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Intelligence vs. Self-organization in an Hybrid Society, Cristiano Castellfranchi

From natural and artificial to hybrid social intelligence: Towards socio-cognitive technical systems

The current explosion and widespread adoption of social network services is deeply impacting how human societies function. Though the impact of these new technologies in the long run is difficult to assess, a major problem stems from the way such technologies are designed. In the absence of a rigorous understanding of how societies work, evolve and change, social network services risk to unintentionally cause deep and structural social change with unforeseen negative consequences and to miss opportunities for positive social innovation. Although social network technologies are nowadays already fused with human sociality, the future emerging societies are at risk of becoming an unpredictable mutant.

Consider the problem of privacy. Social network technologies are inevitably changing the way the private and public spheres are conceived by the new generation of digital natives. Social network technologies are inadvertently promoting new social norms and unintentionally changing human self-conception. As an unintended side-effect, a constitutive conception of personhood and autonomy might be eroded.

There is thus the need for a new generation of tools for human societies. These new tools should be conceived from the start on the basis of the core principles characterizing human societies and human cognitive development, should be designed with a view to socially desirable outcomes, should be aware of the subtleties that are intrinsic to human sociality and be able to anticipate and monitor the inevitable new spontaneous social order.

Indeed, as is well known, one peculiar feature of human societies is that they are based on a level of cooperation that is not achieved by any other biological species and was for a long time left unexplained. During the last decade, however, there has been an enormous rise in the scientific study of human cooperation, and nowadays there is a consolidated body of theoretical and empirical results that explain how cooperation in human societies is indeed possible. Such a conceptual toolbox has been the product of a merging of different disciplines: from biology to economics, from sociology to cognitive science. This interdisciplinary approach to natural social intelligence has identified a number of mechanisms that support human societies (like reputation, punishment, trust, norms and social and legal institutions, etc.) and has developed new formal and conceptual frameworks to approach these problems.

At the same time of the explosion of cooperation studies in the social sciences, computer science has given birth to artificial social intelligence: from early distributed artificial intelligence in which a massive number of autonomous intelligent computational entities interact in order to achieve collective objectives to the domain of Multi-Agent Systems in which software applications have been designed from the scratch as societies of software agents. Still, this artificial social intelligence has been conceived mainly as a closed artificial society mirroring human ones but with no real interaction.

A new generation of tools for human societies is however possible. By promoting a new interdisciplinary alliance between the cognitive sciences, social sciences and computer science, new paradigms to design a new form of hybrid - partly natural and partly artificial - social intelligence can be developed. These future systems will support human-like social features like cooperation, trust,

norms etc. They will be anchored on the complexities of human cognitive systems. As a consequence these systems that will be partly made of autonomous and intelligent entities and partly made of humans, will be able to embody crucial principles of human sociality and offer new ecological niches. In order to build such systems, there is the need to promote interdisciplinary research between computer science, engineering, cognitive sciences, philosophy, economics and sociology.

This is the era of Socio-Cognitive Technical Systems.

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<http://www.sintelnet.eu/wiki/garbage/docs/sourcebook/positionpapers/SCTS-Castelfranchi&Tummolini2.pdf>

Slides

castelfranchi-ecsi14.ppt

The image shows a grid of 15 slide thumbnails from a presentation. Each slide contains text related to the topics of intelligence, self-organization, and hybrid societies. The slides are arranged in a 3x5 grid. The text on the slides includes various sub-headings and key concepts, such as 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', 'Intelligence vs. Self-organization in an Hybrid Society', and 'Intelligence vs. Self-organization in an Hybrid Society'. The slides also mention 'Cognitive Mediators' and 'Social Engineers'.

libed and endowed minds are the crucial
rdination artifacts in cognitive agents.

from Communication for informing you
ence/manipulation and Adoption, for
cing you to do something

Coordination Artifacts are crucial
use they create the Common ground, the
apposed shared knowledge:

cripts, games, rules, norms, institutions,
ties.... Garfinkel's order

cribed and endowed minds: what you
re prescribed to and assumed to assume
do... Your prescribed/expected mind.

ally also Communication is for shaping
mind; and also scripts, rules, norms,
es, are for that...

