SOCIAL AGENTS?

GET REAL

FRANK DIGNUM

BE SOCIAL
Agenda

• Why do we need social agents?
• What does it mean to be social?
• Where does sociality lay?
• What are fundamental aspects of social individuals?
• Social reality
• Social practices
• Social deliberation
• Conclusions
Social agents in traditional MAS

<inform:
Hello World>

(use speech act theory to communicate)
Socially enhanced Agents

<inform:
Hello Games &
Agents students>

(add context, gestures,...)
THE FUTURE?
Sociality according to Social Science

1. **Individualists** (Weber, beginning 1900’s):
   individuals only, social arises from individual behaviors

2. **Socialists** (Durkheim, 1910’s):
   “natural” norms/roles determine individual behavior

3. **Textualists** (Habermas, 1960’s):
   conceptualization and language determine our social reality

4. **Social Practice** (Latour/Reckwitz, 1990’s):
   social reality is shaped by practices, the process is central
Sociality according to Agents Community

**Individualists:** AAMAS, Game Theory

**Socialists:** COIN, Social Simulation

**Culturalists:** Agent Communication

**Social Practice:** Social Simulation
Claim

Computational models of social reality need all four elements

1. Fundamental socially defined individuals

2. Norms, social facts etc. as “normal” part of reality

3. Cognitive capabilities to create “new” concepts and categorize/classify “reality”

4. Processes and Emergence lead to “new” reality
SOCIAL AGENTS

• Social motivations
• Social identity
• Social deliberation
• Social reality
MOTIVES (McClelland)

1. Achievement motive
   From variety incentive

2. Affiliation motive
   From contact incentive

3. Power motive
   From impact incentive

4. Avoidance motive
   From consistency incentive
Getting to action

Cues (social, physical)

Motivations × Skills × Importance = Impulse to act

Incentives

Motives

Cognitive interpretation

Situation

Person

Situation
Balance between control and novelty

• INDIVIDUAL
  • Get bored when “nothing happens” (life is a routine, job done without thinking)
  • Get anxious when encountering an unknown situation (new club, new country, new job)
  • Adventurers: balance towards novelty
    • Find new opportunities for business
    • unreliable
  • Pillars of society: balance towards control
    • Reliable support for people in need
    • Stuck into world Image

• SOCIETY
  • “socialistic”: controlled progress for everyone
  • “capitalistic”: competition drives society to optimum
  • Evolution: keep the good but variate in order to adapt to changing environment
Different

Variance

Social

Identity

Individual

Consistency

Equality
Identity

Individual
Organism
Motives/Needs
Affordances/Skills
Traits
Belongings
Values

Social
Social Categories
- Membership
- Commitment
- Status/Esteem
- Ideology/Values
Identity

reference group of Dutch

Family man reference group of man
Identity

1. Personal identity
   values, beliefs, norms,...

2. Reference groups
   values, beliefs, norms,...

3. Social groups
   values, beliefs, norms,...
Personal identity

1. Self esteem
   Am I OK? Great? Terrible?

2. Self image
   I am a family man (runner, intellectual, ...)

3. Self regulation
   I want to be a good father

4. Emotions
   I feel great (sad, ...)

5. Homeostatic status
   I am hungry (sleepy, ...)
Social groups

1. Status in group
2. Importance of group
3. Role
4. Membership
5. Rituals, strategies

Social groups give individual (social) feedback on interactions
Reference groups

1. Standards (Values)
2. Culture
3. Possibly unconscious
4. Can be used as “ideal”

Reference groups might not be aware of individual actions
Social reality

1. Creating social reality
2. Social landscape
3. Social “laws”
4. Interdependencies between social and functional/physical
5. Social practices
Why creating social reality?

- hunger
- tired
  - ask food
  - eat
  - sleep

Universiteit Utrecht
Why creating social reality?

NOT THAT SIMPLE

hunger
tired

ask for
eat
sleep
Why creating social reality?

