Social Capital

in Online Communities

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Intro & Related Work

Social Capital

- Concept popularized by Robert Putnam
  - Fosters reciprocity, coordination, collaboration, and communication
  - Researched by many others including Burt, Lin, Coleman, and Bourdieu
  - Bonding and bridging
- Social connections are beneficial
  - Individual and group
  - Ex. CEO Compensation, open source projects
- How to measure?

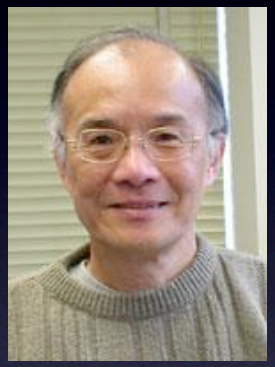
Researchers and Related Work

- Mark Granovetter
  - Strength of Weak Ties
  - Bridging is beneficial

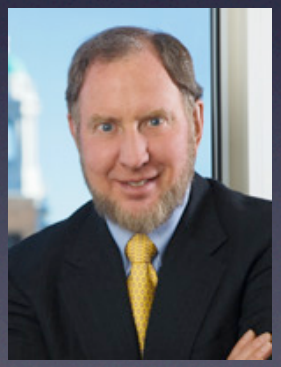
- Ronald Burt
  - Brokerage and Closure
  - Structural Holes

Researchers and Related Work

- Nan Lin
  - Social Resources



- Robert Putnam
  - Decline of Social Capital
  - Bonding & Bridging
  - Group membership analysis



Factors of Social Capital

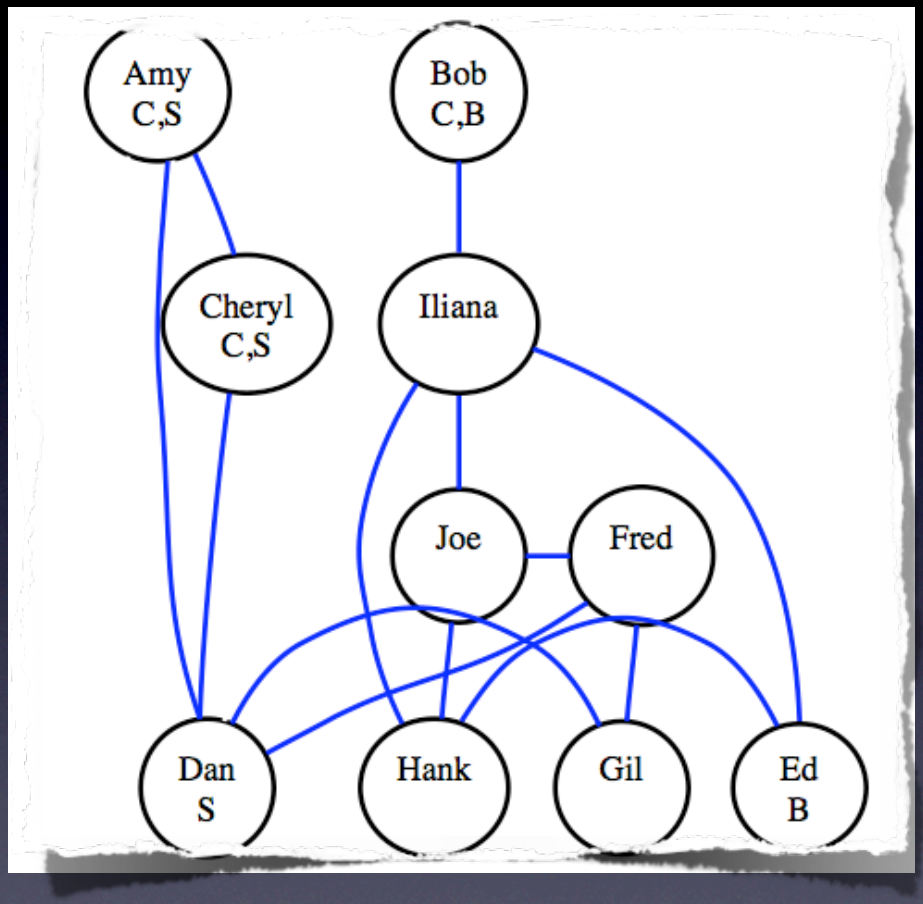
- **Relationships** (Burt, Granovetter)
  - context, strength
- **Individuals' attributes** (Putnam)
  - used to determine heterogeneity
- **Available social resources** (Lin, Bourdieu)
  - physical or symbolic

