

Oswaldo Gervasi · Beniamino Murgante
Sanjay Misra · Ana Maria A.C. Rocha
Carmelo M. Torre · David Taniar
Bernady O. Apduhan · Elena Stankova
Shangguang Wang (Eds.)

LNCS 9790

Computational Science and Its Applications – ICCSA 2016

16th International Conference
Beijing, China, July 4–7, 2016
Proceedings, Part V

5
Part V



 Springer

Oswaldo Gervasi · Beniamino Murgante
Sanjay Misra · Ana Maria A.C. Rocha
Carmelo M. Torre · David Taniar
Bernady O. Apduhan · Elena Stankova
Shangguang Wang (Eds.)

Computational Science and Its Applications – ICCSA 2016

16th International Conference
Beijing, China, July 4–7, 2016
Proceedings, Part V

Editors

Osvaldo Gervasi
University of Perugia
Perugia
Italy

Beniamino Murgante
University of Basilicata
Potenza
Italy

Sanjay Misra
Covenant University
Ota
Nigeria

Ana Maria A.C. Rocha
University of Minho
Braga
Portugal

Carmelo M. Torre
Polytechnic University
Bari
Italy

David Taniar
Monash University
Clayton, VIC
Australia

Bernady O. Apduhan
Kyushu Sangyo University
Fukuoka
Japan

Elena Stankova
Saint Petersburg State University
Saint Petersburg
Russia

Shangguang Wang
Beijing University of Posts
and Telecommunications
Beijing
China

ISSN 0302-9743

ISSN 1611-3349 (electronic)

Lecture Notes in Computer Science

ISBN 978-3-319-42091-2

ISBN 978-3-319-42092-9 (eBook)

DOI 10.1007/978-3-319-42092-9

Library of Congress Control Number: 2016944355

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

© Springer International Publishing Switzerland 2016

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by Springer Nature

The registered company is Springer International Publishing AG Switzerland

Organization

ICCSA 2016 was organized by Beijing University of Post and Telecommunication (China), University of Perugia (Italy), Monash University (Australia), Kyushu Sangyo University (Japan), University of Basilicata (Italy), University of Minho, (Portugal), and the State Key Laboratory of Networking and Switching Technology (China).

Honorary General Chairs

Junliang Chen	Beijing University of Posts and Telecommunications, China
Antonio Laganà	University of Perugia, Italy
Norio Shiratori	Tohoku University, Japan
Kenneth C.J. Tan	Sardina Systems, Estonia

General Chairs

Shanguang Wang	Beijing University of Posts and Telecommunications, China
Osvaldo Gervasi	University of Perugia, Italy
Bernady O. Apduhan	Kyushu Sangyo University, Japan

Program Committee Chairs

Sen Su	Beijing University of Posts and Telecommunications, China
Beniamino Murgante	University of Basilicata, Italy
Ana Maria A.C. Rocha	University of Minho, Portugal
David Taniar	Monash University, Australia

International Advisory Committee

Jemal Abawajy	Deakin University, Australia
Dharma P. Agarwal	University of Cincinnati, USA
Marina L. Gavrilova	University of Calgary, Canada
Claudia Bauzer Medeiros	University of Campinas, Brazil
Manfred M. Fisher	Vienna University of Economics and Business, Austria
Yee Leung	Chinese University of Hong Kong, SAR China

International Liaison Chairs

Ana Carla P. Bitencourt	Universidade Federal do Reconcavo da Bahia, Brazil
Alfredo Cuzzocrea	ICAR-CNR and University of Calabria, Italy
Maria Irene Falcão	University of Minho, Portugal

Contents – Part V

Information Systems and Technologies

Discovering Popular Events on Twitter	1
<i>Sartaj Kanwar, Rajdeep Niyogi, and Alfredo Milani</i>	
Analysis of Users’ Interest Based on Tweets	12
<i>Nimita Mangal, Rajdeep Niyogi, and Alfredo Milani</i>	
User-Friendly Ontology Structure Maintenance Mechanism Targeting Sri Lankan Agriculture Domain	24
<i>S.W.A.D.M. Samarasinghe, A.I. Walisadeera, and M.D.J.S. Goonetillake</i>	
A Software Project Management Problem Solved by Firefly Algorithm	40
<i>Broderick Crawford, Ricardo Soto, Franklin Johnson, Sanjay Misra, and Eduardo Olguín</i>	
A Baseline Domain Specific Language Proposal for Model-Driven Web Engineering Code Generation	50
<i>Zuriel Morales, Cristina Magaña, José Alfonso Aguilar, Anibal Zaldívar-Colado, Carolina Tripp-Barba, Sanjay Misra, Omar Garcia, and Eduardo Zurita</i>	
ArtistRank – Analysis and Comparison of Artists Through the Characterization Data from Different Sources	60
<i>Felipe Lopes de Melo Faria, Débora M.B. Paiva, and Álvaro R. Pereira Jr.</i>	
Solving Manufacturing Cell Design Problems by Using a Dolphin Echolocation Algorithm	77
<i>Ricardo Soto, Broderick Crawford, César Carrasco, Boris Almonacid, Victor Reyes, Ignacio Araya, Sanjay Misra, and Eduardo Olguín</i>	
Cryptanalysis and Improvement User Authentication Scheme for Multi-server Environment	87
<i>Dongwoo Kang, Jongho Moon, Donghoon Lee, and Dongho Won</i>	
An Operational Semantics for Android Applications	100
<i>Mohamed A. El-Zawawy</i>	
A Type System for Android Applications.	115
<i>Mohamed A. El-Zawawy</i>	

A Weed Colonization Inspired Algorithm for the Weighted Set Cover Problem	129
<i>Broderick Crawford, Ricardo Soto, Ismael Fuenzalida Legüe, Sanjay Misra, and Eduardo Olguín</i>	
Software Architecture and Software Quality	139
<i>Michal Žemlička and Jaroslav Král</i>	
Multi-hop Localization Method Based on Tribes Algorithm	156
<i>Alan Oliveira de Sá, Nadia Nedjah, Luiza de Macedo Mourelle, and Leandro dos Santos Coelho</i>	
Developing Tasty Calorie Restricted Diets Using a Differential Evolution Algorithm	171
<i>João Gabriel Rocha Silva, Iago Augusto Carvalho, Michelli Marlane Silva Loureiro, Vinícius da Fonseca Vieira, and Carolina Ribeiro Xavier</i>	
Using Classification Methods to Reinforce the Impact of Social Factors on Software Success	187
<i>Eudisley Anjos, Jansepetrus Brasileiro, Danielle Silva, and Mário Zenha-Rela</i>	
When to Re-staff a Late Project – An E-CARGO Approach	201
<i>Haibin Zhu, Dongning Liu, Xianjun Zhu, Yu Zhu, Shaohua Teng, and Xianzhong Zhou</i>	
An Experience of Constructing a Service API for Corporate Data Delivery.	218
<i>Itamir de Moraes Barroca Filho, Mario Melo, Cicero Alves Silva, Gibeon Soares de Aquino Jr., Vinicius Campos, and Viviane Costa</i>	
Cat Swarm Optimization with Different Transfer Functions for Solving Set Covering Problems	228
<i>Broderick Crawford, Ricardo Soto, Natalia Berrios, Eduardo Olguín, and Sanjay Misra</i>	
A Data Warehouse Model for Business Processes Data Analytics	241
<i>Maribel Yasmina Santos and Jorge Oliveira e Sá</i>	
A Novel Voting Mathematical Rule Classification for Image Recognition	257
<i>Sadrollah Abbasi, Afshin Shahriari, and Yaser Nemat</i>	
Towards a Common Data Framework for Analytical Environments	271
<i>Maribel Yasmina Santos, Jorge Oliveira e Sá, and Carina Andrade</i>	
Dependency Analysis Between PMI Portfolio Management Processes	288
<i>Ana Lima, Paula Monteiro, Gabriela Fernandes, and Ricardo J. Machado</i>	