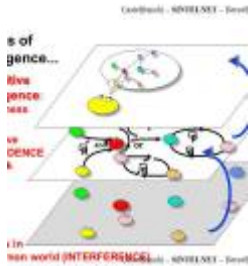
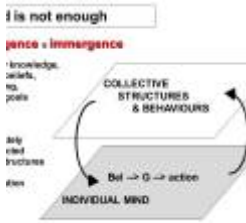
the central device is Mind shaping and
upposing:

ct:

houlder we need to coordinate are REGULATED
agent models, no, without norms are coordinated
e coordination will be there. Minds in social spe
there (also) for that.

2

Mind is not enough
Emergence, Self-Organization
Functions and Cognitions



For a (Pessimistic) Theory of
Spontaneous Social Order

A critical homage to F. von Hayek

ould relationships between the intended states of the
ons and the implied goals and preferences, and the possibly
understood 'beliefs' or 'intentions' of their behavior.

tion of 'negative functionalities' in computer simulation.

pose some solutions about the theoretical and functional relation
ness agents' functionalities and non-intentional 'purpose' of
ons.

ated order' is not necessarily a real 'order' or something good
table for the involved agents, but something that
ould be bad for the social system against their intentions and
rough emergence from their intentions and from the agents
nd's theory of operations could 'order' and Elber's app
was functionally explained and functional use will be criticized.

core theoretical problem
of the whole soc
ce" (Hayek)

is not enough
gence / emergence

core theoretical problem
of the whole social science" (Hayek)

is problem (the epistemological emergence of an intentional
order and institutional) is in no way specific of
social science... it is hidden in THE core theory
tion of the whole social science" (von Hayek, former
the 'Function')

problem is not simply how a given qualitative
change is achieved and **what viable order emerges**

is a 'social order' or an 'institution', spontaneous emergence
function not enough. They must be 'functional'.

m Smith's "invisible hand"

Smith's original formulation of "THE problem" is much deeper
of epistemological nature:

to individuals - that does nothing, in general, **intends**
the public interest, nor is aware of the fact that I
bring it... is caused by an invisible hand to **advance**
that is not among his intentions" (Smith, 1776)

the Smith is not acknowledging the advantage nature of the invisible
hand in order, considered as a problem of
positive value judgement, a providential, benevolent
intentional vision of the process of self-organiza
tion.

"Invisible Hand"

intentional and behavioral

intentional and awareness (long term or complex) effect on
behavior

It is not just an effect, it is an end in itself, i.e. the agent
is in some way **intending** to "intentionally" affect his
beliefs.

How is it possible that we perceive something that is in
fact a function of the behavior of an intentional
being agent (goal-oriented, teleological (end'), self
directed intention).

g which sense the intentional effect of our behavior
is "not"??

ory of "Function"

problem appeared in other social sciences as
a core of the notion of "functions" (social
psychology) implying on the behavior of autopoietic
intentional agents, and of their relations with
intention.

al Functions and Cognition

is no theory of social functions is possible and has
not clearly solving this problem.

without a theory of emerging functions among cogni
tive agents social behavior cannot be fully explained.

over: we have to **build social functions &
taneous orders** (conventions, conform
Agent-supported human organizations i
on MAS

not only good
intentionally cooperating/competing system

al Functions and Cognition

is in the new Hybrid, coupled, augmented reality

is human informational cognition, effective 'functional'
ing much better, reliable, update data, interact
tion...

the making explicit and even visible to the individuals
agents and the support "functions" of their context
explaining the "why" of norms, rules, etc.

five people voice and participating and proposed power
ing those rules and outcomes, and in deciding about.

al Functions and Cognition

Does intend and maintain themselves periodically

low intend and maintain themselves
x to and through agents' mental
representative of their own
representations:

i.e. without being aware of or least intending

al Functions and Cognition

Social Norms emergence and functioning require all
of "negative emergence".

Function requires an **extra-negative** emergence.

For a Social Norm to stand as a Social Norm and be,
its agents should recognize and accept it as a Social Norm
a contrary the effectiveness of a Social Function
end of agents' understanding of this function
end behavior.

the function on the end intention itself without the function's
end.

If the agents intend the results of their behavior (they would mean
"social functions" of their behavior, but not "intentional").

problem:

agent and functions should not be
what the observer files or notices,
"Just in the eye of the beholder"

could be indeed **observed independent**,
an self-organizing and self-reproducing phenomena
"positive", "good" can just consist in this.
more include "negative functions" (Marina) (doku
ment) from the theory: perhaps the more mechanism
able for both positive and negative functions.