Preliminary Work

Types of Connections

- Explicit Link
  - Direct knowledge, interaction, or communication
  - Ex. friends, web links, and club members
  - Explicit Social Networks (ESNs)
- Implicit Link
  - Inherent similarities or affinities
  - Ex. attributes, hobbies, interests, and background
  - Implicit Affinity Networks (IANs)

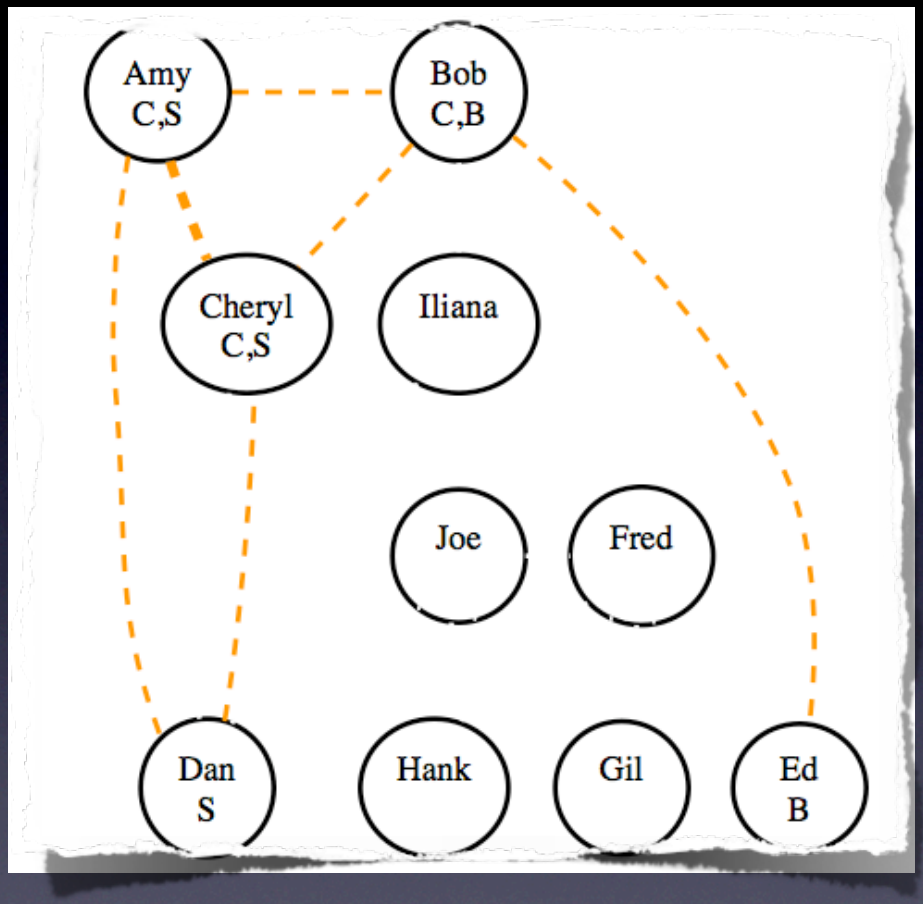
ESN



Explicit Social Network (ESN)

Links: Friends, Web Links, etc.