Representation and Reasoning of Topological Relations Between Enclave and Exclave Regions	301
<i>Wan Neng, Deng Zhongliang, and Yang Guangyong</i>	
Toward a Robust Spell Checker for Arabic Text	312
<i>Mourad Mars</i>	
Geographical Communities and Virtual Communities: The Web 2.0 in the Creation of Tourist Information	323
<i>Ilaria Greco and Angela Cresta</i>	
Analysis Spreading Patterns Generated by Model	337
<i>Thiago Schons, Carolina R. Xavier, Alexandre G. Evsukoff, Nelson F.F. Ebecken, and Vinicius da F. Vieira</i>	
Confederative ERP Systems for Small-to-Medium Enterprises	350
<i>Michal Žemlička and Jaroslav Král</i>	
Longitudinal Analysis of Modularity and Modifications of OSS	363
<i>Gabriel Rolim, Everaldo Andrade, Danielle Silva, and Eudisley Anjos</i>	
State of Art Survey On: Large Scale Image Location Recognition	375
<i>Nuno Amorim and Jorge Gustavo Rocha</i>	
A Felder and Silverman Learning Styles Model Based Personalization Approach to Recommend Learning Objects	386
<i>Birol Ciloglugil and Mustafa Murat Inceoglu</i>	
Modeling Software Security Requirements Through Functionality Rank Diagrams	398
<i>Rajat Goel, M.C. Govil, and Girdhari Singh</i>	
Finding Divergent Executions in Asynchronous Programs	410
<i>Mohamed A. El-Zawawy</i>	
Is Scrum Useful to Mitigate Project’s Risks in Real Business Contexts?	422
<i>Joana Oliveira, Margarida Vinhas, Filipe da Costa, Marcelo Nogueira, Pedro Ribeiro, and Ricardo J. Machado</i>	
A Semantic Comparison of Clustering Algorithms for the Evaluation of Web-Based Similarity Measures	438
<i>Valentina Franzoni and Alfredo Milani</i>	
Rating Prediction Based Job Recommendation Service for College Students . . .	453
<i>Rui Liu, Yuanxin Ouyang, Wenge Rong, Xin Song, Cui Tang, and Zhang Xiong</i>	

Development of M-Health Software for People with Disabilities	468
<i>Suren Abrahamyan, Serob Balyan, Avetik Muradov, Vladimir Korkhov, Anna Moskvicheva, and Oleg Jakushkin</i>	
Using Formal Concepts Analysis Techniques in Mining Data from Criminal Databases and Profiling Events Based on Factors to Understand Criminal Environments	480
<i>Quist-Aphetsi Kester</i>	
Network System Design for Combating Cybercrime in Nigeria	497
<i>A.O. Isah, J.K. Alhassan, Sanjay Misra, I. Idris, Broderick Crawford, and Ricardo Soto</i>	
Clustering of Wikipedia Texts Based on Keywords	513
<i>Jalalaldin Gharibi Karyak, Fardin Yazdanpanah Sisakht, and Sadrollah Abbasi</i>	
Measure-Based Repair Checking by Integrity Checking	530
<i>Hendrik Decker and Sanjay Misra</i>	
Towards Temporal Analysis of Integrated Scenarios for Sustainable Innovation	544
<i>Alfredo Cuzzocrea, Ilaria D’Elia, Antonio De Nicola, Hugo Maldini, and Maria Luisa Villani</i>	
An Innovative Similarity Measure for Sentence Plagiarism Detection.	552
<i>Agnese Augello, Alfredo Cuzzocrea, Giovanni Pilato, Carmelo Spiccia, and Giorgio Vassallo</i>	
Critical Success Factors for Implementing Business Intelligence System: Empirical Study in Vietnam	567
<i>Quoc Trung Pham, Tu Khanh Mai, Sanjay Misra, Broderick Crawford, and Ricardo Soto</i>	
Particle Swarm Based Evolution and Generation of Test Data Using Mutation Testing	585
<i>Nishtha Jatana, Bharti Suri, Sanjay Misra, Prateek Kumar, and Amit Roy Choudhury</i>	
Business Modeling and Requirements in RUP: A Dependency Analysis of Activities, Tasks and Work Products	595
<i>Carina Campos, José Eduardo Fernandes, and Ricardo J. Machado</i>	
Conversation About the City: Urban Commons and Connected Citizenship . . .	608
<i>Maria Célia Furtado Rocha, Gilberto Corso Pereira, Elizabeth Loiola, and Beniamino Murgante</i>	

Remote Sensing Fire Danger Prediction Models Applied to Northern China . . . 624
Xiaolian Li, Wiegu Song, Antonio Lanorte, and Rosa Lasaponara

Author Index 635

Conversation About the City: Urban Commons and Connected Citizenship

Maria Célia Furtado Rocha¹, Gilberto Corso Pereira¹, Elizabeth Loiola¹,
and Beniamino Murgante²(✉)

¹ Federal University of Bahia, Salvador, Brazil
rochamcelia@gmail.com, {corso,beloi}@ufba.br

² University of Basilicata, Potenza, Italy
beniamino.murgante@unibas.it

Abstract. The analysis of conversations between Italian and Brazilian groups allows to understand meanings that inspire and motivate political demonstrations and different performances in favor of a desired city. The research takes a descriptive perspective, based on categories of analysis informed by theories, but made by the exploration of terms used in conversations caught by members of four Facebook groups. The expectation is to highlight concepts, revealed by the set of statements made by people interested in trends that city growth takes or just in the given uses of urban spaces. To provide clues for the interpretation of the talks, we use centrality indices of Social Network Analysis (SNA) in a semantic network of concepts. Thus, it is possible to establish similarities and differences between current forms of civic participation and politics on urban commons largely supported by online social networks.

