Responsible AI

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Barcelona

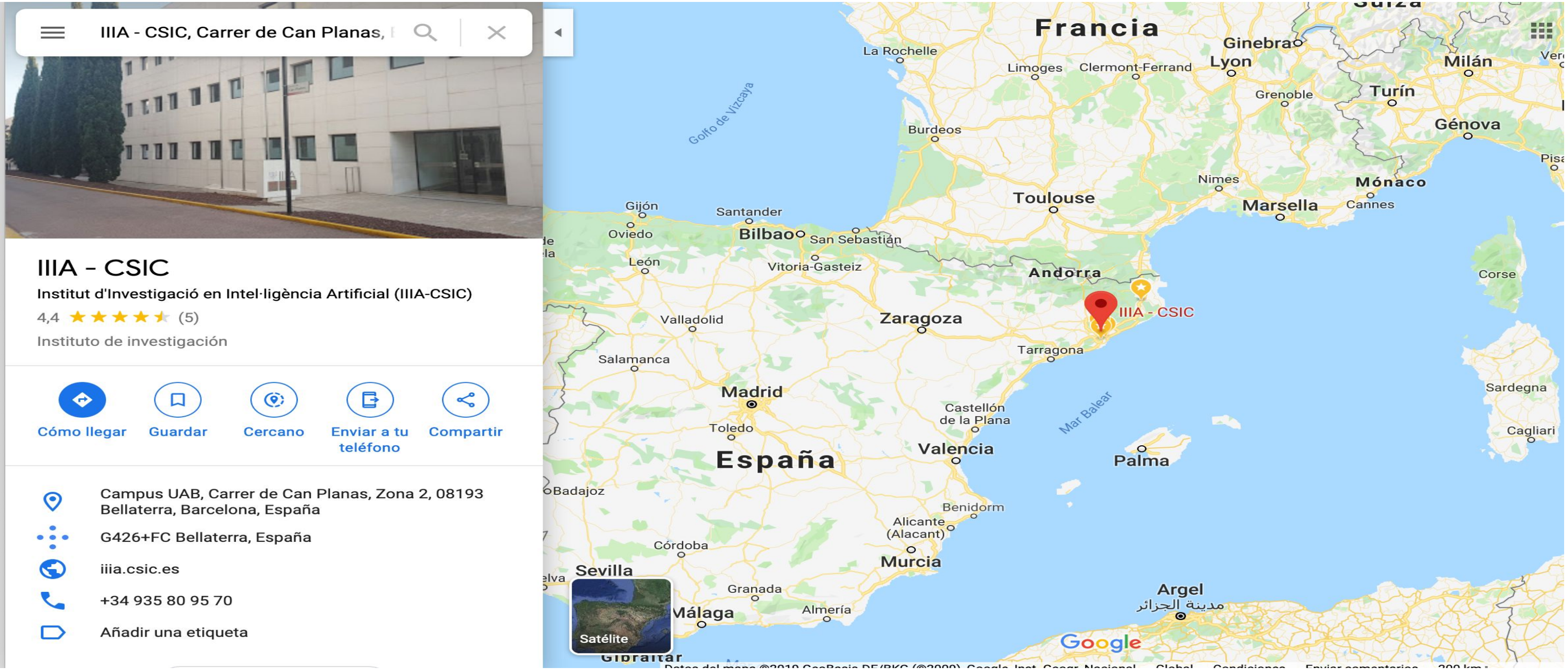
Digital Humanism initiative
Wien, 26 April 2022

* Joint work. Nardine Osman
and Nieves Montes.

IIIA

Students, write your response!

IIIA-CSIC



IIIA - CSIC, Carrer de Can Planas,

IIIA - CSIC

Institut d'Investigació en Intel·ligència Artificial (IIIA-CSIC)

4,4 ★★★★☆ (5)

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iiia.csic.es

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Añadir una etiqueta

80 people including **25 AI Senior Researchers** out of which **6 are EurAI Fellows.**

It has graduated **100 PhDs** in Artificial Intelligence.

