Network Analysis

IMD 1155

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UFRN UNIVERSIDADE FEDERAL DO RIO GRANDE DO NORTE

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Campos do Saber

Bioinformática

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Código	Disciplina	Nível	CH	Tipo
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IMD1152	Coleta e raspagem de dados	Graduação	60	Optativa
IMD1153	Análise Visual dos Dados	Graduação	60	Optativa
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IMD1101	Aprendizado de Máquina	Graduação	60	Optativa
IMD1155	Análise de Redes	Graduação	60	Optativa

Data Science is an interdisciplinary field that use scientific methods, processes, algorithms and systems to extract knowledge and insights from structure and unstructured data.

Data Scientists use data to answer questions.

Graph Data Science is an science-driven approach to gain knowledge from the relationships and structures in data, typically to power predictions.

Data Scientists use relationships to answer questions.

Junckes, Ivan Jairo et al. PODER E DEMOCRACIA: UMA ANÁLISE DA REDE DE FINANCIAMENTO ELEITORAL EM 2014 NO BRASIL. Revista Brasileira de Ciências Sociais [online]. 2019, v. 34, n. 100.

Kaminski et al., 2018, "Moviegalaxies - Social Networks in Movies", Harvard Dataverse, V3

https://moviegalaxies.com

The Matrix (1999)

The Lord of the Rings: The Fellowship of the Ring (2001)

Adjacency Matrix

	S	B	T	LL	J	I	BT	F	ES
S	0	1	0	0	0	0	0	0	0
B	1	0	1	0	0	0	0	0	0
T	0	1	0	1	0	0	0	0	0
LL	0	0	1	0	1	0	0	0	0
J	0	0	0	1	0	1	0	1	0
I	0	0	0	0	1	0	1	0	0
BT	0	0	0	0	0	1	0	0	0
F	0	0	0	0	1	0	0	0	1
ES	0	0	0	0	0	0	0	1	0

Alves, G.; Marques, D.; Silva, I.; Guedes, L.A.; da Silva, M.d.G. A Methodology for Dependability Evaluation of Smart Grids. *Energies* **2019**, *12*, 1817. https://doi.org/10.3390/en12091817

The quickest route along primary roadways to Washington D.C. from any point in the United States
@r/dataisbeautiful/

https://statsbomb.com/

@karim_douieb

Only 6% of Brussels streets are named after women. Open Knowledge BE organized the production of these statistics with the help of 60 volunteers who tagged the gender of each street in Brussels.

https://www.karim.news/project/street-gender

Noisy City

Audible data visualization on Brussels noise pollution.
Crank up the volume and mouse over the city.

https://noisy-city.jetpack.ai/

Milanlouei, S., Menichetti, G., Li, Y. *et al.* A systematic comprehensive longitudinal evaluation of dietary factors associated with acute myocardial infarction and fatal coronary heart disease. *Nat Commun* 11, 6074 (2020)

Appetite 159 (2021) 105048

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journal homepage: www.elsevier.com/locate/appet

Research review

The contribution of network science to the study of food recipes. A review paper

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A B S T R A C T

Recently, scholars have applied network science, which examines interconnected systems, to the study of food recipes. By examining the current literature, this review paper analyses the contribution of network science to recipes, and finds evidence of two main contributions. First, the pioneer studies showed the potential of network science for reducing the complexity of recipes and proposing theories to model ingredient pairings and recipe evolution. The second contribution built upon the previous theories and expanded them to cover different regions of the world as the field moved towards understanding the granularity of human culture with rich and detailed studies that examine different cuisines as more recipe datasets became available. Network science studies of recipes allowed researchers to discover insights in recipes to explain sociocultural aspects of cuisines, and include large numbers of recipes in the analysis, which would be nearly impossible using other techniques.

1. Introduction

Network science is a well-established quantitative method that researchers use when studying relationships in systems. Scholars have recently adopted this methodology to study recipes, where recipe networks might have ingredients, preparation techniques, and recipe titles linked to one another and in doing so, has made many contributions to the food studies literature. This paper presents a review of the literature

Catanzaro, 2004), among other academic disciplines. Network science was first used in 1736 in mathematics (Barabási and Pósfai 2016) and the 1940s in sociology (Moreno, 1945), and has gained popularity in the 21st century as it empowers "everything from Google to Facebook, CISCO, and Twitter" (Barabási and Pósfai 2016).