Keywords: Public participation · Urban commons · Social network analysis

1 Introduction

“Public sphere” refers to the scope, area or space, socially recognized, but not institutionalized, formed by spontaneous discussion, the free movement of questions, contributions, information, views and arguments from everyday experiences of a subject. It is a network for communication content and views. Communication flows are filtered and synthesized through it, and then condensed in the public opinion [1]. Very often, the articulation of socially relevant issues is processed by sharing experiences and opinions through social media. The increase of connected people in various parts of the world, coupled with the reduction of the cost of dealing with the public allows to citizens to produce small valuable contributions [2].

These technologies make practices of social production, that alter the relationship between people and the events that surround them, possible [3]. They can give input to

CAPES (proc. n. 11527/13-7).

a public debate. Networks linking human and non-human, physically present or not [4], bring together people of different cultures, diminish territories and go beyond old boundaries and scales.

Ito and Okabe [5] suggested the emergence of a visual sharing mode via portable devices characterized by a personal, penetrating and intimate nature. This movement may indicate a change in perception of context beyond rational argument, capable of bringing together different points of view. Tursi [6] recognized that current practices in social media play some functions performed by the literary public sphere [7] that has built self-awareness, critical thinkers, reputations and synergies. According to this author, the social dynamic based on sharing experiences in everyday life manifests a kind of social bond based on sharing emotions. Therefore, we can assume that digital technologies give opportunities for the development of new practices and the creation of new social actors, that come to occupy the public sphere. Through the visibility they get, social actors can expose demands accepted as a common good and of interest for everybody.

For this study, we take the public sphere as the exercise of social practices connected to various contexts and multiple scales of social action. As a sensor of public opinion [7], the public sphere, as it is here understood, does not include principles or practices necessarily anchored in rational exchange of arguments to reach consensus. Communicative relations can contribute to increase the participation and disseminate visions of democracy, and thus to support the exercise of sovereignty by a variety of local political actors, even those “geographically immobile”. Therefore, individuals and communities could acquire visibility in international fora or in global politics previously exclusive space of national organizations [8].

Digital spaces where current problems in cities are discussed may open new possibilities for the development of new social practices and give opportunity for participation, although one can not ignore aspects that simultaneously curtail and augment that potential [9]. They allow the articulation of ideas but also of collective experiences that can enrich/challenge previously given meanings to the urban space. In this way, they put in evidence perspectives of various social actors that desire “to make the city”.

Online social networks seem to act in the public sphere. As they spread values, habits and ideals, they provide support for culture and act on implicit substratum of shared opinions that underlie the action of groups [10]. Thus, we can assume that there is an ongoing renewal of the public sphere, either through the struggle for political participation in the city, either by proper civic actions in defense of the quality of urban space.

This article is part of a broader research project, which aims to reveal visions of urban commons of groups present in digital social networks. They run some of the public participation trajectories outlined by [11]: civic and political participation. It analyzes the conversations of four Facebook groups – two from an Italian city (Potenza, southern Italy) and two from a Brazilian city (Salvador of Bahia, northeastern Brazil) to answer the following research questions: what visions of participation, citizenship and the urban commons emerge? And how do they face visions of municipal representatives?

2 The Culture of the Commons

Appealing to fundamental rights becomes very strong [12] in the twenty-first century, with the growing of inequality all over the world. The struggle for rights extends throughout the globalized world, builds new modes of action. According to this author, the fundamental principle of equality should, first, be rethought and placed at the center of attention.

In this perspective, commons are defined as an immediate and concrete guarantee of fundamental human rights, beyond the commodification logic. They are those goods that can not be subjected to pure economic logic, such as water, clean air, healthy environment, knowledge, food, health. These assets are fundamental to human existence. The Internet, for example, would be a key resource to know what happens near or far, to dialogue with others, to participate. The common good, in this case, is a good generated by the participation of everybody and, consequently, should continue to be common [13].

Commons would have a dimension in the future: they speak of social connections, because when a good is common and we use it together with others, we must defend it together. They are characterized by a shared use; every person can enjoy them that way without needing redistributive policies or implementation of a participatory model. The non-discrimination of access to the common good, leads to the issue of equality, and therefore democracy [12].

Rodotà [12, 13] proposes the resumption of the struggle for old and new commons, such as the Internet, unifying it under the banner of struggle for the rights. However, it is certainly necessary to confront issues such as those related to the concentration of resources that promote new geographies as it is demonstrated by concentration of network infrastructures that can be measured by access to the signal of WiFi networks [14]. And so all those who think of public spaces as common goods are challenged to answer questions posed by inequalities expressed in new discontinuities established in the territory. Such inequalities are reinforced by urban policies, at least in large Brazilian and Latin American cities, which tend to favor real estate investments aimed at groups of high and middle income and increase abandon and deterioration of old central areas [15].

In the context of collective movements using social network platforms, groups seek to get public attention for the reappropriation of city areas with a focus on the enjoyment of all stakeholders; further, they oppose governance conducted by public authorities and seek to take part in choices about the allocation to be given to such areas. To a greater or lesser extent, this is the case of groups here studied.

Movements shaking the Brazilian political scene in 2013, on the eve of the World Cup, have raised social justice issues, because they asked for investments in what can be considered to be a common good to all – the right of transport, health, education. The right to urban transport is clearly connected with the access to the city and therefore with the access to diverse environments where one can exercise public personas and develop skills involved in civilization [16].

In Brazil, the right to participate in urban policy decisions is legally provided since 2001. But the inability of stakeholders acting as decision-makers ultimately nullifies the use of full conditions of that right at the time that we see a degradation of the common

urban space. In Italy, the involvement of citizens in local urban policy through district contracts was strengthened in 2008 [17]. In the country, the issue of common goods (particularly water and the use of nuclear energy) mobilized 26 million people in the referendums of June 2011. At the time, Italian citizens have shown their willingness and ability to largely mobilize, independently of the media activation [18]. Today, forms of collaboration between citizens and local authorities for care, management and regeneration of urban commons have been tried in Bologna [19] and Turin [20]. Such forms promote active citizenship [21] which may turn out to be the subject of policy [22].

Our reflection leads us to assume that the informal participation practices are fundamental in urban policies, while formal instruments of participation do not collect all social instances. We must take the point of view of the expanded participation to contemplate groups who use the network communication as a mean to share visions and values to generate a knowledge of the contemporary city – the real and the desired one. And so they begin to pursue goals and to think how to achieve them. We take here the broad concept of culture that includes attitudes, mentalities and values, to study groups that constitute initiatives related to what could be called the culture of the commons. The conceptual scheme that guided the research is illustrated in Fig. 1.

