PhD in Information Technology and Electrical Engineering

Università degli Studi di Napoli Federico II

PhD Student: Giancarlo Sperlì

XXX Cycle

Training and Research Activities Report – Third Year

Tutor: Antonio Picariello

Student

I graduated in Computer Engineering; currently, I am attending the second year of PhD in Information Technology and Electrical Engineering - ITEE- XXX Cycle at the University of Naples Federico II, under the supervision of Prof. Antonio Picariello. I was awarded a MIUR research grant.

Study Activities

Courses

Module	Type	Professor	Date	H	CFU
Games on Graph	Ad-Hoc	Sasha Rubin	10,11,12/04/2017	8	1,6
Testing Automation	Ad-Hoc	Porfirio Tramontana	12,19,26/01/2017 02/02/2017	16	3
Big Data and Business Intelligence	M.sC	Antonio Picariello	II Semester	30	6

Seminars

Name	Type	Professor	Date	H	CFU
1st ACM Europe Summer School | Data Science	Ext	ACM	13-19/07/2017	40	4,0

	Credits year 1								Credits year 2								Credits year 3									
		1	2	3	4	5	6			1	2	3	4	5	6			1	2	3	4	5	6			
	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary	Estimated	bimonth	bimonth	bimonth	bimonth	bimonth	bimonth	Summary	Total	Check
Modules	20	0,0	5,0	3,0	7,0	0,0	0,0	15,0	15	0,0	6,0	0,0	0,0	0,0	0,0	6,0	21	0,0	9,0	1,6	0,0	0,0	0,0	10,6	31,60	30-70
Seminars	8	1,0	1,5	3,8	5,2	0,0	0,0	11,5	6	6,0	0,0	0,0	0,0	0,0	0,0	6,0	12	0,0	0,0	0,0	0,0	6,0	0,0	6,0	23,50	10-30
Research	32	9,0	3,5	3,2	3,0	10,0	10,0	38,7	39	4,0	4,0	10,0	10,0	10,0	10,0	48,0	30	10,0	1,0	8,4	10,0	4,0	10,0	43,4	130,10	80-140
	60	10,0	10,0	10,0	15,2	10,0	10,0	65,2	60	10,0	10,0	10,0	10,0	10,0	10,0	60,0	63	10,0	10,0	10,0	10,0	10,0	10,0	60,0	185,20	180

Research Activities

Nowadays, On-Line Social Networks represent an interactive platform to share -- and very often interact with -- heterogeneous content for different purposes (e.g to comment events and facts, express and share personal opinions on specific topics, and so on), allowing millions of individuals to create on-line profiles and communicate personal information.

In this dissertation, we define a novel data model for Multimedia Social Networks (MSNs), i.e. social networks that combine information on users -- belonging to one or more social communities -- with the multimedia content that is generated and used within the related environments. The proposed data model, inspired by hypergraph-based approaches, allows to represent in a simple way all the different kinds of relationships that are typical of these environments (among multimedia contents, among users and multimedia content and among users themselves) and to enable several kinds of analytics and applications.

Exploiting the feature of MSN model, the following two main challenging problems have been addressed: the Influence Maximization and the Community Detection. Regarding the first problem, a novel influence diffusion model has been proposed that, learning recurrent user behaviors from past logs, estimates the probability that a given user can influence the other ones, basically exploiting user to content actions. On the top of this model, several algorithms (based on game theory, epidemiological etc.) have been developed to address the Influence Maximization problem. Concerning the second challenge, we propose an algorithm that leverages both user interactions and multimedia content in terms of high and low-level features for identifying communities in heterogeneous network.

Eventually, experimental analysis have been made on a real Multimedia Social Network ("Flickr") for evaluating both the feasibility of the model and the effectiveness of the proposed approaches for Influence Maximization and community detection.

Products

Conference proceedings:

- Flora Amato, Giovanni Cozzolino, Vincenzo Moscato, Antonio Picariello, Giancarlo Sperlì: Automatic Personalization of Visiting Path Based on Users Behaviour. AINA Workshops 2017: 692-697
- Flora Amato, Vincenzo Moscato, Antonio Picariello, Giancarlo Sperlì: Recommendation in Social Media Networks. BigMM 2017: 213-216
- Flora Amato, Aniello Castiglione, Vincenzo Moscato, Antonio Picariello, Giancarlo Sperlì: Detection of Lurkers in Online Social Networks. CSS 2017: 1-15
- Giovanni Cozzolino, Vincenzo Moscato, Antonio Picariello, Giancarlo Sperlì, Flora Amato: Sentiment Analysis on yelp social network. DMSVLSS 2017: 94-101
- Flora Amato, Vincenzo Moscato, Antonio Picariello, Giancarlo Sperlì: Influence Maximization in Social Media Networks Using Hypergraphs. GPC 2017: 207-221
- Flora Amato, Vincenzo Moscato, Antonio Picariello, Giovanni Ponti, Giancarlo Sperlì: Influence Analysis in Business Social Media. MIDAS@PKDD/ECML 2017: 43-54
- Flora Amato, Vincenzo Moscato, Antonio Picariello, Giancarlo Sperlì: KIRA: A System for Knowledge-Based Access to Multimedia Art Collections. ICSC 2017: 338-343
- Flora, A., Vincenzo, M., Antonio, P., & Giancarlo, S. (2016, November). Modeling User-Content Interaction in Multimedia Social Networks Using Hypergraphs. In Signal-Image Technology & Internet-Based Systems (SITIS), 2016 12th International Conference on (pp. 343-350). IEEE.
- Amanto, F., Moscato, V., Picariello, A., & Sperlı, G. Recommender Systems and Social Networks: an application in Cultural Heritage.

Journal:

- Amato, F., Moscato, V., Picariello, A., Piccialli, F., & Sperlí, G. Centrality in heterogeneous social networks for lurkers detection: An approach based on hypergraphs. Concurrency and Computation: Practice and Experience.
- Amato, F., Castiglione, A., De Santo, A., Moscato, V., Picariello, A., Persia, F., & Sperlí, G. (2017). Recognizing human behaviours in online social networks. Computers & Security.
- Amato, F., Moscato, V., Picariello, A., Sperlí, G., D'Acierno, A., & Penta, A. (2017). Semantic summarization of web news. Encyclopedia with Semantic Computing and Robotic Intelligence, 1(01), 1630006.

Tutorship

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