> Two kinds of functional notions:

- evolutionary functions, adaptive goals; and
- mental ends (intention, purposes, intentions).

intentional behavior & functional behav

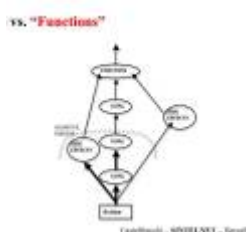
intentional behavior

intentional systems

are two basic types of system having a finalistic behavior

Goal-oriented systems - (McFarland, 1987),
Goal-governed systems

the type of Goal-oriented systems based on **representa
tional** the results



PROBLEMS

charlier is reproduced thanks to its good effects, that
faithful to the goals of the agent (individual or
we) who reproduces them by acting accordingly, then
we are far "functional" (Elber).

so agent appreciates the goodness of these effects and its
end is to replicate in order to reproduce those effects, they ap
ply "intentional".

How is it possible that a system which i
ntentionally and on the basis of the evaluation
effects relative to its internal goals reproduces
f habits thanks to their bad effects?

behavioristic reinforcement layer (von Peirce)

together with
diffusive layer (controlled by beliefs and goals) ???

diffusion layer accounts for intentional and reflexive
behavioristic layer (exploiting, conditional or unconditional rules
coming from learning, functional, behavioral)

functions and "rules" just implying on "habit
intentional, while

intention would just be for personal purposes?

others is indeed that:

intentional actions have functions!
and beliefs of the agents have functions.

intentional actions also have functions, that is,
they lead

intentional actions as a result of their intention
reproduce periodically as a result of their intention

Why also
Kako-functions?
How is it possible?

also kako-functions?

the mechanism that install a bad function can be eas
ily installing a good one

is definitely separate a functional view of behavior
clear from any teleological, providential view (that
is very bad and period although bad)

kako-functions cannot be explained in a strictly
behavioristic framework of reinforcement learning: the
end of the behavior can be disorganizable or random, but it
has to be the "intentional", consolidated and reproduced

end well effects repeat and effects combined with good habituated
to (Bosch, 1977) to which

the intended good effects reproduce

in spite of the negative consequences

the case in which the well effects are not generated as an
intentional activity

of the factors in which they are produced
can play the good effect role (subjective) more important and in use
in the system. No need to find, or the case of extra-intentional (unintentional
effects)

well effects

well effects capable of self-reproduction (through the f
actor of their negative nature (Castelfranchi, 1997)

notion of 'function'

is an effect selecting and reproducing
its own cause

it is possible for a system that acts intentionally on the
realization of the effects via-b-to via in its own goals to repeat
its precisely as a result of their bad effects?

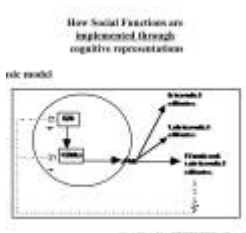
was more crucially - if a behavior is indeed negat
ive its good effects will suggest to the (individual
re) goals of the agent who reproduces them by a
study, that there are no reasons for the "function".

How Social Functions are
implemented through
cognitive representation

How Social Functions are implemented through cognitive representation

How Social Functions are implemented through cognitive representation

How Social Functions are implemented through cognitive representation



Belief Reinforcement

Belief Reinforcement

Belief Reinforcement

Belief Reinforcement

Belief Reinforcement

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Belief Reinforcement

Belief Reinforcement

Belief Reinforcement

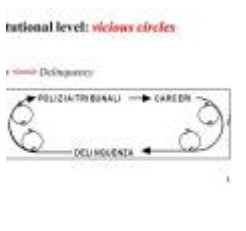
Belief Reinforcement

Belief Reinforcement

Belief Reinforcement

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Belief Reinforcement



3 Blind Sociality

intrinsic Normative "Alienation"
an only work thanks to our blind social order fully understood why "perverts" can identify we have just to "obey", not to try to do for our own reasons, or following the "common good" results understood the end of the norm.

intrinsic Normative "Alienation"
of course, differently from mere "social functions" a fundamental part of the norms that must be moralized and understood.
I works as a mere rule. It is blind as our "involuntary" norm from an external point, etc. Not as a personal claim, imposition.

institutions" Construction
and have to partially be blind also in "institutional" series.
implies, as rule effects) an intrinsic to the object, not, process and effects.

institutions" Construction
is, actually, as intrinsic to the object, not, entity and effects.
ontology causal and ascription "judgments" (Speaker, not only, as only accountable, but useful) for social order.

