WHAT IS AN ONLINE SOCIAL NETWORK?

A set of relationships between entities

WHAT IS A (REAL LIFE) SOCIAL NETWORK?

Network Science: Graph Theory 2012

Relationships (Networks) and Graphs

CS 115: COMPUTING FOR THE SOCIO-TECHNO WEB
THE FUN AND THE FEAR OF ONLINE SOCIAL NETWORKS
Social network analysis is grounded in the observation that social actors are interdependent and that the links among them have important consequences for every individual and for all of the individuals together. ... 

Relationships provide individuals with opportunities and, at the same time, potential constraints on their behavior. ... 

Social network analysis involves theorizing, model building and empirical research focused on uncovering the patterning of links among actors. It is concerned also with uncovering the antecedents and consequences of recurrent patterns. [Linton C. Freeman, UC-Irvine]
**Definition:**
A path is a sequence of nodes \((v_1, \ldots, v_k)\) such that for any adjacent pair \(v_i\) and \(v_{i+1}\), there’s an edge \(e_{i,i+1}\) between them.

**Examples of Social Networks**

What do you observe?

**Path Length**

Definition: The length of a path is the number of edges it contains.
**Definition:**
The distance between nodes \( v_i \) and \( v_j \) is the length of the shortest path connecting them.

Kevin Bacon number = distance between actor and Bacon
ERDŐS NUMBERS

Erdős wrote 1500+ papers with 507 co-authors.
Number of links required to connect scholars to Erdős, via co-authorship of papers
What type of graph do you expect?
Jerry Grossman (Oakland Univ.) website allows mathematicians to compute their Erdős numbers:
http://www.oakland.edu/enp/

Connecting path lengths, among mathematicians only:
• avg = 4.65
• max = 13

FAMOUS DISTANCES

Paul Erdős number

nodes = \{mathematicians\}
edges = if 2 mathematicians co-author a paper

Erdős number = distance between mathematician and Erdos

PROUD PEOPLE!
FAMOUS DISTANCES

Erdős number of ... = 4

Erdos → Fan Chung → F.T. Leighton → P.T. Metaxas

YOU = Bill Gates

if you publish with Takis!
Confirmed: Echo chambers exist on social media. So what do we do about them?

By Christine Emba  July 14, 2016