AI at the ethical frontier

Ethical Concerns

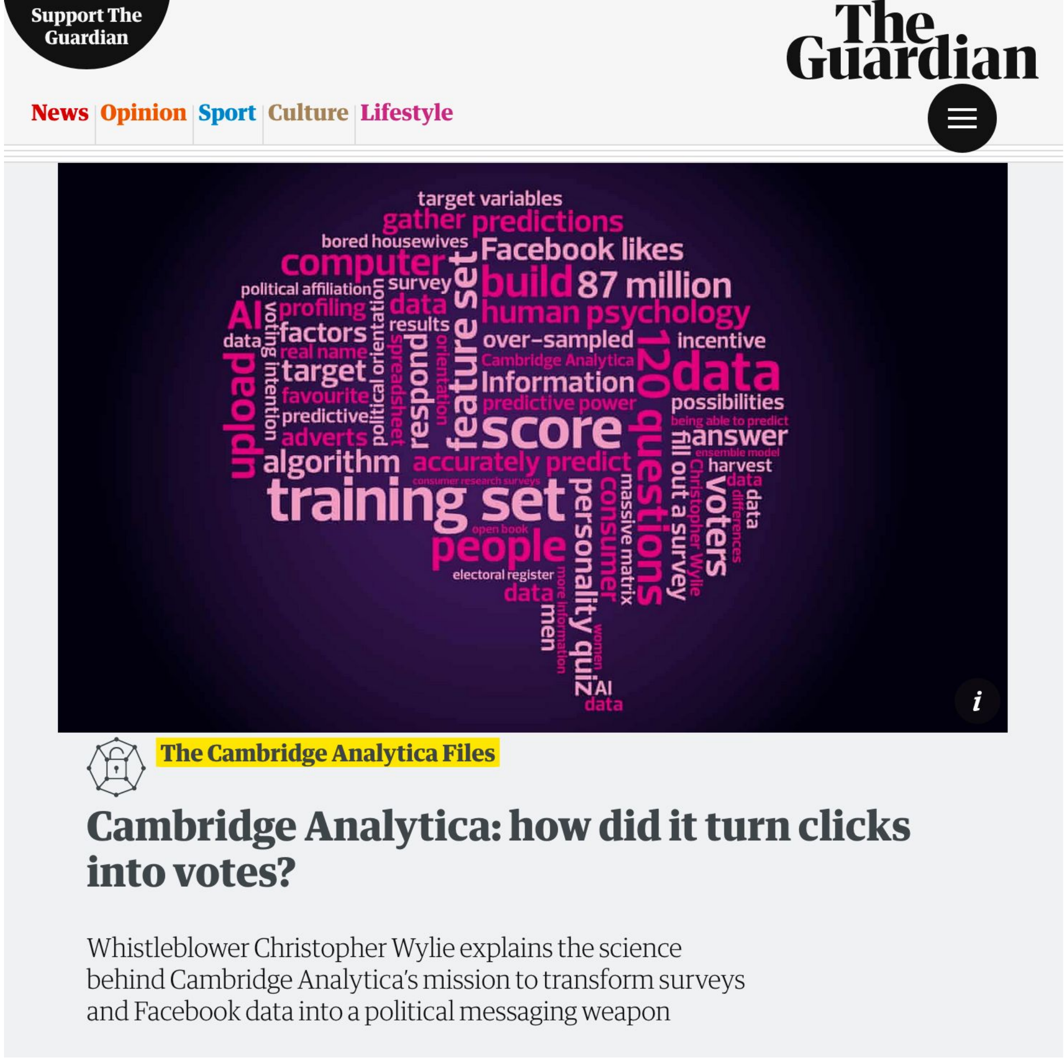
AI High level expert group

AI Act

Barcelona Declaration

…

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE
ETHICS OF AI
ONLINE CERTIFICATE COURSE
Investigate the ethical challenges and opportunities posed by AI in this highly applicable master class experience