Since the late 2000s, a combination of factors –such as the recent abundance of recipes on the Internet, a general growing social interest in food, and food politics movements– led to the emergence of a body of

https://reticular.hypotheses.org/1879

@jacomyma https://abre.ai/phd-defense

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SMIC

#followthemoney

+10x publicações
+15x citações
+15x pub. Top 10%

#IceBreaker

https://abre.ai/icebreaker

Historical Context of Network Analysis

30's - 1953

Who would you like to sit next to at the dinner table (1932 - 1938)?

Milgram, Stanley (May 1967). "The Small World Problem". Psychology Today. Ziff-Davis Publishing Company.

https://research.fb.com/blog/2016/02/three-and-a-half-degrees-of-separation/

The Strength of Weak Ties[1]

1973

Mark S. Granovetter
Johns Hopkins University

Analysis of social networks is suggested as a tool for linking micro and macro levels of sociological theory. The procedure is illustrated by elaboration of the macro implications of one aspect of small-scale interaction: the strength of dyadic ties. It is argued that the degree of overlap of two individuals' friendship networks varies directly with the strength of their tie to one another. The impact of this principle on diffusion of influence and information, mobility opportunity, and community organization is explored. Stress is laid on the cohesive power of weak ties. Most network models deal, implicitly, with strong ties, thus confining their applicability to small, well-defined groups. Emphasis on weak ties lends itself to discussion of relations *between* groups and to analysis of segments of social structure not easily defined in terms of primary groups.

A fundamental weakness of current sociological theory is that it does not relate micro-level interactions to macro-level patterns in any convincing way. Large-scale statistical, as well as qualitative, studies offer a good deal of insight into such macro phenomena as social mobility, community organization, and political structure. At the micro level, a large and increasing body of data and theory offers useful and illuminating ideas about what transpires within the confines of the small group. But how interaction in small groups aggregates to form large-scale patterns eludes us in most cases.

I will argue, in this paper, that the analysis of processes in interpersonal networks provides the most fruitful micro-macro bridge. In one way or another, it is through these networks that small-scale interaction becomes translated into large-scale patterns, and that these, in turn, feed back into small groups.

Sociometry, the precursor of network analysis, has always been curiously peripheral—invisible, really—in sociological theory. This is partly because it has usually been studied and applied only as a branch of social psychology; it is also because of the inherent complexities of precise network analysis. We have had neither the theory nor the measurement and sampling techniques to move sociometry from the usual small-group level to that of larger structures. While a number of stimulating and suggestive

[1] This paper originated in discussions with Harrison White, to whom I am indebted for many suggestions and ideas. Earlier drafts were read by Ivan Chase, James Davis, William Michelson, Nancy Lee, Peter Rossi, Charles Tilly, and an anonymous referee; their criticisms resulted in significant improvements.

Who can help more in a job search: a close friend or an acquaintance?

Published: 04 June 1998

Collective dynamics of 'small-world' networks

Duncan J. Watts & Steven H. Strogatz

Nature **393**, 440–442 (1998) | Cite this article

57k Accesses | **23664** Citations | **385** Altmetric | Metrics

Abstract

Networks of coupled dynamical systems have been used to model biological oscillators[1,2,3,4], Josephson junction arrays[5,6], excitable media[7], neural networks[8,9,10], spatial games[11], genetic control networks[12] and many other self-organizing systems. Ordinarily, the connection topology is assumed to be either completely regular or completely random. But many biological, technological and social networks lie somewhere between these two extremes. Here we explore simple models of networks that can be tuned through this middle ground: regular networks 'rewired' to introduce increasing amounts of disorder. We find that these systems can be highly clustered, like regular lattices, yet have small characteristic path lengths, like random graphs. We call them 'small-world' networks, by analogy with the small-world phenomenon[13,14] (popularly known as six degrees of separation[15]). The neural network of the worm *Caenorhabditis elegans*, the power grid of the western United States, and the collaboration graph of film actors are shown to be small-world networks. Models of dynamical systems with small-world coupling display enhanced signal-propagation speed, computational power, and synchronizability. In particular, infectious diseases spread more easily in small-world networks than in regular lattices.