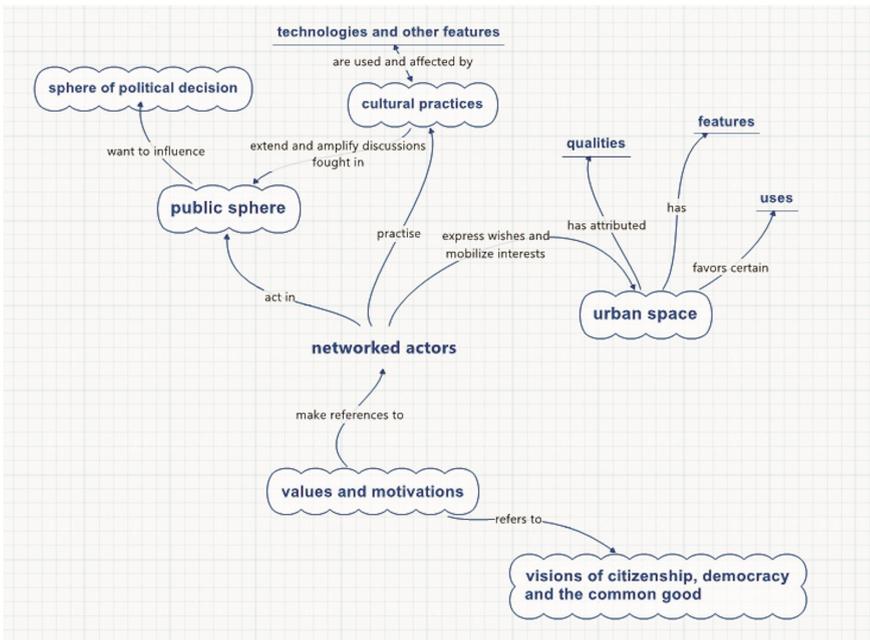


Fig. 1. The research conceptual map

3 Networked Concepts: Exploring Meanings

Conversations on Facebook pages of two Italian groups and two Brazilian groups constitute the source of the data analyzed in this paper. These groups moved ahead movements for regeneration of degraded urban areas of the city of Potenza (Italy) and Salvador (Brazil), mainly in the years 2012 and 2013.

Though the cities have very different sizes – Potenza has about 70,000 inhabitants and Salvador has 2,7 million inhabitants – there is some mirroring between Brazilian and Italian groups. Two of them directly confront the government: the Parco del Basento (Basento's Park) [54] group in Italy and the Movimento Desocupa (Vacate Movement) in Brazil. The others two groups never directly address the power. The Italian group Il Giardino in Movimento [53] (Garden in Motion) and the Brazilian group Canteiros Coletivos (Collective Yards) take care of some urban areas while trying to develop specific kinds of sociality. We verified peculiarities in the way those four groups acted in unconventional arenas of politics in their desire to reintegrate areas to collective urban life.

To analyze their performances, we used the Network Text Analysis (NTA), a method that encodes semantic links among words and constructs networks of linked concepts [23]. A concept is a single idea; a statement is two concepts and the relation between them [24]. Based on the assumption that language and knowledge can be modeled as networks of words, NTA aims to reveal meanings of terms and themes by analyzing the relations between them (existence, frequencies, and covariance) [24]. More than linkage between concepts in each block of text, concepts and linkages can be characterized by their position within the network [23]. Since we did not start from preconceived categories, this quantitative approach is first used to an inductive category development. Moreover, the quali-quantitative analysis was supported by means of the Social Network Analysis (SNA) centrality measures to identify the main terms and visions of urban commons and the desired type of citizenship.

The process of data acquisition involves two major stages, each one iteratively developed: preparation of semantic networks and identification of the main concepts. In the first stage, after reading Facebook group messages to know the most important events and phases, the work entailed the following steps:

1. Preparing texts: tag preselected posts according to the main themes: urban space, conflict with representatives, what means to be political?
2. Getting semantic networks from posts:
 - identifying concepts;
 - extracting statements (words that do not transmit content were excluded, the other ones have been generalized [24]);
 - defining coding choices: text unit = sentence (string of words limited by full stops – period, colon, question mark, exclamation point, ellipses); window size = 2 (i.e., how distant concepts can be from each other and still have a relationship) and directionality = bi-directional;
 - representing statements as a network of shared concepts.

The semantic networks were generated with AutoMap v3.0.10.36 and first visualized using ORA NetScenes version 3.0.9.9j and later using Gephi 0.8.2. Thus comments to group posts (case of Parco del Basento and Movimento Desocupa groups) and messages (case of Il Giardino in Movimento e Canteiros Coletivos groups) were modeled as networks of connected concepts that coded in its structure a semantic field represented by the proximity of nodes [25] and communities that bring together concepts strongly connected in clusters [26].

The detection of communities was carried out equally towards all networks: randomly, without knowing the structure of communities, considering edges weight, which represents the number of occurrences of a particular relationship, and fixing in 1 the resolution, a measure of stability that considers the network partition time [27].

The second stage encompassed three steps:

3. Characterizing networks: nodes were organized according to their local connections and are contextually related to their surroundings and connection paths. The following basic statistics were used [28, 29]:
 - diameter, to know the greatest distance between any two nodes of the network;
 - density for a network cohesion index, to identify how close it is to contain all possible links;
 - average degree, to know the average number of existing links to each node;
 - average path length, to know the average distance between nodes;
 - number of communities, to know how many agglomerations are there.
4. Identifying main concepts: the prominent terms (here called concepts) were identified according to the value obtained by the concepts for each of the following centrality indices [30, 31]:
 - Degree shows the number of concepts directly connected to a given concept. It focuses on the importance of a concept (node) through the connections that it establishes with its neighbors [32].
 - Closeness centrality describes how close a concept is to all other concepts. It shows, therefore, its proximity to all other concepts of the network.
 - Eigenvector centrality tells how closely a concept is to other concepts that are important in respect to Degree. The importance of a vertex (node) increases as its neighbors are important themselves. A score is assigned for each vertex, that is proportional to the sum of the scores of its neighbors [33].
 - Betweenness centrality shows how often a concept is positioned on the shortest path (geodesic) between any other pairs of concepts. Nodes located in many geodesic lines are central in a network: they allow the flow of information through the network [33].
5. Ranking of concepts: it was obtained for each index, an ordered list of the most prominent concepts for each of the networks, particularly those that occupy the top five positions in at least three of the four indexes of centrality.

Then neighborhoods and communities of the most prominent terms have been explored, since communities represent semantic contexts. The exploration of context started from a node of interest towards its neighbors [26].

The categorization of concepts occurred throughout the process of creation of networks. It helped to appoint actions, resources and qualities mentioned for the initiatives and activities of the groups, for the city and the urban elements, the existing and desired space. Categories were: “Actor”, “Action”, “Event, Institution, Initiative or Resource” and “Value, Quality and Motivation” [34]. The latter was used particularly to grasp ideas about how to exercise citizenship and the ideals of democracy and commons that support the actions and activities of the groups. These ideals were found not only in the network specifically obtained for the Policy theme, but it is also found in the following thematic networks: Urban Space, Conflict with public officials. Actors category – each individual, group, professional category or role played by individuals, entity or institution – helped to identify the agents most evidenced by the groups for their political activity.

