P2P Interaction in Socially Intelligent ICT

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Questions

1. What is ICT-enabled social intelligence?
2. What theories exists on social intelligence?
3. Are there engineering principles for creating social intelligence systems?
1. What is ICT enabled social intelligence?

First let’s ask:

What is Social Intelligence?
What is social intelligence?

Answer

It is the opposite of:

**Antisocial stupidity**

(hence game theory not much use ;-)
What is social intelligence?

• What is meant by intelligence?
  – doing the right thing to achieve goals given the information at hand (reason)
  – learning from experience in order to improve performance (adaptation / learning)

• What is meant by social?
  – some population of intelligent entities (agents)
  – agents cooperate to achieve their goals
  – goals of agents may or may not conflict
  – interactions restricted by spatial, temporal and informational constraints - may be dynamic
What is social intelligence

• Feedback mechanisms:
  – individual (micro) to collective (macro)
  – collective (macro) to individual (micro)

• Leading to, emergent, “collectively good” outcomes
  – Adam Smith called it the “hidden hand” in the context of markets
  – Many mechanisms other than markets
1. What is *ICT enabled* social intelligence?

- Social intelligence in which:
  - ICT plays a significant role in social mediation
  - The agents are users and possibly computational agents and services
  - enables the emergence of “collectively good” outcomes through e.g.:
    - Fostering cooperation (incentives)
    - Conflict resolution (norms, rules, policing)
    - “Fair” and “productive” allocation of resources
    - Filtering out “bad” adaptations and spreading “good” adaptations
2. What theories exist on social intelligence?

- **Evolutionary theory**: reciprocal altruism, kin, group and cultural group selection
  - How positive social behaviors / strategies / norms emerge through evolutionary processes

- **Common pool resource theory**: Ostrom’s CPRG
  - How people govern common resources collectively and productively

- **Social contract theory**: Rawls’ “Theory of Justice”
  - Using reason to derive just social norms / laws that others subscribe to rationally

- **Economics, markets, peer production, symbolic interactionism, enthnomethodology...**
3. Engineering principles for creating social intelligence systems?

• Active research area we focus on in QLectives
• Socially inspired design patterns for P2P:
  – Direct reciprocity (e.g. TFT in BitTorrent)
  – Indirect reciprocity (e.g. credit / points systems)
  – Group selection (e.g. evolving communities)
  – Altruistic punishment (e.g. self-policing)
• See *QLectives deliverable D2.1.1* for details on www.qlectives.eu
Questions?

• www.qlectives.eu
• www.davidhales.com
Elinor Ostrom 1990

Ostrom identifies eight "design principles" of stable local common pool resource management:

1. Clearly defined boundaries (effective exclusion of external unentitled parties);
2. Rules regarding the appropriation and provision of common resources are adapted to local conditions;
3. Collective-choice arrangements allow most resource appropriators to participate in the decision-making process;
4. Effective monitoring by monitors who are part of or accountable to the appropriators;
5. There is a scale of graduated sanctions for resource appropriators who violate community rules;
6. Mechanisms of conflict resolution are cheap and of easy access;
7. The self-determination of the community is recognized by higher-level authorities;
8. In the case of larger common-pool resources: organization in the form of multiple layers of nested enterprises, with small local CPRs at the base level.
User Models

• We need realistic models of how users behave when embedded within given ICT systems
• A priori theoretical models tend not work – users rarely behave “rationally” in the sense of maximising some simple utility
• Empirical measurements suggest its complex – heterogeneous, adaptive, but progress can be made
• Need large-scale deployments / measurements – an empirical / experimental approach
Rawls’ "veil of ignorance" approach

• assume we wish to specify the kind of society that is just and good
• but we stand outside the society and don't know what role we ourselves would play
  – we are ignorant of what endowments, knowledge, capacities and position we would hold
• what rules / norms would we accept as just and fair? i.e. what would we accept as “collective good”
Designing a socially int. system

• We wish to specify the requirements of a system that will structure interaction between peers
• the protocol could run on diverse devices with diverse goals, capacities and user behaviour
• but we need 1 billion users of the system to make it a success (and get rich)
• What collective goals will we define such that many different devices and users would accept and run it?
  • “do no evil”? or “make the world a better place”? or “from each according to his abilities to each according to his need”?