"We hope that our work will stimulate further studies of smallworld networks. Their distinctive combination of high clustering with short characteristic path length cannot be captured by traditional approximations such as those based on regular lattices or random graphs. Although **small-world** architecture has not received much attention, **we suggest that it will probably turn out to be widespread in biological, social and man-made systems, often with important dynamical consequences.**"

The Oracle of Bacon

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Lázaro Ramos has a Bacon number of 3. Find a different link

Lázaro Ramos
was in
Lower City
with
Wagner Moura
was in
Elysium
with
Faran Tahir
was in
Picture Perfect
with
Kevin Bacon

Kevin Bacon to Lázaro Ramos Find link More options >>

http://oracleofbacon.org/

https://sites.google.com/a/binghamton.edu/netscied/

NETSCIED (NETWORK SCIENCE IN EDUCATION) IS AN INTERNATIONAL INITIATIVE WHOSE CENTRAL GOAL IS TO RAISE THE LEVEL OF NETWORK LITERACY FOR EVERYONE BY BRINGING NETWORK SCIENCE INTO TEACHING AND LEARNING.

NetSciEd has evolved in response to escalating activity in the field of network science, and the urgent need for citizens to be able to access the field through education channels. NetSciEd reflects the multiple efforts underway in pursuit of this goal: intensive workshops for students, introductory workshops open to the public, participation in public science festivals, professional development for teachers, development of network literacy principles, curriculum development, YouTube videos and online courses – plus much more, all of which you will find here.

http://networkdatascience.ceu.edu/

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PROGRAMS | PEOPLE | RESEARCH | EVENTS | WHAT'S UP AT DNDS

Inequality, Social Network Segregation and Urban Topology

New paper by Johannes Wachs and János Kertész in Nature Communications.

Read more

The **Department of Network and Data Science** at the Central European University carries out research in network science, with a special focus on the foundations and applications of network science to practical data-driven problems. The Department organizes a BA program in Quantitative Social Sciences as well as hosts a PhD Program and an Advanced Certificate Program in Network Science.

Data science tools and the network science approach offer a unique perspective to tackle complex problems, impenetrable to linear-proportional thinking. Building on decades of development of fundamental understanding of networks, the modern data deluge has opened up unprecedented opportunities to study and understand the structure and function of social, economic, political and information systems. The concept of networks has become indispensable in the social, information, biological, and physical sciences. Data-driven network science aims at explaining complex

Link Prediction

Link Prediction
59 benchmarks
377 papers with code

Dynamic Link Prediction
3 papers with code

Calibration for Link Prediction
1 papers with code

Anchor link prediction

Graph Embedding

Graph Embedding
2 benchmarks
208 papers with code

Knowledge Graph Embedding
1 benchmark
75 papers with code

Knowledge Graph Embeddings
49 papers with code

Dynamic graph embedding
4 papers with code

Structural Node Embedding
2 papers with code

See all 6 tasks

Node Classification

Node Classification
68 benchmarks
303 papers with code

Heterogeneous Node Classification
1 benchmark
4 papers with code

https://paperswithcode.com/area/graphs

Course Syllabus

1. Fundamentals of Network Analysis
2. Small Worlds Theory
3. Hubs
4. Communities
5. Targeted and Weighted Networks;
6. Network Models
7. Case Studies
    a. Social Networks
    b. Documents
    c. Community Detection
    d. Anomalies and others.

2021 JUNE

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Printable Calendar From Wishshi.com

2021 JULY

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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2021 AUGUST

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

2021 SEPTEMBER

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

1. https://medium.com/criteo-engineering/top-applications-of-graph-neural-networks-2021-c06ec82bfc18
2. https://github.com/DeepGraphLearning/LiteratureDL4Graph
3. https://twitter.com/xbresson/status/1346314115640295426
4. https://www.dropbox.com/s/sig9x7orjl6c9qu/lecture15_recent_graph_neural_netorks.pdf
5. https://theinnovator.news/how-knowledge-graphs-will-transform-data-management-and-business/
6. http://networksciencebook.com/
7. https://www.notion.so/SP21-Network-Science-e05e1b86550f4c349bfa66e1d8a40faa
8. https://www.youtube.com/watch?v=C_90gkDWnLE&list=PL9HI4pk2FsvUvR7T9Tjd9QMj7n6WtWTpc

Clone me!!!!

https://github.com/ivanovitchm/network_analysis