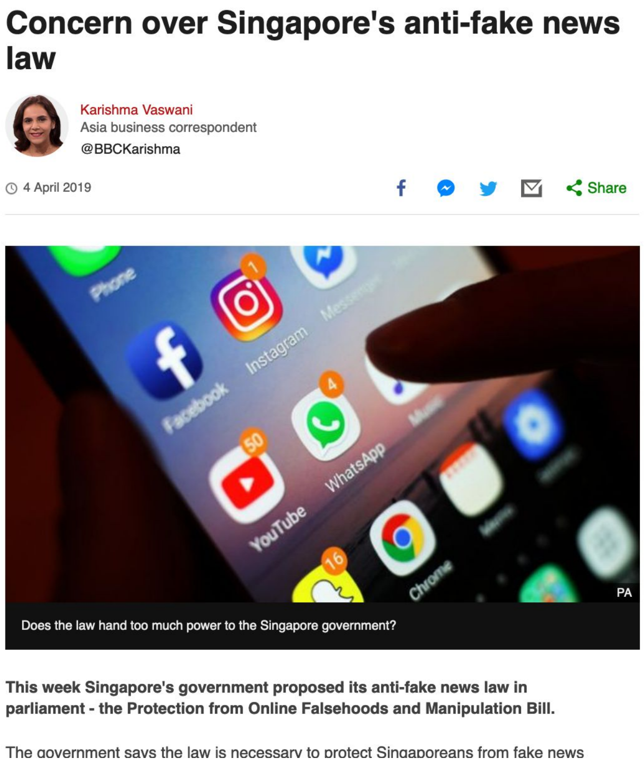


The Cambridge Analytica Files

Cambridge Analytica: how did it turn clicks into votes?

Whistleblower Christopher Wylie explains the science behind Cambridge Analytica's mission to transform surveys and Facebook data into a political messaging weapon

Ethical Concerns



Concern over Singapore's anti-fake news law

Karishma Vaswani
Asia business correspondent
@BBCKarishma

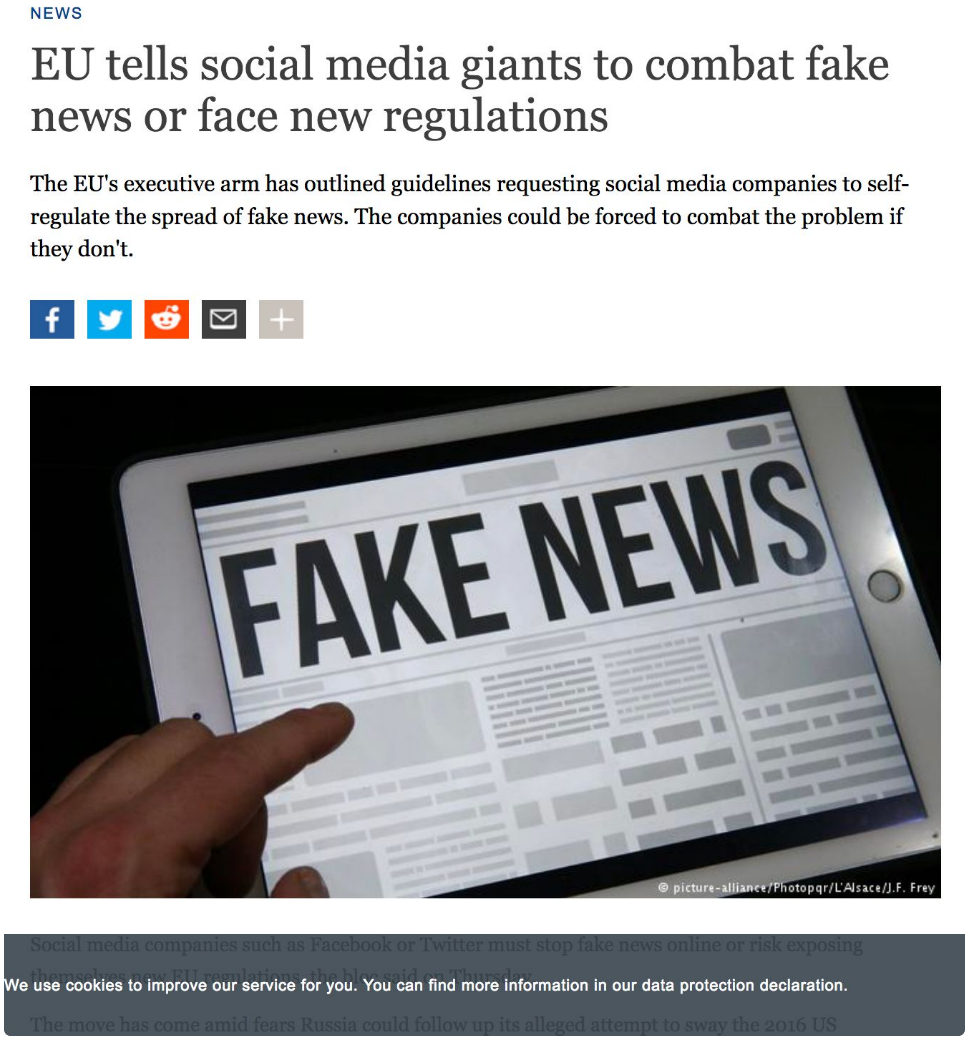
4 April 2019

PA

Does the law hand too much power to the Singapore government?

