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Are we connected? Network analysis in the Society

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Network analysis is a traditional field of study, but it has been investigated in recent times due to the evolution of digital communication technologies. Discoveries in this area change our perception of how social relationships influence the way information is spread and which habits are adopted.

Social science experts have been studying this domain of knowledge for over a century. Social network analysis is the process of investigating structures of social relationships in a set called a network. But what is a network? It is nothing more than a collection of elements (nodes) and connections between these elements (edges), determining the relations of influence between them.

This concept is formalized in graph theory, a branch of mathematics that studies relationships between objects in a set, seeking to understand how the behavior of that set works, called network dynamics. However, many set formations can be represented by graphs, allowing several practical problems to be analyzed using this theory.

In 1929, Frigyes Karinthy suggested that any six people are separated by a maximum of six relationship connections. This idea was popularized in 1990, through a game designed by John Guare, where two actors have to be connected to each other in up to six types of connection. This phenomenon ends up showing that even without having a direct connection between two actors, there is a type of connection that makes them relate.

Knowing the properties of a network can explain, for example, why certain less qualified people are more favored than people more qualified for a function. This may be because these less qualified people benefit from the network dynamics they are inserted in. This example presents the idea that the configuration of the collective can influence the reality of the parties.

Networks can have targeted relationships, in which an element follows a one-way path towards another element, for example, if one person follows another on Twitter or Instagram, they can have undirected relationships. These interactions do not have a single meaning between one element and another, such as Facebook friends or LinkedIn connections, as both need to be connected for this relationship to occur.

The connections we are part of influence the way we see and understand the world

Networks can also be co-interactions. Several elements are present in the same interaction, such as the use of twitter hashtags, as they do not need to be connected to each other directly to relate, but rather to have a common element to allow that connection to occur. And there may

also be an affiliation network, where these definitions of elements belonging to a group are very different from each other, that is, although there is no direct connection between members, they belong to the same group, for example, users who receive specific recommendations for YouTube videos or Spotify music.

Social networks are different from social media. The latter are digital media that enable collaborative interaction from the creation and sharing of content. Social networks consist of the very interaction between social actors, which can range from social media to economic, geographic, biological, and anthropological actors.



Analyzing social media as social media is just one possible form of interpretation. The new possibilities arising from digital communication allow this type of method to be more easily measurable, so that we can better understand the functioning of the dynamics of current networks that we are inserted in.

An important scholar of analysis of social networks on the internet, Raquel Recuero, says in her studies with social media that the people with whom we are connected on the networks influence our way of seeing and understanding the world.

An idea widely used in Jim Rohn speeches is that we are the average of the five people who spend the most time together. This influence does not work exactly like that. Nicholas Christakis and James Fowler conducted social studies that complement this discourse with the indication that this influence is much more dispersed and may include people we have never met. They indicate in their study that we need to examine the entire configuration of the network that we are included in, because the habits of others who are connected with whom we relate to can influence our own individual habits.

Damon Centola elucidates in his book **Theory of complex contagion** that, contrary to how simple information spreads in a viral network, as is the case with a job opportunity, needing only a simple contagion to spread; complex information needs much more than a simple contact to be adopted, such as an application to install, where a more elaborate contagion scheme is needed.

According to this theory, complex information, such as the adoption of behaviors ranging from health habits to political positioning, requires not only a simple contagion between an individual and another in the network to spread, but also needs reinforcement of the network where the individual is inserted. This reinforcement has at least four social mechanisms to explain why this complex contagion needs reinforcement of the network: complementarity, credibility, legitimacy, and emotional contagion.

The social mechanism of complementarity indicates that the value of the behavior increases according to the increase in the number of adoptions of that behavior. As for credibility, the more people adopt a behavior, the

more it may be worth the cost of adopting it. The legitimacy mechanism points out that the more people adopt a behavior, the greater the expectation that other people will approve the adoption decision and the lower the risk of embarrassments or sanctions. Finally, the mechanism of emotional contagion indicates that euphoria is positively associated with other people's adoption of behavior.

If we are really connected, we notice that we are not only influenced in our habits by the connections that are part of our network, but we also play an influential role in this network, contributing to the spread of collective phenomena that modify social ways of seeing and understanding the world. The understanding and better use of the network reinforcement mechanisms serve as a critical aid and enable more conscious decision-making concerning the networks we are part of.



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This article is a result of the authors' ascertainment and analysis, without compulsorily reflecting CEST's opinion.