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)
Explicit Social Network (ESN)
Links: Friends, Web Links, etc.
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
Bonding and Bridging Social Capital

- **Individual**

\[
\text{bonding}(i, j) = s^{I\text{A}N}_{ij} s^{E\text{S}N}_{ij}
\]

- **Network**

\[
\text{bonding} = \frac{\sum_{i,j} \text{bonding}(i, j)}{\sum_{i,j} s^{I\text{A}N}_{ij}}
\]

\[
\text{bridging}(i, j) = (1 - s^{I\text{A}N}_{ij}) s^{E\text{S}N}_{ij}
\]

\[
\text{bridging} = \frac{\sum_{i,j} \text{bridging}(i, j)}{\sum_{i,j} 1 - s^{I\text{A}N}_{ij}}
\]
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

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 \((\text{hopefully})\)

- Medical communities
  - increasingly common, implicit and explicit links available
  - beneficial for patient support groups
Conclusion
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• 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 disconnected explicitly and fully connected implicitly (all attributes are common)
  - Potential Bonding: 1  Actual Bonding: 0
  - Potential Bridging: 0  Actual Bridging: 0/0 ~ 0