IAN

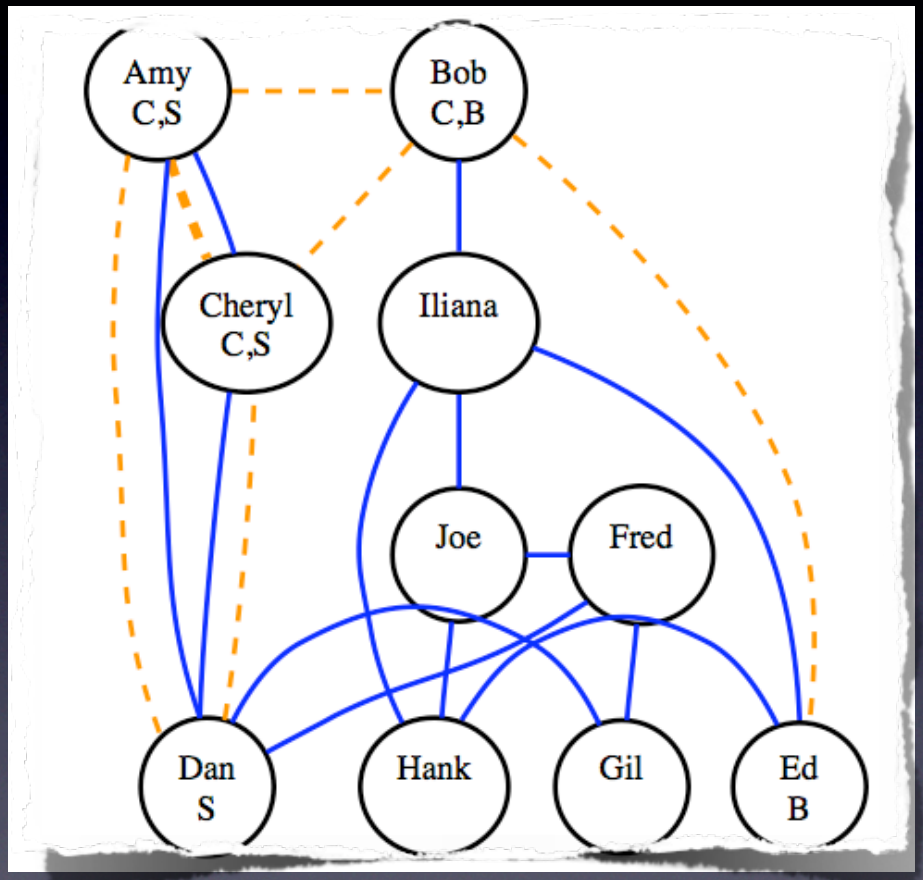


Implicit Affinity Network (IAN)

Links: Affinities or inherent similarities

Hybrid Network

ESN overlaid with IAN



Applications: Medical, Political, Blogosphere, etc.

Potential vs. Actual Social Capital

- Potential Social Capital (IAN)
- Actual Social Capital (ESN)
  - Accrues only when explicit links are present

		IAN Link	
		Yes	**No**
ESN Link	**Yes**	Actual Bonding	Actual Bridging
	No	Potential Bonding	Potential Bridging

Bonding and Bridging Social Capital

- Individual

$$bonding(i,j) = s_{ij}^{IAN} s_{ij}^{ESN}$$

$$bridging(i,j) = (1 - s_{ij}^{IAN}) s_{ij}^{ESN}$$

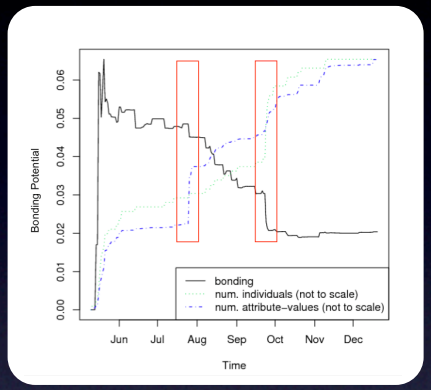
- Network

$$bonding = \frac{\sum_{i,j} bonding(i,j)}{\sum_{i,j} s_{ij}^{IAN}}$$

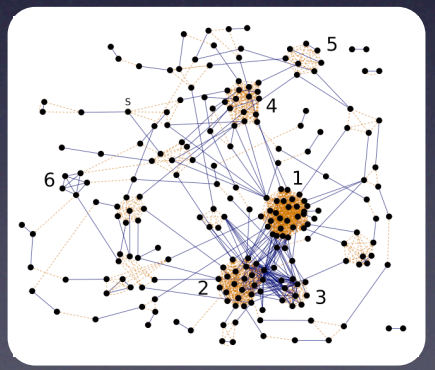
$$bridging = \frac{\sum_{i,j} bridging(i,j)}{\sum_{i,j} 1 - s_{ij}^{IAN}}$$

Experiments

- IAN community (WITS)
  - New communities create bridging potential



- Blogosphere (AAAI Symposium)
  - Bloggers are connected by both implicit and explicit links
  - Identified opportunities for bridging and bonding