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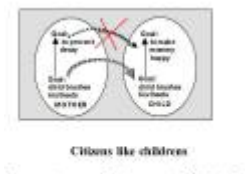
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4 Trusting & Delegating without Understanding

a-technical, non-rational nature of deontic "ought"
The "alienated" nature of norm adoption

a-technical, non-rational nature of the deontic "ought"
sense the deontic "ought" "have to" is a deonticized "ought", no longer a necessary claim, something that you have to want, to choose, no (because to ... you should, have to ... "social ought) (have to" for what? why? (deontic ought)



a-technical, non-rational nature of the deontic "ought"
the "idea" and the "sub-idea" (for avoiding something) once share a fundamental core, crucial for the real status "deontic" "norm", "ought".

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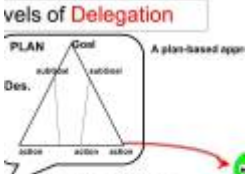
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The "alienated" nature of norm adoption and on institution and social powers
We do not intend the ends of our intentional behavior!

5 Delegation, Proactivity, Order, Norms, Violation in Hybrid Society

"We have to maintain the control"
can delegate to Artificial Intelligences "how to achieve a given goal, but not "what": goal decision and choice should remain power (a general worry, as stated before)



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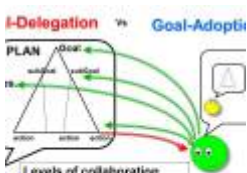
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Social-Agent's Architecture and Multiple Goal-Sources



Degrees of Autonomy
There are degrees of Autonomy, but also types of Autonomy; I we also need "adjustable" autonomy

Monitoring People (and Autonomous Agents)?
cannot monitor and control people without understanding "what" they are trying (goal) and "why", and why sometimes they have to violate rules or roles

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Functional violations of norms and commitments

Functional violations of norms and commitments
different forms of "functional disregard or violation" (others) "here means" "good for..."

Functional violations of norms and commitments
Sociological Description and Definition of the phenomenon

5 Multi-Agent Systems & Emergence, Self-Organization Functions and Cognitions

only the MAS supported social order cannot be p-down, but it must allow autonomy and flexibility to delegations and commitments, and "serious" and "norms" (top-down & bottom-up) but intrinsic possible "violation".

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Government and Simulation

Government and Simulation
MAS can solve this theoretical and technical ones) by changing the Social Sciences methods and modeling tools.

Government and Simulation
will play several crucial roles:
Implementation and platforms for the Social and political/behavioral research, theoretical and modeling tools.



6 Social Simulation, Social Innovation, and System Management

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Government and Simulation

Government and Simulation
In fact, learning (and adjustment) requires a real world. You cannot do this on a box in real context and people.

The Simulation Revolution
"realism" is so important and crucial because it leads us to the social sciences a truly "epistemological" need for validation and adjustment of the models (and of the "architectures" not simply "formal")

political issues and challenges
It will happen in a few decades the systems of Simulations as the basis for any big decision at strategies and policies in any domain:
social, environmental, financial, economic, urban, geographic, energetic, educational, logistic, sanitary,...

political issues and challenges
in the power of future computational scientific models, different, and in a society fully connected in real-time, as-line, near virtualized, with "react" environments and ambient agents".

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political issues and challenges

emotional challenge for the future is - in any view - it will be...

we need to systematically integrate simulation of social phenomena with real-time feedback from the "playground" of social processes?

Castelfranchi - SINTELNET - level

political issues and challenges

It's needed

regulative ones and just remain regulative and controls just "applied" to the field.

It need to combine:

- simulation models and their meaning and prediction
- consequent decision and choices, with possible time delay from the territory, due to intelligent sensors or eyes there
- run time reordering the simulations and then their intervention, and
- to be cyclical (if you)

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political issues and challenges

social and cognitive technology gives us the tools and the skills... but the real challenge is to integrate local systems and processes... to create a hybrid society...

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political issues and challenges

likely, the solution (and the design) consist in the use of robotics.

simple, to really maximize and promote the business, because of a complex interplay of a big political dimension... this is quite critical... design a best interaction between the simulated behavior...

different, or local solutions.

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political issues and challenges

how simple is the case of social policies and interventions on future welfare...

we need to systematically integrate simulation of social phenomena with real-time feedback from the "playground" of social processes?

decision and re-planning is a real technical. It is public requires the right subjects and participations and data.