4 City and Citizenship

Each group was involved in conversations about urban areas as a commons, therefore accessible to all. The Italian group Parco del Basento and the Brazilian group Movimento Desocupa addressed to society, representatives and public officials to express their dissatisfaction with the treatment given to urban spaces and how their occupation and use were being managed. They promoted political demonstrations and directly directed issues to the political decision sphere.

Members of the Parco del Basento group aimed to exercise their civil and political citizenship. The group advocated active, participatory citizenship (“cittadinanza attiva”) in particular with regard to decisions on the allocation of areas of the city of Potenza. Their political vision of citizenship had an abstract character, formal and centered on the state – the “received” citizenship [35] (Fig. 2).

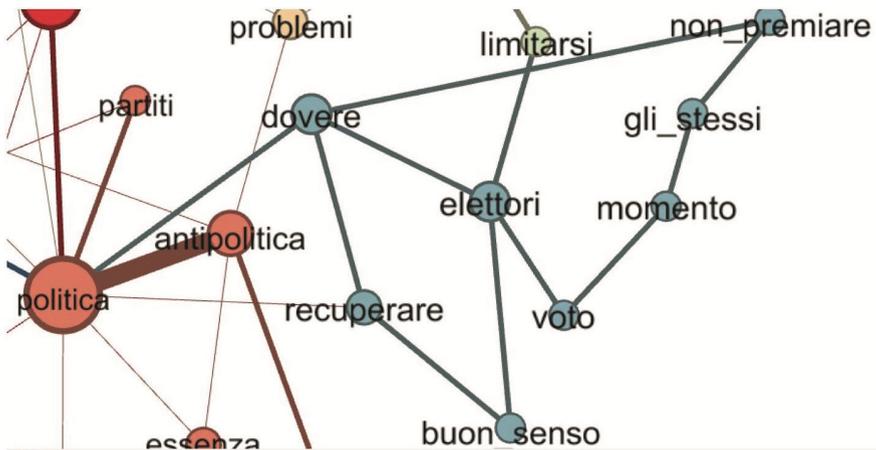


Fig. 2. Parco del Basento group – Satate-centered citizenship

However, when their members discussed the desired urban space, they assumed other perspectives. In this case, they were affiliated to an active citizenship perspective, where people propose, design and evaluate the urban space (Fig. 3). This perspective is associated to what [35] calls “acquired” citizenship, therefore it results from political struggle.

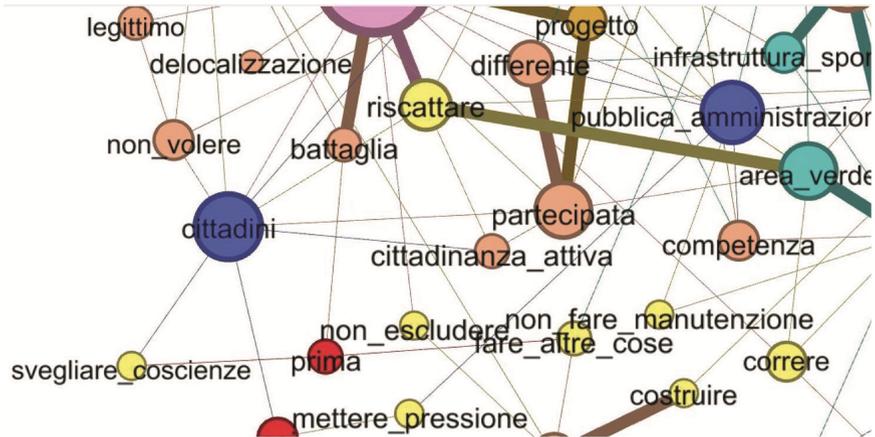


Fig. 3. Parco del Basento group – Active citizenship

In Brazil, after a period of intense protests in 2012, the growth of Movimento Desocupa faltered. Even when membership was grown, comments on the group’s Facebook page mainly focused on organizing public demonstrations. Complaints brought by group members almost never gave rise to the discussion and the search for alternative solutions to the problems of Salvador City.

In a gentrification process of a traditional central area, the group called for investments and proposed the development of a plan for the neighborhood by the residents themselves.

In general the debate was poor, an atmosphere of polarization prevailed, without any opinion becoming hegemonic. The common thread was that the movement should remain nonpartisan (“política” “não partidária”) (Fig. 4).

On the other hand, the Italian group Il Giardino in Movimento and the Brazilian group Canteiros Coletivos did not address the public authorities but other groups and civil society organizations to invite them to recover residual spaces forgotten by the public administration. They promoted civic participation aimed at upgrading these areas and used social media to share views and meanings about the city as commons.

Il Giardino in Movimento group valued a civic culture based on the ideal of the shared commons and the “do good” for others [35, 36]. At each meeting, it reiterated the pact about the value to be given to public spaces [37], made by Parco del Basento group. Figure 5 shows how participation (“partecipazione”) is directly related to the management of the space (“gestione”, “spazio”).

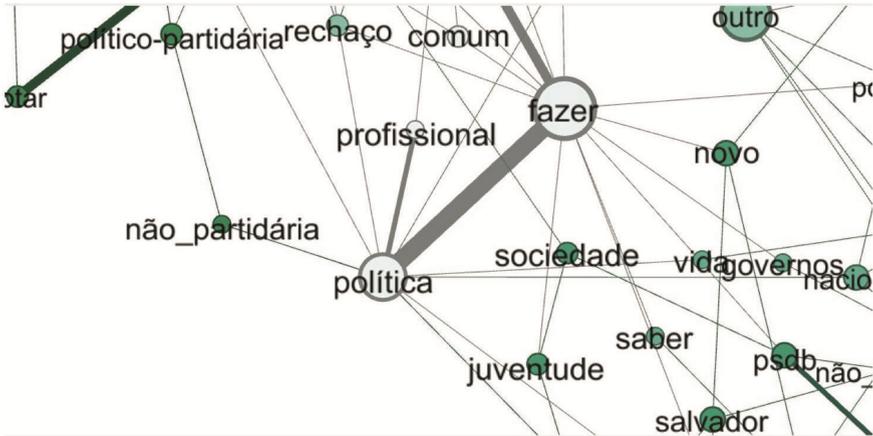


Fig. 4. Movimento Desocupa – nonpartisan



Fig. 5. Il Giardino in Movimento – participation

Regarding Canteiros Coletivos group, its participation in social projects in partnership with neighborhood communities and NGOs seems to have ensured its continuity. It aims to improve community bonds and care of urban areas by residents. While not taking a professedly political vision, the group stood against “pro-violence policy” in solidarity with the residents of a neighborhood in which they operated, after the death

of some young residents. It expanded at that time its practice beyond the idea of participation and management of urban space, without directly addressing some kind of government interference.