Reality

Social filters

Social rules

percept

percept

percept

percept

percept

percept

percept

percept
Creating Social Reality

objectivation

externalization

internalization
Externalization

1. Create patterns of behavior
   - The patterns are based on context and individuals
   - They can change when individuals change or context changes

2. Actions are performed as “social actions”
   - Agents have “we” intentions
Objectivation

1. Name the patterns as objects in their own right
   - Here social reality is created!
   - The social structure now has an existence independent of the persons
   - The social structure can be transmitted easy, be discussed, etc.

2. The social structures are legitimized
   - Legitimization can be different from the reason the structure is created.
   - E.g.
     - **Justification**: coffee time is at 10:30 because it breaks the morning (9-12) nicely in two parts.
     - **Reason**: coffee time is at 10:30 because then the last person gets into work and we can have coffee together
(Social) reality persists with legitimation
Internalization

1. The social structure is used as a part of reality that has to be taken into account when deciding upon actions.
2. Beliefs, norms, etc. become part of individual mental attitudes.
Cause and Effect

1. Due to the cyclic nature of the influence between individual and social reality it is not clear what is the cause and what is the effect of certain phenomena.

E.g. In the playground soccer is the most popular activity because it can satisfy the largest set of motivations (achievement, power and affiliation). Boys are physically a bit bigger than girls and thus better at playing soccer. Because the boys achieve more at soccer they tend to play more soccer (and might even get better). Mostly boys play the most popular activity (soccer). Boys are the most popular children, because they can play the most popular activity best. Boys are better than girls.
Cause and Effect

It is easy to draw wrong conclusions, based on limited observations. But how far back does one have to go to get to the “real” origins of some social structures?
Social landscape
Modeling Social laws

No laws of nature but things like NORMS

Example:
You cannot drive more than 100km/hr

BUT NORMS CAN BE VIOLATED!
How does Social Reality work?

1. When do we follow norms and when do we violate them?

2. How do norms arise?

3. Which norms are stable? How are they maintained?

4. Norms have many motivational and social aspects → Which aspects and how do we model them?
Social structures

- Formal social structures:
  - Institutions, Organizations, Nations,...
- Informal social structures:
  - Teams, Groups, Families, Friends,...

Social structures are described in terms of:
- Roles
- Relations and interaction (patterns)
- Norms
- Values
- Culture
- ...
Example Organizational Model (based on OperA)

Normative Concrete Level
- Role Norms
- Scene Norms
- Transition Norms
- Role Rules
- Scene Rules
- Transition Rules

Organizational Model
- Architectural Templates
- Social structure
  - ROLE
    - norms
    - objectives
    - role
    - relation
- Interaction structure
  - SCENE
    - SCRIPT
      - scene
      - transition
      - norms
      - constraints
      - landmarks
      - player

Ontological Concrete Level
- Ontologies
- Communication languages
Social structures and norms

- The accountant of a company has to make sure the accounts of the company are correct
- The head of the department can order an employee to perform a task
- A “green” company has rules that force its employees to use public transport for business trips
- Academics do not wear suits
- In a collectivistic team all members are committed to the agreed course of action
- If George Clooney drinks Nespresso I also have to drink Nespresso
Social structures regulate behavior

- Persons influence each other through social structures, using social structures and because of social structures
Social structures regulate behavior

Institutions:
restaurant

Get me some coffee, please
Social structures regulate behavior

Organization:
boss, secretary

Get me some coffee, please
Social structures regulate behavior

Group of friends

Get me some coffee, please
Social structures regulate behavior

Get me some coffee, please
Social structures motivate behavior

- Identity and perception of identity is (partially) determined by group membership
- People are member of many formal and informal groups (social structures)
- These memberships all influence the behavior:
  - Role in a group
  - Relations to members of a different group
  - Aspiring a certain role or position in a group
  - ...

