Effective Learning Networks

The ‘Groups Versus Networks’ Argument Explained

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- Status of the Theory
- Elements of Networks
- Network Learning
- Networks Functionality
- Effective Networks

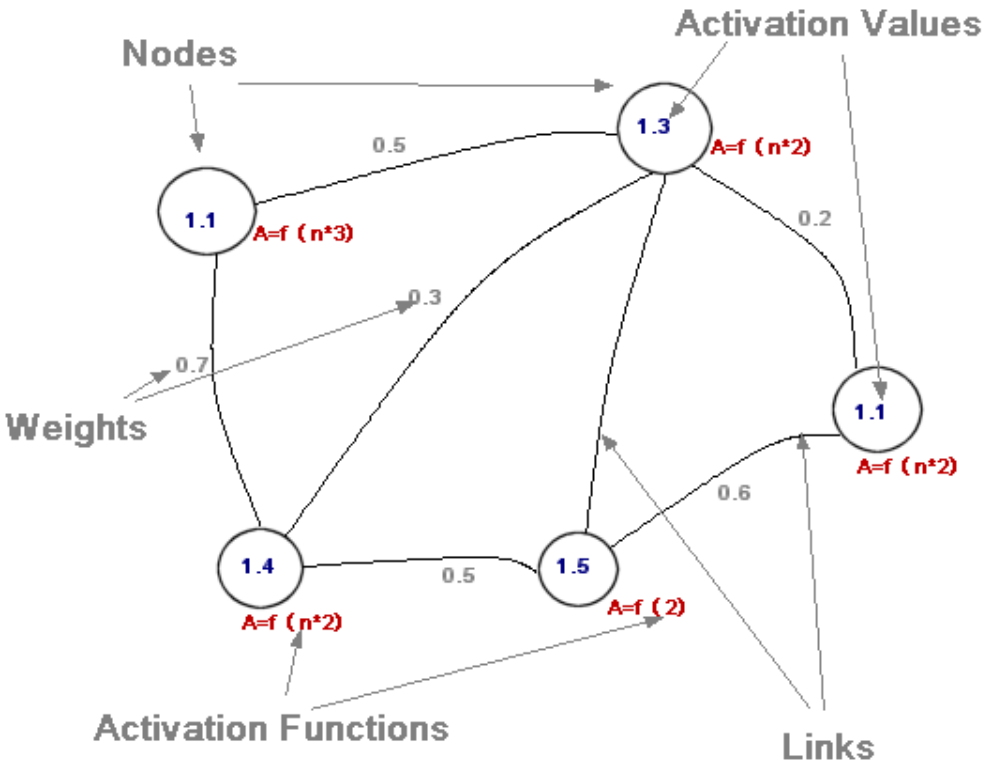
Status of the Theory

- Connectivism is an empirical theory intended to describe how learning occurs
- It is based in observations and evidence from a variety of related empirical theories:
  - connectionism, in computer science
  - associationism, in philosophy and psychology
  - graph theory, in mathematics
  - social network theory

- Connectivism doesn’t have a ‘message’
  - it doesn’t require adherence or belief
  - it’s not a political movement
- Connectivism doesn’t argue, it *describes*
  - it is intended to describe the world as we see it
  - it explains why we are developing e-learning as a distributed and networked process
- It is relativistic, but not a free-for-all

Elements of Networks

- This is a review from an earlier week…



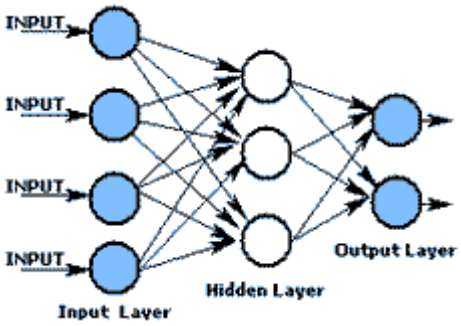
Network Learning

- ‘Knowledge’ in a network is the set of connections…
  - To ‘know’ P is not to have a characteristic set of connections that we can point to and say ‘This is knowing that P’
  - Rather, it is to have any of many possible sets of connections such that input characteristic of ‘P’ produces output characteristic of ‘knowing that P’

- ‘learning’ in a network is the development of the connections to produce knowledge
  - ‘plasticity’ – the idea that new connections may be formed, existing connections may be lost
  - ‘adjustment’ – the idea that connection *weights* may be adjusted
- ‘experience’ in a network is the activation of nods through inputs
  - learning occurs as a result of experience

- Networks function through ‘spreading activation’ – ie., one node is activated, then another, etc.
- It is this activity that impacts plasticity or the adjustment of weights

