 2004.

[2] FORTUNATO, S., Community detection in graphs. *Physics Report*, 486(3):75-174, 2010.

[3] BÓTA, A., CSIZMADIA, L., PLUHÁR, A., Community detection and its use in Real Graphs. *Proceedings of the 2010 Mini-Conference on Applied Theoretical Computer Science*, 95-99, 2010.

[4] NELSON, D. L., MCEVOY, C. L., SCHREIBER, T. A., The university of south Florida word association, rhyme, and word fragment norms. www.usf.edu/FreeAssociation, 1998.

[5] KOVÁCS L. Conceptual Systems and Lexical Networks in the Mental Lexicon (In Hungarian: "Fogalmi rendszerek és lexikai hálózatok a mentális lexikonban"). Tinta Könyvkiadó, Budapest, 2013.