Figure 6 shows how participation (“participação”) means attending meetings, festivals (“festg”) and workshops (“oficinas”) for the Canteiros Coletivos group.

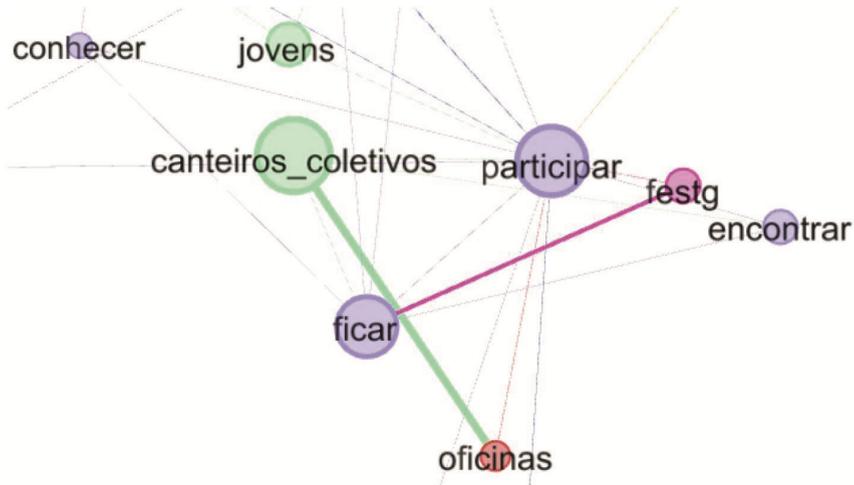


Fig. 6. Canteiros Coletivos – participation

The views of all groups on citizenship, politics and participation are summarized in Table 1.

Table 1. Citizenship, politics and participation

Group	Vision
Parco del Basento	Policy is the polis (the assembled citizens) Participation is active citizenship
Movimento Desocupa	The space for citizen political action is not the same of professional politicians Nonpartisan participation
Il Giardino in Movimento	Participation is care and management of urban space
Canteiros Coletivos	Participation is community actions to improve the quality of public space by planting and cultural interventions

5 City as Commons

Groups did actions of participation, as reported by [11], and forced the expansion of the scope of such participation, as mentioned by [38]. The defense of citizenship as a shared activity, oriented the Parco del Basento group to the realization of the common good referred to a republican tradition [39]. The Parco del Basento movement allowed a rich

political experience, not only through confrontation with the public administration. Within the group itself, there was exchange of ideas about the project itself and political action strategies. This allowed its members to experience a participatory process that persists in current initiatives aiming to rescue urban areas abandoned by the public authorities of Potenza.

On the other hand, the Movimento Desocupa group since not advocated any idea of democracy, direct or representative, remained calling for legalizing each issue of conflict in a judicial dispute. This attitude leads to a deadlock. It has origins in the weakening of representation of social conflicts currently staged by parties in traditional arenas of politics, far removed from real citizenship [22]. However the movement has played an important role in strengthening the claims of civil society for holding of public hearings to approve changes in urban land use. However audiences per se certainly fail to address issues in a city that in 2010 had more than 2.5 million inhabitants [40], with a complexity of problems that need to be addressed at a metropolitan scale.

The Il Giardino in Movimento e Canteiros Coletivos groups performances are strongly linked to the recovery of symbolic values, the strengthening of social liaisons and therefore the possibility to ensure continuity of commons [12]. However, achievements for the Canteiros Coletivos group seem to depend on self-consciousness of individuals possessing a community identity. In a world without “them” the group’s identity remains grounded in action, so to speak, “therapeutic”. Its social practice resembles those of the Il Giardino in Movimento group, but unlike this, the meaning of participation is different.

The affiliations of the studied groups to ideals of democracy can be summarized as follows:

- The Parco del Basento group stands against real estate speculation, assumes a Republican vision: links politics to a common *praxis*, preserves the quality of urban space and its use for citizens. It mobilizes citizens of Potenza City and directs its proposal to representatives, without seeking for the mediation of politicians and parties. Still, it reinforces representative democracy and, through participatory design practices of dialogic and procedural nature, it takes part in a participatory democracy framework [41]. Its keyword is “active citizenship”.
- The Movimento Desocupa comes into open conflict with the government when it repudiates political parties and politicians. It demonstrates the great dissatisfaction with the city government, but it can not draw up alternative proposals for the development of Salvador. Proposals, if any, do not become hegemonic in the movement. Without a channel of dialogue with the Executive and considering the Legislative strongly distrustful, the movement calls for the intermediation of their demands by the judiciary. Its keyword is “non-partisanship”.
- Il Giardino in Movimento group strengthens the movement for the Basento Park, and assumes participatory design practices. Their idealizations for the area are collectively selected and executed. Although not exactly inserted in politics, it strengthens and educates towards active citizenship vaunted by the Parco del Basento group. Through practices of civic culture, it constitutes resources of collective life important to the exercise of citizenship in its political dimension [42]. Its keyword is “laboratory”.

- The Canteiros Coletivos group has a vision of citizenship that approaches the communitarian one: it advocates the rescue of the cultural dimension of citizenship [43]. It acts against the degradation of areas of the city, while educating and propagating harmonized coexistence ties, believing that those lead people to attribute a common value to living in public space. Unlike the political clarity of prescriptions advocated by [44], it does not make clear what are the interests and values involved in the relationship “we/they”. When faced with issues such as urban violence, it proposes peace without bringing out the name of the actors of urban warfare. Its keyword is “community”.

In the conversations analysis of the four groups, the urban space is taken as a common good. Almost everyone joins desire and action: the meaning of what is common is produced by collective action, while space, itself, is being designed and/or produced. But this is done in different ways: while the Parco del Basento and Movimento Desocupa groups address public authorities and demonstrate clear desire to access urban areas and participate in choices about their destination, the Il Giardino in Movimento and Canteiros Coletivos groups dialogue only with their peers and sympathizers and propose to establish links between people and space by acting on it. The emphasis they place on each type of action to defend the urban commons is shown in the chart below Fig. 7.