Input →



→ Output

perceiving → sensing, feeling, thinking, deciding → behaving

- Network Learning Mechanisms
  - Hebbian associative
  - Proximity / contiguity based
  - Back-propagation
  - Boltzmann - settling
- Note: whether a given system, or any system, uses these is an empirical matter
- Other mechanisms (eg. Selective attraction) may also be at work

Types of Networks

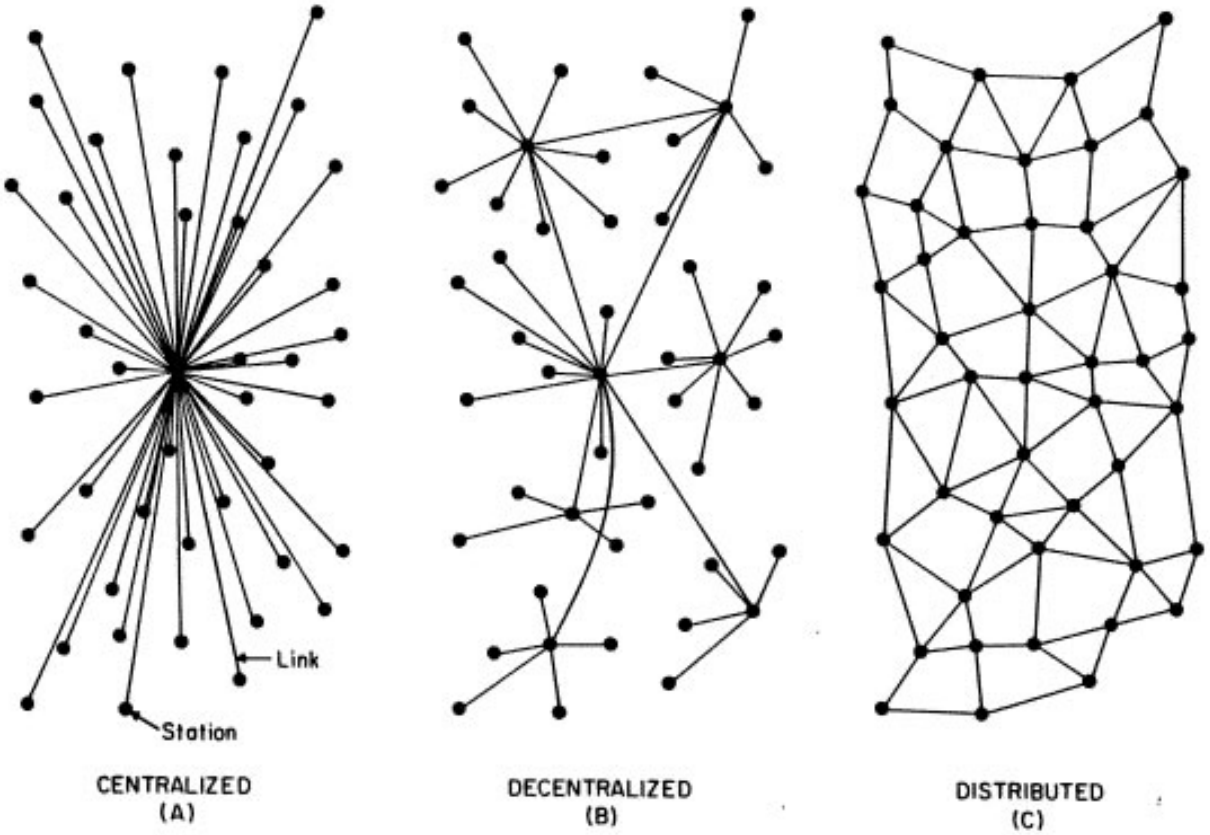
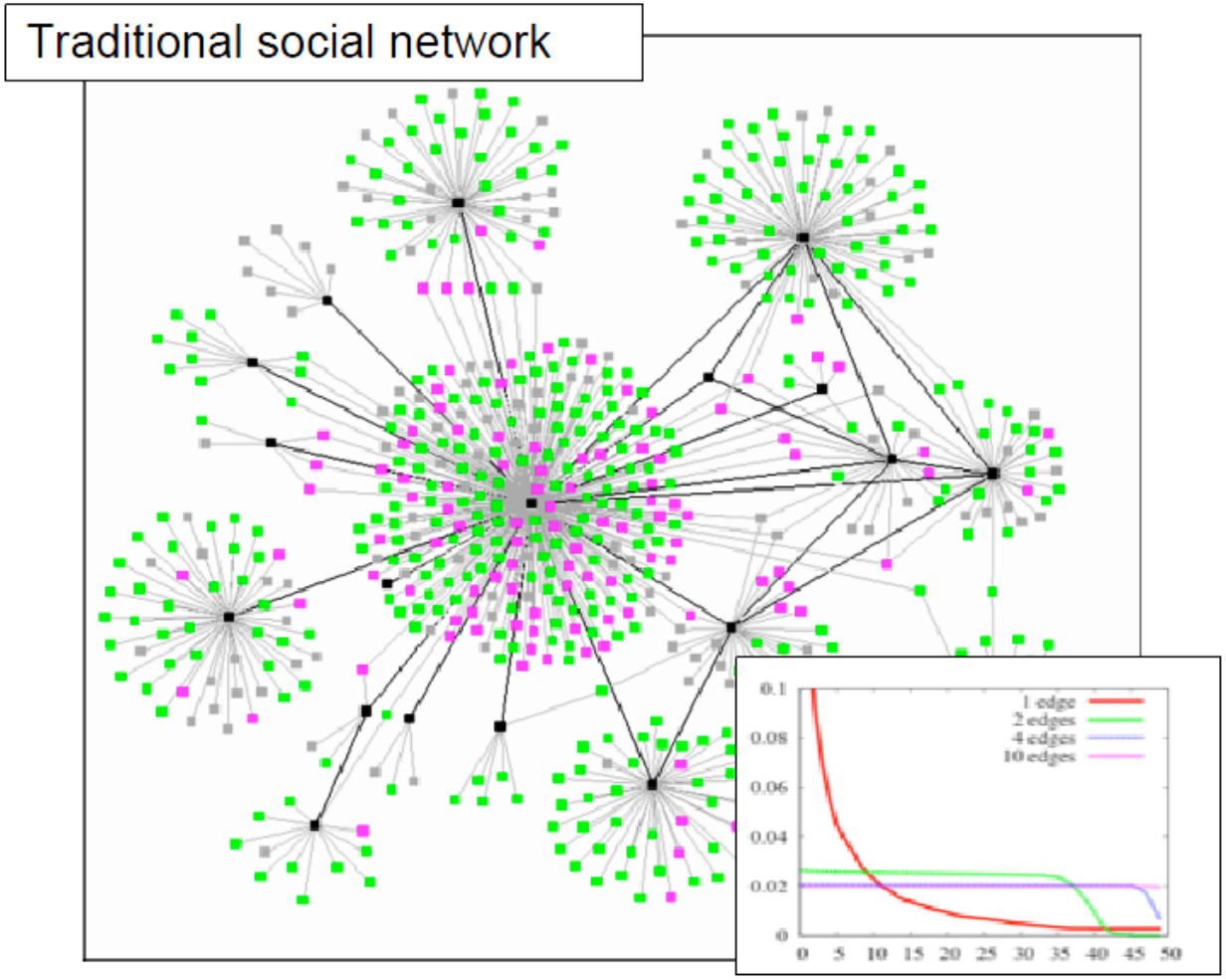