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The Simulation Revolution

play such a role however computer Social simulation must become stronger and much more able.

based by internal arbitrary parameters, that might be less relevant for the world, guided by the values of a group of interest.

I perhaps we even will need a "artificatory" simulation (like in scientific) with different stakeholders providing comparing their results.

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political issues and challenges

computer modeling and simulation is a viable revolution of the "collective" cognition: "anticipatory" and "imagination" power

such an unbelievable cognitive power should be at disposal of the army, of the "big brother" of the world corporations?

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Concluding Remarks

we need to systematically integrate simulation of social phenomena with real-time feedback from the "playground" of social processes?

decision and re-planning is a real technical. It is public requires the right subjects and participations and data.

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Organization "Out of Minds"

we need to systematically integrate simulation of social phenomena with real-time feedback from the "playground" of social processes?

decision and re-planning is a real technical. It is public requires the right subjects and participations and data.

there are also very dysfunctional and unproductive results of a policy failures.

also there are not understood and forgot, and this does not mean we are not aware of our theory, that's why we repeat them so often.

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the Invisible Hand become computational invisible intelligence

estrating and monitoring society and adjusting societies and dynamics?

in part; Complexity can never be noted; we have to combine complex simulation, prediction, environment and immediate compact and data, with re-decision.

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Can We.....?

we engineering and manage our society (in part) preserving self-organization and individuality and (semi-)autonomy of life?

Castelfranchi - SINTELNET - level

new synthesis



Castelfranchi - SINTELNET - level

new synthesis

emerging Emergence and Cognition as a level of emergence: from objective to subjective - from explicit to implicit - as dependence

and cognition: emergent, functional social phenomena - cooperation, problem solving - among cognitive agents

Castelfranchi - SINTELNET - level

Can We Overcome our Alienation?

the Leviathan become connected and informed unity of agents, giving their collective Power?

we are skeptical about that (also for cognitive agents)

we are not sure about that (also for cognitive agents)

we are not sure about that (also for cognitive agents)

Castelfranchi - SINTELNET - level

Engineering a new Society?

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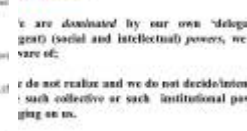
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Castelfranchi - SINTELNET - level

Functional violations of norms and commitments

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Castelfranchi - SINTELNET - level

"Cognitive Mediators" of Social Phenomena

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Castelfranchi - SINTELNET - level

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Castelfranchi - SINTELNET - level

Science will be "computational" or will not be

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Castelfranchi - SINTELNET - level

This was a SELF-ORGANIZED talk

Not so intelligently planned.

Sorry

Castelfranchi - SINTELNET - level

END

Thank you for your attention!

Sorry

Castelfranchi - SINTELNET - level

Can We.....?

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Castelfranchi - SINTELNET - level

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CONCLUSION

we need to systematically integrate simulation of social phenomena with real-time feedback from the "playground" of social processes?

decision and re-planning is a real technical. It is public requires the right subjects and participations and data.

there are also very dysfunctional and unproductive results of a policy failures.

also there are not understood and forgot, and this does not mean we are not aware of our theory, that's why we repeat them so often.

Castelfranchi - SINTELNET - level

reciprocal S-Dependent actual S-Dependence



change

chasing, defeating, problems of reciprocation, ...

Castelfranchi - SINTELNET - level

reciprocal S-Dependent actual S-Dependence



cooperation

common goal, co-interested agents, to defeat a self-defeating...

Castelfranchi - SINTELNET - level

and is not enough

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a technical, non-rational nature of the doactic "ought"

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Castelfranchi - SINTELNET - level

back into the

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Pareto, Garfinkel: social sciences as opposed top psychology. We need to go back.

We need MIND READING because agents behaviours are due to the mental mechanism creating and controlling them.

Una teoria del cerebro que evita la mente no permite entender las inteligencias artificiales.

Social interactions are artifacts not only for coordination but to predict and prescribe the mental states of participants. THE CENTRAL DEVICE IS MIND PRESUPPOSING AND MODIFICATION.

- We need MIND MODIFICATION models: goal adoption and goal induction, m mind and other's mind
- social coordination works "as if" they have a mind
- MIND is a social artifact. our social minds are social institutions
- ASCRIBED and ENDOWED minds are crucial coordination artifacts because they crete the common ground, shared knowledge.
- COMMUNICATION is also for shapingmind

BUT MIND IS NOT ENOUGH

- The social actors do NOT understand, negotiate and plan
- Identify the MENTAL MEDIATOR. unavoidable alienation, Leviatha Demo-crazy
- Necesitamos entender como construimos algo que no entendemos aún.