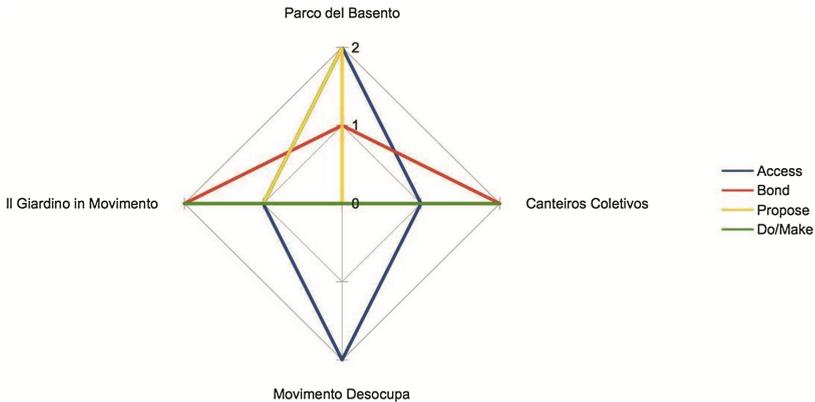


Fig. 7. Urban commons: types of action (Color figure online)

Although these groups aren't “union of people who build a project” for the whole of society, even without a comprehensive idea of the future, yet they demand things to it, and draw attention to the shared management of common space. Even if incipiently, they introduce issues as governance of commons, an institution through which the individual can be an active agent and exercises his rights of citizenship [45].

6 Conclusions

This work aimed to understand ideals and values associated to urban commons observing conversations of two Italian and two Brazilians groups Facebook pages. The central concepts were represented in semantic networks and were highlighted by centrality indices of Social Network Analysis.

The so-called “symbolic” networks [46] enabled a contextualized view of the use of terms and expressions by group members to describe their actions and thus gain insight into their views of citizenship, democracy and urban commons. If they suggest meanings attributed by the groups, certainly they can not express and communicate all meanings of speech and behavior of agents, but still they allow generalizations that reveal what motivates them.

Obtaining statements through the relationship between concepts according to a fixed distance (windows method), taking as limits the sentence, is a simplified feature. It is known that sentences combine themselves beyond these limits, in different ways, and thus guide the discourse [47]. However, we believe that the various paths of interpretation presented by semantic network, although simplistic, amplify capabilities enabled by traditional content analysis, which focuses on the co-occurrence of words [23].

If the different centrality indices contributed to highlight the most prominent concepts by the amount of times they held more central positions in each of these indices, the analysis of the particular functions of the concepts in the discourse, revealed by the indexes was left in the background. This is the case of concepts with high betweenness centrality, that can connect communities with several topics of interest and can assist in the underlying information retrieval [48].

The method used – ranking of concepts according to their position in various centrality indices – must be deepened through the analysis of each index and, then, the comparison of results. However, it was found that often the same concepts occupied the most central locations for many of the centrality indices. This may indicate that the size of networks (the largest of which had 110 nodes and 230 links) matters.

Both text encoding choices – text unit, directionality and window size – for the purpose of generation of semantic networks, as the method of selection of core concepts based on centrality indices, were adequate in relation to the level of detail needed to obtain insights to answer the research questions. Indeed, the results for the Italian groups were validated by their members. Therefore the method was effective to explore the emerging meanings of speeches, many of which remain hidden or undervalued in a traditional content analysis that “*tell us about text’s fundamental building blocks, but not the structure in which those blocks are arranged*” [49]. Our focus on networks of linked concepts rather than on counted concepts [50] proved its importance to give answers and close the conceptual schema that guided the research illustrated in Fig. 1.

Through analysis of Facebook conversations we have reached a issue almost never pointed by the groups, except in the case of Movimento Desocupa during the struggle against the gentrification of a neighborhood in Salvador: after all, “who does the city?”. The not raised question would have the power to relate the urban space to other actors certainly present in the public sphere, made in this case for those who treat the city as a

business and are more interested in the discourse in favor of “city as a growth machine” [51].

Surely if they had unveiled the role that real estate capital currently plays in urban dynamics, groups could perform more effective ways of opposing to the transfer of control of land use and occupation and urban policy-making from the public to the private sphere [52].

The question that the groups have not formulated would lead to an answer that could finally confront ideas of possible futures for the cities of Potenza and Salvador – the future that some groups point to and the one that other city actors prepare in other forums and other ways.

References

1. Gomes, W.: Esfera pública política e comunicação em *Direito e Democracia* de Jürgen Habermas. In: Gomes, W., Maia, R.C.M. (eds.) *Comunicação e Democracia. Problemas & Perspectivas*, pp. 69–115. Paulus, São Paulo (2008)
2. Shirky. *A cultura da participação: criatividade e generosidade no mundo conectado*. Zahar, Rio de Janeiro (2011)
3. Benkler, Y.: *The Wealth of Networks: How Social Production Transforms Markets and Freedom*. Yale University Press, New Haven (2006)
4. Palacios, M.: A internet como mídia e ambiente. Reflexões a partir de um experimento de rede local de participação. In: Maia, R., Castro, M.C.P.S. (orgs.) *Mídia, esfera pública e identidades coletivas*, pp. 229–244. Editora UFMG, Belo Horizonte (2006)
5. Ito, M., Okabe, D.: Intimate visual co-presence. In: 7th International Conference on Ubiquitous Computing, UbiComp, Tokyo (2005)
6. Tursi, A.: *Politica 2.0 – Blog, facebook, wikileaks: ripensare la sfera pubblica*. Mimesis Edizione, Milano (2011)
7. Habermas, J.: *Direito e Democracia: entre facticidade e validade*, 2nd edn., vol. II. Tempo Brasileiro, Rio de Janeiro (2003)
8. Sassen, S.: *Sociologia da Globalização*. Artmed, Porto Alegre (2010)
9. Papacharissi, Z.: The virtual sphere: the internet as a public sphere. *New Med. Soc.* 4(1), 9–27 (2002)
10. Landi, S.: Opinioni silenziose. Per una storia della dimensione non discorsiva della sfera pubblica. In: Rospoche, M. (ed.) *Oltre la sfera pubblica. Lo spazio della politica nell’Europa moderna*, pp. 55–84. il Mulino, Bologna (2013)
11. Dahlgren, P.: Reinventare la partecipazione. *Civic agency* e mondo della rete. In: Bartoletti, R., Faccioli, F. (cura) *Comunicazione e civic engagement. Media, spazi pubblici e nuovi processi di partecipazione*, pp. 17–37. Franco Angeli, Milano (2013)
12. Rodotà, S.: *Il diritto di avere diritti*. Ed. Laterza, Roma-Bari (2012)
13. Rodotà, S.: *La democrazia e il bene comune*. In: Gallina, E. (cura) *Vivere la democrazia*, pp. 83–96. Edizioni Gruppo Abele ONLUS, Torino (2013)
14. Varnelis, K.: *The Centripetal City: Telecommunications, the Internet, and the Shaping of the Modern Urban Environment*, vol. 17. Cabinet Magazine (2005)
15. Carvalho, I., Pereira, G.C.: Estrutura social e organização social do território na Região Metropolitana de Salvador. In: Carvalho, I., Pereira, G.C. (org.) *Salvador: transformações na ordem urbana: metrópoles: território, coesão social e governança democrática*. pp. 138–177. Letra Capital/Observatório das Metrópoles, Rio de Janeiro (2014)
16. Bauman, Z.: *Modernidade Líquida*. Zahar, Rio de Janeiro (2001)