Proposed Work

Improve Node Evaluation

- Derive a formula to estimate the social capital of a particular individual
- Base formulation on:
  - **relationships**
  - **attributes**, and
  - ***social resources***

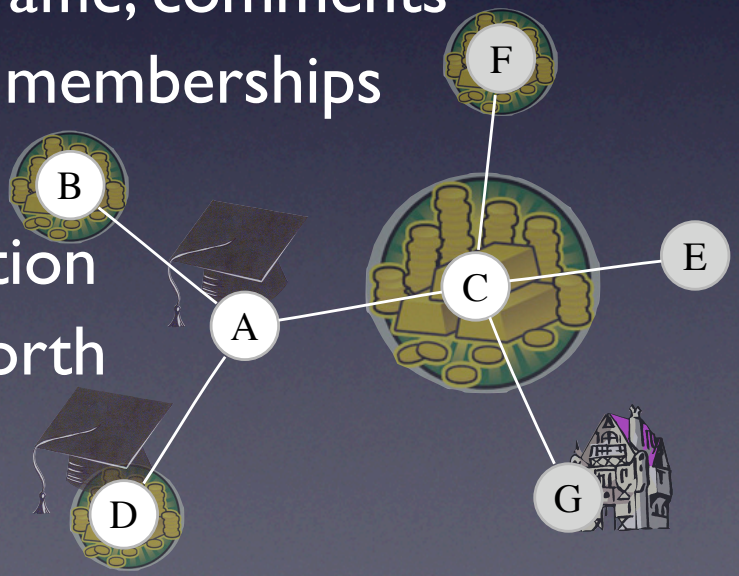
Social Resources

- Material Goods
  - land, houses, car, and money
- Symbolic Goods
  - education, memberships in clubs, honorific degrees, nobility or organizational titles, family name, reputation, or fame

From: Lin 2001, Social Capital: A Theory of Social Structure and Action

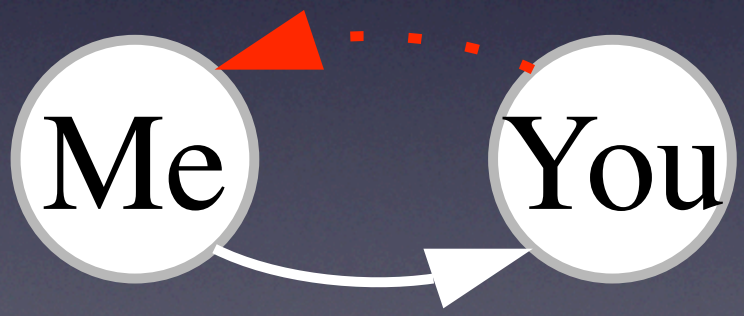
Identify Social Resources

- Identify a set of *measurable* social resources accessible within online communities
- Possibilities
  - web traffic, comments
  - group memberships
  - education
  - net worth



Access Connecting Costs

- Reciprocal Connections
  - Connecting to You is relatively inexpensive
  - However, convincing You to connect to Me can be relatively expensive



Validation

- Validate Proposed Models
  - Measure social capital using the proposed models for communities overtime
  - Compare measured social capital to existing social capital evidence

Experiments

- Blogosphere
  - open community, free-form, explicit and implicit connections present, measurable
  - identifiable social resources *(hopefully)*
- Medical communities
  - increasingly common, implicit and explicit links available
  - beneficial for patient support groups

Conclusion

Conclusion

- We have proposed to create a quantitative model for characterizing and providing decision support on how to maximize participation within social networks.
- Major challenges:
  - Identifying social resources
  - Validation

Impact

- This research will be useful in answering important questions, such as:
  - Who should a newcomer to a community attempt to connect with?
  - How much social capital does each individual (or a group) have access to?
  - What social resources were mobilized within the community during the past month?
  - Which individuals tend to mobilize the most social resources?

Questions & Comments

Ask me now:

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Extra Slides

Network Extremes

- Fully connected explicitly and fully disconnected implicitly (all attributes are different)
  - Potential Bonding: 0 Actual Bonding: 0/0 ~ 0
  - Potential Bridging: 0 Actual Bridging: 1
- Fully disonnected explicitly and fully connected implicitly (all attributes are common)
  - Potential Bonding: 1 Actual Bonding: 0
  - Potential Bridging: 0 Actual Bridging: 0/0 ~ 0