Department of Network and Data Science | CENTRAL EUROPEAN UNIVERSITY

THRESHOLD DRIVEN CONTAGION ON WEIGHTED NETWORKS DEVELOPMENT

A TALK BY

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ABSTRACT | Weighted networks capture the structure of complex systems where interaction strength is meaningful. This information is essential to a large number of processes, such as threshold dynamics, where link weights reflect the amount of influence that neighbors have in determining a node's behavior. Despite describing numerous cascading phenomena, such as neural firing or social contagion, the modeling of threshold dynamics on weighted networks has been largely overlooked. We fill this gap by studying a dynamical threshold model over synthetic and real weighted networks with numerical and analytical tools. We show that the time of cascade emergence depends non-monotonously on weight heterogeneities, which accelerate or decelerate the dynamics and lead to non-trivial parameter spaces for various networks and weight distributions. Our methodology applies to arbitrary binary state processes and link properties and may prove instrumental in understanding the role of edge heterogeneities in various natural and social phenomena.

Reference:

Unicomb, Samuel, Gerardo Iñiguez, and Márton Karsai. "Threshold driven contagion on weighted networks." Scientific reports 8.1 (2018): 3094.
https://www.nature.com/articles/s41598-018-21261-9

BIO | Gerardo is an Assistant Professor at the Department of Network and Data Science at CEU, a visiting researcher at Aalto University (Finland) and UNAM (Mexico), and co-founder at Predify (Mexico). The researcher in him likes complex systems, networks, computational social science, and data science. He also writes fiction and co-develops video games on the side. Find out more on his website at: www.gerardoiniguez.com.