17. Bifulco, L.: *Governance* e territorialização: o *welfare* local na Itália entre fragmentação e inovação. *Cadernos Metr pole* **14**(27), 41–57 (2012)
18. Morcellini, M.: Le cose della comunicazione che non abbiamo capito. In: Bartoletti, R., Faccioli, F. (cura) *Comunicazione e civic engagement*. Media, spazi pubblici e nuovi processi de partecipazione, pp. 86–96. Franco Angeli, Milano (2013)
19. Comune di Bologna. Iperbole rete civica. <http://comunita.comune.bologna.it/beni-comuni>
20. Torino Social Inovation. <http://www.torinosocialinnovation.it/a-torino-cittadini-e-comune-insieme-per-i-beni-comuni/>
21. Rodot , S.: Introduzione. In: MBS Consulting (cura). *Beni Comuni*, pp. 9–20. Feltrinelli, Milano (2015)
22. Sodr , M.: *A ci ncia do comum: notas para o m todo comunicacional*. Vozes, Petr polis/RJ (2014)
23. Popping, R.: *Computer-Assisted Text Analysis*. SAGE, London (2000)
24. Diesner, J., Carley, K.M.: *AutoMap1.2 – extract, analyze, represent, and compare mental models from texts*, Pittsburgh, Carnegie Mellon University, School of Computer Science (2004)
25. Danowski, J.A.: Computer-mediated communication: a network-based content analysis using a CBBS conference. *Commun. Yearb.* **6**, 905–924 (1982)
26. Drieger, P.: Semantic network analysis as a method for visual text analytics. *Procedia – Soc. Behav. Sci.* **79**, 4–17 (2013)
27. Fortunato, S.: Community detection in graphs. *Phys. Rep.* **486**, 75–174 (2010)
28. Barab si, A-L.: *Network Science Book* (2012). <http://barabasi.com/networksciencebook/>
29. Clauset, A., Newman, M.E.J., Moore, C.: Finding community structure in very large networks. *Phys. Rev. E* **70**(6), 066111 (2004)
30. Freeman, L.C.: A set of measures of centrality based on betweenness. *Sociometry* **40**(1), 35–41 (1977)
31. Bonacich, P., Lloyd, P.: Eigenvector-like measures of centrality for asymmetric relations. *Soc. Netw.* **23**(3), 191–201 (2001)
32. Fadigas, I.S., Trazibulo, H., Senna, V., Moret, M.A., Pereira, H.B.B.: An lise de redes sem nticas baseada em t tulos de artigos de peri dicos cient ficos: o caso dos peri dicos de divulga o em educa o matem tica. *Educa o Matem tica Pesquisa* **11**(1), 167–193 (2009)
33. Fadigas, I.S.: *Difus o do Conhecimento em Educa o Matem tica sob a perspectiva das Redes Sociais e Complexas*. Tese de Doutorado, Salvador (2011)
34. Rocha, M.C.F., Pereira, G.C., Murgante, B.: City visions: concepts, conflicts and participation analysed from digital network interactions. In: Gervasi, O., et al. (eds.) *ICCSA 2015. LNCS*, vol. 9156, pp. 714–730. Springer, Heidelberg (2015)
35. Dahlgren, P.: *Media and Political Engagement: Citizens, Communication and Democracy*. Cambridge University Press, Cambridge (2009)
36. Amin, A.: Collective culture and urban public space. *City* **12**(1), 5–24 (2008)
37. Resweber, J.-P.: *A Filosofia dos Valores*. Livraria Almedina, Coimbra (2002)
38. Carpentier, N.: The concept of participation. If they have access and interact, do they really participate. *Revista Fronteiras - estudos midi ticos*, **14**(2), 164–177 (2012)
39. Held, D.: *Models of Democracy*. Stanford University Press, California (2006)
40. BGE: Censo 2010. Cidades. <http://cod.ibge.gov.br/GBB>
41. Deplano, C.: *Antropologia Urbana. Societ  Complexe e Democrazia Partecipativa*. Edicom Edizioni, Monfalcone (2009)

42. Artieri, G.B.: Connessi in pubblico: sfera pubblica e civic engagement tra mainstream media, blog e siti di social network. In: Bartoletti, R., Faccioli, F. (cura) *Comunicazione e civic engagement. Media, spazi pubblici e nuovi processi di partecipazione*, pp. 97–116. Franco Angeli, Milano (2013)
43. Bakardjieva, M.: Subactivism: lifeworld and politics in the age of the internet. *Inf. Soc.* **25**(2), 91–104 (2009)
44. Mouffe, C.: *The Democratic Paradox*. Verso, London, New York (2009)
45. Sacconi, L.: Introduzione. *Visione Nuova, Ragionevoli Proposte*. In: Sacconi, L., Ottone, S. (cura). *Beni comuni e cooperazione*, pp. 7–31. Bologna, il Mulino (2015)
46. Watts, D.J.: The “new” science of networks. *Ann. Rev. Sociol.* **30**, 243–270 (2004)
47. Neves, M.H.: *Gramática de usos de português*. Ed. Unesp, São Paulo (2011)
48. Paranyushkin, D.: *Visualization of Text’s Polysingularity Using Network Analysis*. Nodus Lab, Berlin (2012)
49. Carley, K., Palmquist, M.: Extracting, representing, and analyzing mental models. *Soc. Forces* **70**(3), 601–636 (1992)
50. Carley, K.: Coding choices for textual analysis: a comparison of content analysis and map analysis. *Sociol. Methodol.* **23**, 75–126 (1993)
51. Molotch, H.: Growth machine links: up, down, and across. In: Jonas, A.E.G., Wilson, D. (eds.) *The Urban Growth Machine. Critical perspectives, Two Decades Later*, pp. 247–265. State University of New York, New York (1999)
52. Carvalho, I., Pereira, G.C.: A Cidade como Negócio. *EURE* **39**(118), 5–26 (2013)
53. Lorusso, S., et al.: Involving citizens in public space regeneration: the experience of “garden in motion”. In: Murgante, B., et al. (eds.) *ICCSA 2014, Part II. LNCS*, vol. 8580, pp. 723–737. Springer, Heidelberg (2014). doi:[10.1007/978-3-319-09129-7_52](https://doi.org/10.1007/978-3-319-09129-7_52)
54. Murgante, B.: Wiki-planning: the experience of Basento Park in Potenza (Italy). In: Borruso, G., Bertazzon, S., Favretto, A., Murgante, B., Torre, C. (eds.) *Geographic Information Analysis for Sustainable Development and Economic Planning: New Technologies*, pp. 345–359. Information Science Reference IGI Global, Hershey (2012). doi:[10.4018/978-1-4666-1924-1.ch023](https://doi.org/10.4018/978-1-4666-1924-1.ch023)