PROJECT PERIODIC REPORT

Grant Agreement number: 288956

Project acronym: NADINE

Project title: New tools and Algorithms for Directed Network analysis

Funding Scheme: Small or medium-scale focused research project (STREP)

Final report: 1ˢᵗ X 2ⁿᵈ X

Final Plan for using and disseminating knowledge

Period covered: from   1.05.2012   to 30.04.2015

Name, title and organisation of the scientific representative of the project's coordinator[1]:

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FINAL REPORT IS COMPOSED FROM Periodic reports of 1ˢᵗ and 2ⁿᵈ periods

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[1]

   Usually the contact person of the coordinator as specified in Art. 8.1. of the grant agreement

Final Plan for using and disseminating knowledge

The results obtained during the grant period are presented in publications [1-73] available for public at the web page

http://www.quantware.ups-tlse.fr/FETNADINE/pub.html

Among press releases we note those for publication P4.16 highlighted by The Guardian, The Washington Post, Uppsala Universitet, EC Cordis, CNRS INP news (this CNRS highlight got the largest number of views on the day of its publication which exceeded the number of views for the CNRS highlight about Nobel prize for S.Haroche), in total there are about 20 countries highlighted this publication (see all links at the above web page).

The software developed during the grant period is publicly available at the web page

http://www.quantware.ups-tlse.fr/FETNADINE/software.htm

The algorithms and software developed by NADINE attracted interests of various institutions and companies. Thus the NADINE algorithms for the multiproduct world trade are reported to United Nations COMTRADE New York; this database continues to provide to P1 a free access to this database. These algorithms have been also applied to the data collected by OECD-WTO in collaboration with the Chief statistitian H.Escaith (WTO Geneve with a joint publication P1.22). These results based on OECD-WTO database for the world network of economic activities are presented to the International conference at Bank for International Settlements, Basel in Oct 2015 http://www.bis.org/events/gfi.htm . It is clear that the algorithms developed by NADINE for multiproduct world trade can be directly applied to the treatment of stability of financial flows between bank units. This world network of bank units is estimated to be of a rather small size (7000 nodes for Federal Reserve of USA, 2000 nodes for all banks of Germany and about 50000 nodes for the whole world). In various talks NADINE Coordinator argued that the NADINE methods will be very useful for financial networks allowing to prevent the financial crises (invited talk at   Deutsche Bundesbank, Zentrale, Makroprudenzielle Analysen, Frankfurt am main, 6 Feb 2012 (slides are at http://www.quantware.ups-tlse.fr/dima/dlstalks/dlstalk26.pdf) and at presentation talk of

NADINE project at International Workshop on Search Computing, Brussels 25-26 Sept 2012

(video of talk is at http://videolectures.net/searchcomputing2012_shepelyansky_nadine/).

However, banks prefer to hide their financial flows (even flows between unknown anonymized bank units are not available). NADINE Coordinator expressed the firm opinion that EC political wish can make a political pressure on banks allowing to get for scientists an information about financial flows between bank units (for example, for old periods of time, or/and for no-named bank units). This would allow to create the World Bank Web (WBW) and to protect the human society from bank

crises after which countries and common people are obliged to compensate bank losses. At present the money transfers with SWIFT clearly show that the WBW really exists. The computer science and mathematical methods developed by NADINE would allow to superwise the financial flows on WBW and bring to the society the stability of world financial system. There is an appealing analogy with the WWW: it appearance in 1991 changed the world on a scale of 20 years, we argue that the creation of the WBW (with restricted access to authorized community of politicians and researchers) will bring the financial stability to the world. This direction can be developed in the frame of FAPLIDIN project submitted to the FET Open in March 2015.

Algorithm developed by P2 (publication P2.13) attracted interest of Yandex (Russia) which wanted to make a patent on the basis of this algorithm (two co-authors of this paper work at Yandex) but the paper had been presented at a conference at early stage and a patent could not be realized after that.

Algorithms developed by P3 attracted interest of NOMAO.com (paper P3.16 with P1), other results of P3 had been solicited by Ericsson Hungary, P2 had been invited to a workshop organized by Airbus in Toulouse in Dec 2014 to present their algorithms.

P4 developed various software tools used by Facebook (paper P4.1 highlighted by New York Times), P4 got also a large Google grant on software development.

The datasets collected during the grant period are available for public at

http://www.quantware.ups-tlse.fr/FETNADINE/datasets.htm

The results present at the FET NADINE meetings, conferences are available at

http://www.quantware.ups-tlse.fr/complexnetworks2012/

http://www.quantware.ups-tlse.fr/FETNADINE/dnd2013/

http://www.quantware.ups-tlse.fr/FETNADINE/dnd2014/

Materials of Summer schools organized by NADINE are available at

http://www.quantware.ups-tlse.fr/ecoleluchon2014/

http://www.quantware.ups-tlse.fr/ecoleluchon2015/ (in preparation)

The obtained analytical results and software give clear recipes for advanced analysis of complex directed networks. These tools are advertised to PME companies like NOMAO, Gravity etc. The open public crawler developed by

NADINE is used by various research groups and companies. NADINE also developed contacts with the World Trade Organisation (Geneve) and UN COMTRADE (New York) analyzing their international trade and economic activities data by NADINE tools.

Future developments and applications of the results of NADINE are planned to be extended in the proposed FET Open project FAPLIDIN (Fundamentals and APLIcations of DIrected Networks) submitted to FET in March 2015 (Proposal number: SEP-210260860)