FIG. 1 — Centralized, Decentralized and Distributed Networks

Paul Baran's Networks. Via Barabasi, 2002, p, 144

Network Structures - Tree



Central

Influence

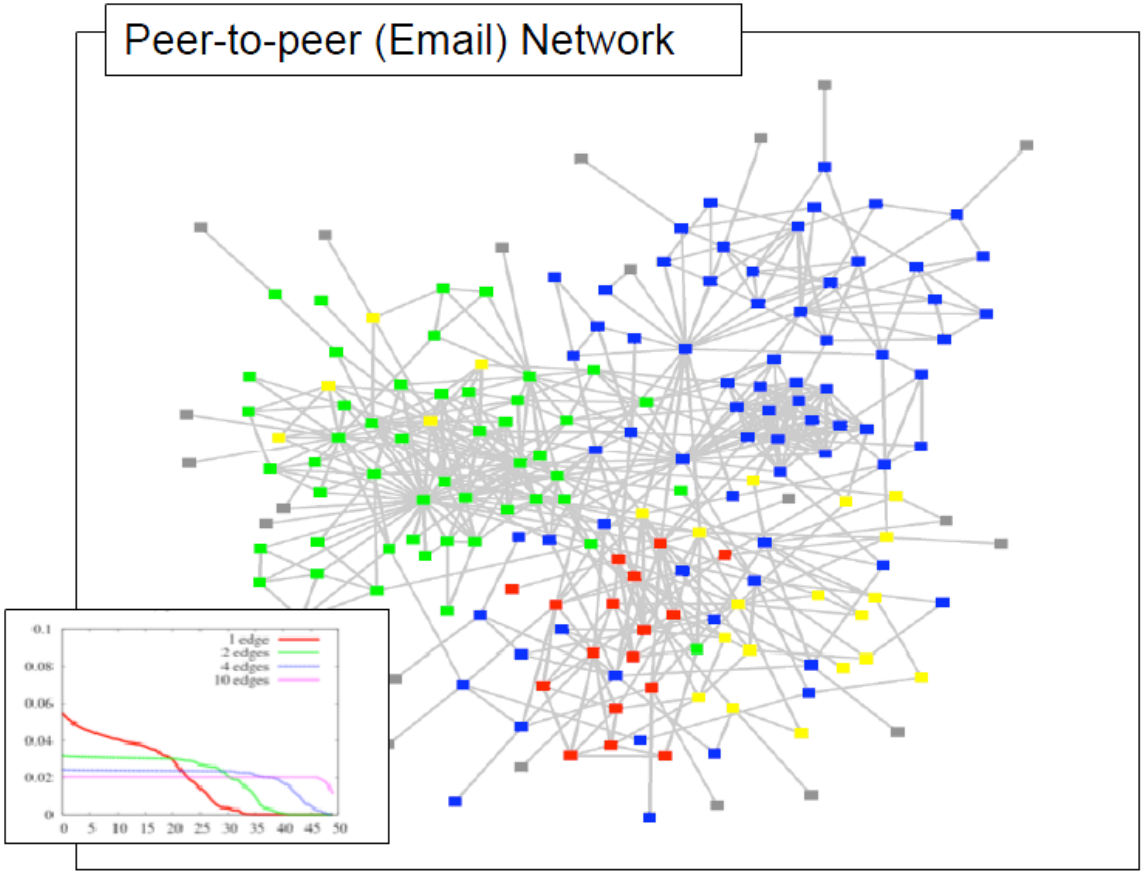
Power Law

Viral

Hierarchy

http://middleburydemocrats.wordpress.com/2008/09/28/college-democrats-getting-obama-to-go-viral-no-really/

Network Structures - Mesh



Distributed

Discussion

Balanced

Reflective

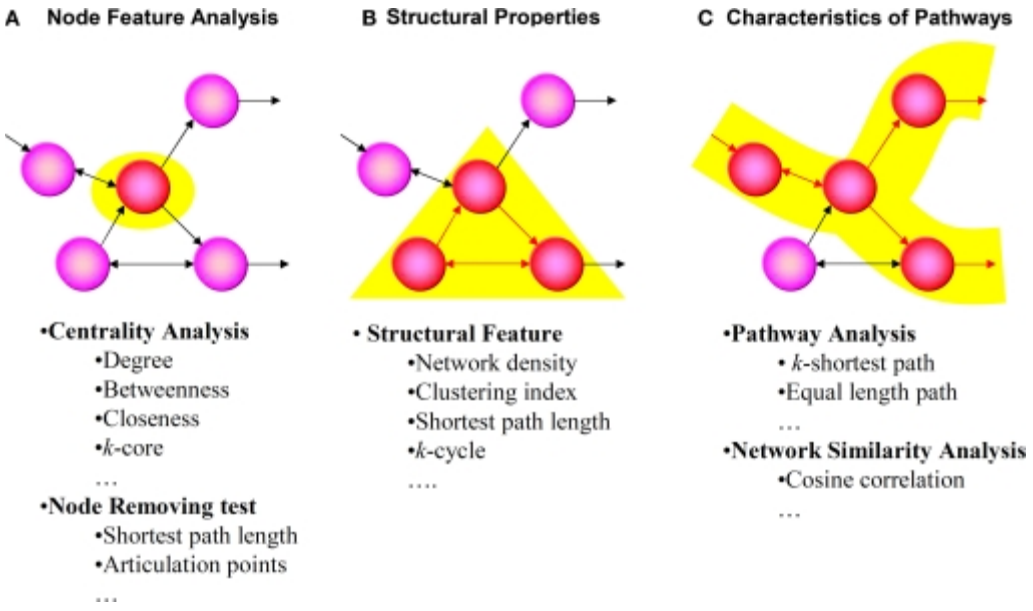
Democracy

http://www.daniel-lemire.com/fr/abstracts/DIVERSITY2008.html

http://www.mailchimp.com/blog/using-email-to-uncover-hidden-social-networks/

Effective Networks

- Cascade Phenomena – what causes them? What are the consequences?



Analysis of Signal Cascade, Yanashiuma, et.al. 2009 http://www.biomedsearch.com/nih/Network-Features-Pathway-Analyses-Signal/19543432.html

http://www.downes.ca/post/45316