This week Singapore's government proposed its anti-fake news law in parliament - the Protection from Online Falsehoods and Manipulation Bill.

The government says the law is necessary to protect Singaporeans from fake news



NEWS

EU tells social media giants to combat fake news or face new regulations

The EU's executive arm has outlined guidelines requesting social media companies to self-regulate the spread of fake news. The companies could be forced to combat the problem if they don't.

© picture-alliance/Photopqr/L'Alsace/J.F. Frey

Social media companies such as Facebook or Twitter must stop fake news online or risk exposing themselves new EU regulations, the bloc said on Thursday.

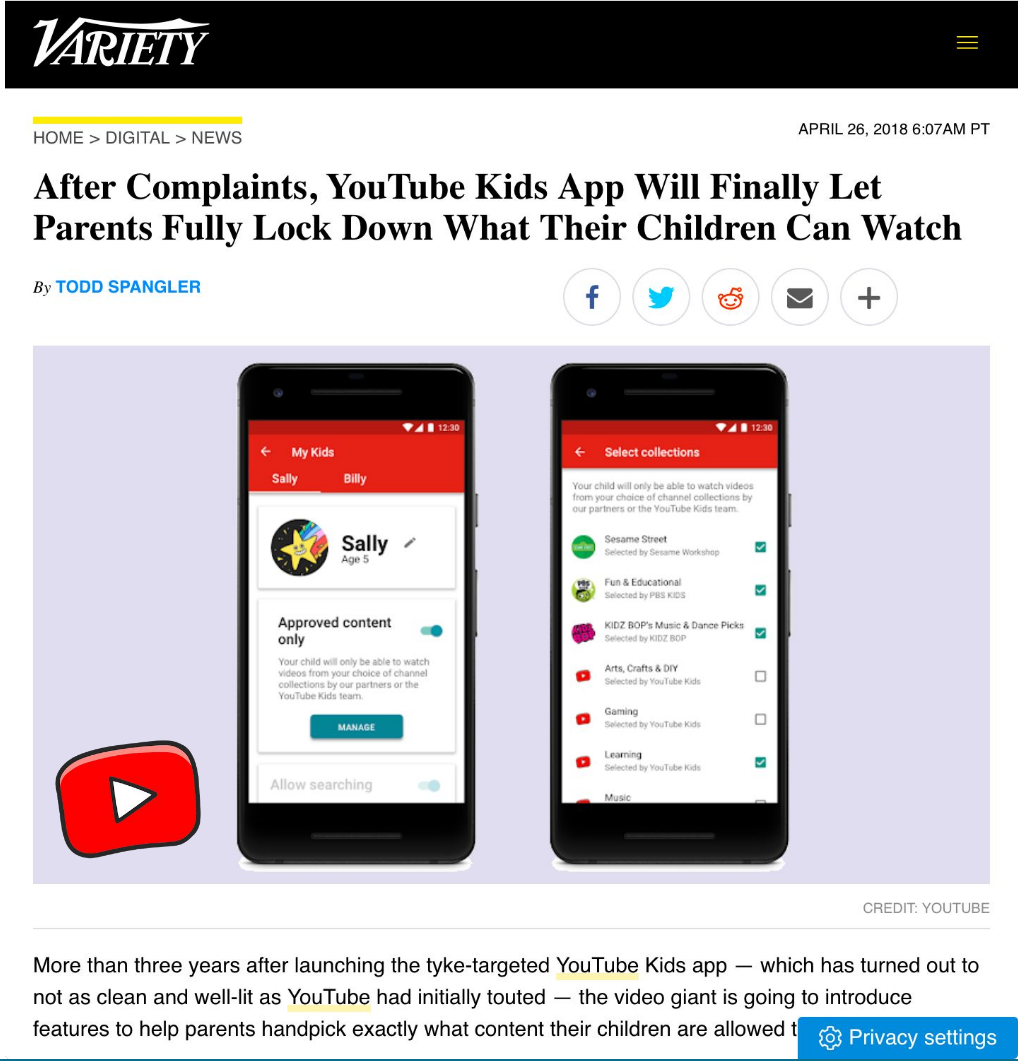
We use cookies to improve our service for you. You can find more information in our data protection declaration.

