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**INTERSOCIAL: Unleashing the Power of Social
Networks for Regional SMEs**

Deliverable D2.3.3.a: Partial deliverable for D2.3.1-4 - Invited Talk

Action 2.3: Project Results Presentation

WP2: Information and Publicity

Invited Talk: partial deliverable for D2.3.1-4

Deliverable D2.3.3.a Action 2.3

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Table of Contents

1.	Introduction	4
2.	M Vazirgiannis Invited Talk	4

1. Introduction

The subject of this deliverable was the invited talk of the Workshop IWOSN that took place on June 15 in Patras, by Michael Vazirgiannis Professor of Athen University of Economics and Business. More info on the event can be found at: <http://dmod.eu/intersocial>

2. M Vazirgiannis Invited Talk

Prof Vazirgiannis prepared a talk on the subject of Graph degeneracy for graph mining in social networks

An outline of the talk follows:

Graphs constitute the dominant data structure in the WWW, and appear essentially in all forms of information. Examples are the web graph, social networks, protein interaction networks, terms dependency graphs etc. Important knowledge is hidden in the macroscopic topology and features of these graphs.

The dominant knowledge artifacts extracted from graphs are either individual node based scores (such as authority/hubness/centrality) or unsupervised grouping of nodes in to clusters or global statistics computations (such as degree distributions etc). What is missing is metrics, structures and measures that represent the deeper knowledge hidden in the macroscopic structure of potentially directed/weighted graphs.

We propose new metrics and evaluation schemes for the macroscopic structure of graphs capitalizing on the degeneracy concept, i.e. k-cores, towards identifying the most cohesive components of graphs – finding thus the most collaborative constituents. These metrics compute the most robust subgraphs representing dense and mutual connectivity in the case of directed and weighted graphs as well. Connectivity can be then interpreted in several ways: i.e. as collaboration in citation or social networking graphs, collective affinity in protein interaction graphs etc. We also use the best k-cores of graphs as seeds for optimizing the speed of spectral graph clustering. We conducted several experiments on real (DBLP, Wikipedia) and synthetic data sets. The results are interesting especially in the case in the DBLP citation graph.

We further extend k-core to deal with directed graphs, introducing the D-core concept, as means of evaluating a digraph's collaborative nature. Based on the D-core we devise a wealth of novel metrics used to evaluate the graphs collaboration features. We applied the above approaches on large real world graphs - Wikipedia and DBLP - and report interesting results.

The CV of Prof Vazirgiannis: He is a Professor at Dept. Informatics, AUEB. Greece. He holds a degree in Physics (1986), a MSc. in Robotics (1988), both from U. Athens, and a MSc. in

Knowledge Based Systems from Heriot Watt University (in Edinburgh, UK). He acquired a Ph.D. degree in 1994 (Dept. of Informatics, U. Athens, Greece). Since then, he has conducted research in GMD-IPSI, Max Planck MPI (Germany), in INRIA/FUTURS (Paris). He has been a teaching in AUEB (Greece), Ecole Polytechnique, Telecom Paris (France) and in Deusto University (Spain).

His current research interests are on Web Graph analysis & evolution monitoring (page rank prediction, graph based aggregate metrics, graph clustering, model learning for web graph, algorithms for web advertising campaigns and community evaluation metrics. Also distributed machine learning algorithms, distributed dimensionality reduction, distributed resource management. His industrial experience and expertise lie in the areas of data mining and machine learning for large scale data repositories (i.e. the Web graph, social networks, medical data etc). He has supervised nine completed PhD theses <http://www.dbnet.aueb.gr/michalis/index.html> - [phds_completed](http://www.dbnet.aueb.gr/michalis/index.html#phds_completed).

He has contributed chapters in books and encyclopedias, published two books and more than a hundred twenty papers in international refereed journals and conferences. He is also coauthor of two patents filed in the Greek patent office and one application filed in the European Patent office. He is actively involved in national and international research & development projects. He has received the ERCIM (2001) and the Marie Curie EU (2006) fellowships. Currently he holds a DIGITEO Chair research grant in France supported by Ecole Polytechnique, Telecom Paris & UVSQ. He participates in the editorial board of the Intelligent Data Analysis Journal and serves as guest editor for “Machine Learning” and “Data Mining & Knowledge Discovery” journals. He co-chaired the PC committee of ECML/PKDD 2011 conference, has served the Data Mining Track chair <http://www.icde2011.org/node/6> of the IEEE - ICDE 2011 conference and has participated as a conference committee member for more than forty international conferences, in the areas: Data Bases, Data Mining/Machine learning and the Web.

Prof. Vazirgiannis has been invited and participated in three /Google faculty EMEA summits /in Zurich, in 2008, 2011 and 2012.



Prof Vazirgiannis talking at the workshop