- Often these influences are all expressed in terms of norms
- Social structures are needed to model the relations, priorities and preferences between norms
Social structures and information exchange

- Social structures determine with whom we communicate
- Social structures determine when we communicate
- Social structures determine how the communication is interpreted

E.g.
- Tell a colleague about possible fraud at work
- Tell the boss about possible fraud at the university
- Tell the tv about possible fraud at university

Cf. Social network analysis
Social structures and virtual agents

Social structures are an important aspect in human behavior

→

Social structures should be represented in virtual agent models

→

Norms play an important role in defining social structures

→

Norms should be used in virtual agents models

Norms can only be understood and modeled in the context of social structures

→

Social structures are very important for virtual agents
Norms and Violations

Example:
Be polite/helpful for older/other people

Normally: conformity incentive leads to norm compliance

Please, let me help you such that I can also still get in.
Norms and Violations

Example:
Be polite/helpful for older/other people

Ingroup/outgroup:
violation of norm helps (status) difference
Norms and Violations

Example:
Be polite/helpful for older/other people

Power: power leads to conformance of the norm
Norms and Violations

Example:
Be polite/helpful for older/other people

Gender bias? Culture bias? ...
Social Reality and Physical Reality

Big friend $\rightarrow$ greet with hug
Social Reality and Physical Reality

Greeting at work

Portugal → standard greeting

The Netherlands → good friends

Israel → inappropriate
Social deliberation

- Deliberation
  - Functional
  - Social
  - Interdependencies

perceive/act
Social Practices

• **Materials:**
  • Physical elements that are part of a practice

• **Meaning:**
  • Understandings, beliefs, emotions, social interpretations that are part of a practice

• **Competence:**
  • Skills and knowledge needed for a practice
<table>
<thead>
<tr>
<th>Abstract Social Practice</th>
<th>Combat Fire</th>
<th>Going to work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Context</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>inflammable objects, water, barriers...</td>
<td>Vehicles, money, ...</td>
</tr>
<tr>
<td>Places</td>
<td>locations of fire, actors and resources,...</td>
<td>Stations, roads,...</td>
</tr>
<tr>
<td>Actors</td>
<td>Victims, bystanders, colleagues,...</td>
<td>Drivers, co-passengers, ...</td>
</tr>
<tr>
<td><strong>Social Context</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social interpretation</td>
<td>Dangerous places, safe places, rescue equipment</td>
<td>Bus driver, train driver...</td>
</tr>
<tr>
<td>Roles</td>
<td>police, medics, ...</td>
<td></td>
</tr>
<tr>
<td>Norms</td>
<td>own safety; public safety</td>
<td></td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Identify type of fire; Extinguish fire; Removal victims; Clear area; ensure own/team safety; ...</td>
<td>Choose transport type; buy ticket; drive car; ...</td>
</tr>
<tr>
<td><strong>Plan patterns</strong></td>
<td><img src="image" alt="Diagram" /></td>
<td></td>
</tr>
<tr>
<td><strong>Meaning</strong></td>
<td>braveness, leadership, ...</td>
<td>Environmental conscientiousness, comfort, social status, ...</td>
</tr>
<tr>
<td><strong>Competences</strong></td>
<td>• Fire combat knowledge and skills</td>
<td>• driving skills,</td>
</tr>
<tr>
<td></td>
<td>• Coordination skills</td>
<td>• cycling skills,</td>
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<td></td>
<td></td>
<td>• knowledge of public transport routes</td>
</tr>
</tbody>
</table>
From situation to action protocol

- Determine salient identity
- Check abstract social practices associated with identity
- Match situation/context to social practice
- Determine concrete instantiation of Social practice
- Decide which action to take from actions associated with social practice (depends on own goals, past experiences, ...)
- Take action
- Use result of action to feedback to identity (change of status) and to social practice (reinforcement)
(Social) conclusions

1. Creating socially intelligent agents leads to many interesting challenges

2. Just adding a “social module” might work for a specific domain or application, but requires explicit modeling of all relevant social rules, motivations, etc.

3. A good principled social architecture for agents can serve as a basis from which relevant parts are used for applications

4. Enough issues for 10 years of research in all kinds of aspects (theoretical, engineering,...)