MIND NOT ENOUGH - SELF ORGANIZATION

- emergence & inmergence
- emergence cognitive, dependence in network, interference in the world
- spontaneous social order: Friedrich Hayek: emergence must be functional. (Hayek: Knowledge. Market. Planning)
- Adam Smith invisible hand: teleological nature of invisible hand to pursue social order. Ideologism, too much positive. Must be rejected but social order is emergent as Smith said.
- How is posible that we pursue something that is not an intention of ours?

2. Theory of function

theory of eemerging functions among cognitive agents NEEDED

In an hybrid world we can reduce guman affective handicap providing more reliable data

Social functions require an aextracognitive emergence working the efectiveness of social function is independent of agents understanding of this function on their own behaviour

Two finalistic systems

- goal oriented
- goal governed

Functional OK, teleological no.

KAKO-FUNCTIONS POSSIBLE?

- cannot be explained in behaviouristic or reinforcement scenarios
- notion of function as SELECTING and REPRODUCING its own causes
- we need COMPLEX REINFORCEMENT LEARNING FORMS operating on GOALS and BELIEFS, this is, in the cognitive representations
- example of kakofunction: dirty and clean screens
- institutional level vicious circles: prisons reproduce delinquency
- FUNCTION is something SELF REPRODUCING AND SELF PRODUCED, emergent

3. Blind sociality

Obey norms blindly make norms work because the issuer sees norm as a tool for a problem. We trust that norm is for social good. Socrates taking the poison. But there is a part of the norm that has to be understood partially.

We blindly reify, objectify power. We dress thinking with our eyes.

The "mistakes", like the idea of god, works very well socially. Doesn't depend on existence.

Social Control

- MANTENER CONTROL: delegar en IA el COMO conseguir una meta pero no dejar que escoja CUAL meta conseguir
- OPEN DELEGATION, transparently let know all goals
- AVOID UNAWARE COOPERATION, better goal adoption instead of goal delegation

We need adjustable autonomy

- MONITOR PEOPLE to understand why they need to violate norms: possible danger of formalization and enforcement of rules.
- Violations sometimes produce better functionality.

Concluding remarks

- we are engineering a new society
- reconcile emergence, self-organizing with intelligence, people participation
- self organization = out of mind
 - society works thanks to our PARTIAL INTELLIGENCE, not knowing what's going on at social level
 - will invisible hand become a computational invisible intelligence orchestrating societies? PRESERVE SELF-ORGANIZATION
 - reconcile emergence and cognition
 - en sociedades híbridas se necesita información para que la gente que conozca el cuadro completo de normas y todos los efectos
 - alienation
 - worry: net-demagogy
 - Mark Twain: si votar pudiera cambiar el orden social no nos dejarían hacerlo

The book [Computational intelligent data analysis for sustainable development](#): shows how predicting without understanding is possible in this area also

Science will be computational or will not be

- AI (Artificial Inleggigence) was the first attempt
- not just models but EXPERIMENTAL PLATFORMS, VR

The Goal-Oriented Agents Lab (GOAL) is an interdisciplinary group that carry out research on finalistic behavior in intelligent agents. Key areas of activity are Cognitive Systems, Social Cognition, Action Control, Decision Making, and Emotions. Since the 70s, members of the group developed a novel approach to cognition, known as goal theory. www.istc.cnr.it/group/goal

Q&A

- Formalizacion no es necesariamente mala, lo malo es crear un modelo social en el que la violacion de la norma no este contemplado
- Big data es como la gravedad, desde Newton sabemos como funcona en la practica, es una ley, pero no es una teoria porque nosabemos que es realmente. con Big Data encontramos resultados espectaculares de prediccion minando grandes cantidades de datos pero no entendemos los mecanismos sociales que intervienen.
- social simulations
 - with insects we predict social complexity
 - we eplain without cognitiva agent.thats true
 - technology for collective intelligency
 - VDI is just an preliminary step
 - do we need an emotional mind alwaysin simullations? castelfranchi thiks not
- there is no technical perfect solutions to political problems because the cause is here are CONFLICTING PERSONAL INTERESTS

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