The move has come amid fears Russia could follow up its alleged attempt to sway the 2016 US

Ethical Concerns

Not JUST privacy, security, & manipulation!

We are also concerned about basic features and functionality.



VARIETY

HOME > DIGITAL > NEWS

APRIL 26, 2018 6:07AM PT

After Complaints, YouTube Kids App Will Finally Let Parents Fully Lock Down What Their Children Can Watch

By TODD SPANGLER

My Kids
Sally
Billy
Sally
Age 5
Approved content only
Your child will only be able to watch videos from your choice of channel collections by our partners or the YouTube Kids team.
MANAGE
Allow searching
Select collections
Your child will only be able to watch videos from your choice of channel collections by our partners or the YouTube Kids team.
Sesame Street
Selected by Sesame Workshop
Fun & Educational
Selected by PBS KIDS
KIDZ BOP's Music & Dance Picks
Selected by KIDZ BOP
Arts, Crafts & DIY
Selected by YouTube Kids
Gaming
Selected by YouTube Kids
Learning
Selected by YouTube Kids
Music

CREDIT: YOUTUBE

More than three years after launching the tyke-targeted YouTube Kids app — which has turned out to not as clean and well-lit as YouTube had initially touted — the video giant is going to introduce features to help parents handpick exactly what content their children are allowed t

Privacy settings

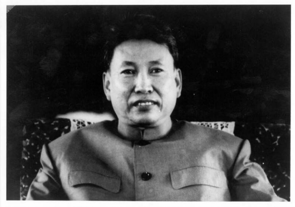
Can we (AI developers) put humans in control?

Should we?

Moral Humans

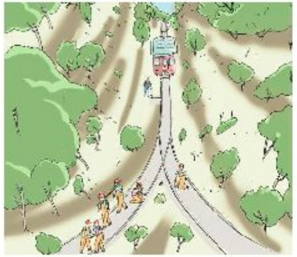
Psychopaths, an amoral mind.

- Enjoying other's suffering/loses
- Insensibility to signs of physical pain in others
- Lack of fear and insensibility to punishment
- Instrumental, gratuitous violence
- Lack of remorse, guilt, shame



Breakdown in the brain network subserving moral judgment in criminal psychopathy

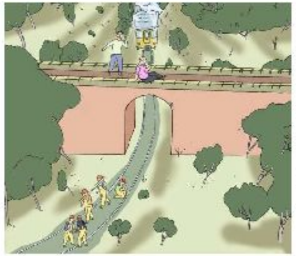
Pujol J, Batalla I, Contreras-Rodriguez O, Harrison BJ, Pera V, Hernández-Ribas R, Real E, Soriano-Mas C, Deus J, López-Solà M, Pifarre J, Menchón JM and Cardoner N (2011), ***SCAN***, 7, 8. 917-923.



18. Mr. Jones is working on a section of the rail track where two separate tracks converge. A runaway train is heading towards Mr. Jones's position. On the tracks travelling to the left there is a group of five railway workmen. On the tracks to the right there is a single workman. If Mr. Jones does nothing, the trolley will proceed to the left and kill the group of five men. If he changes the train's direction, the trolley will divert to the right killing only the one workman.

Voice prompt: Would you switch on the dashboard?

Psychopaths' Responses:
Yes: 77.3%; No: 22.7% (Omissions= 0)
Controls' Responses:
Yes: 90.9%; No: 9.1% (Omissions= 0)
Group comparison: χ^2= 1.5; p= 0.216



8. Mr. Jones sees a trolley car that is moving at high speed towards five workmen on the rail track. Mr. Jones is standing on a footbridge above the tracks. Next to him there is a very large and tall man. If Mr. Jones pushes the man off the bridge, he will die but his body will stop the trolley and the workmen will be saved. If he does not, all the workmen will die.

Voice prompt: Would you push the man off the bridge?

Psychopaths' Responses:
Yes: 60%, No: 40% (Omissions 2)
Controls' Responses:
Yes: 36.4%; No: 63.6% (Omissions 0)
Group comparison: χ^2= 2.3; p= 0.126

6. Dr. Jones has five patients, each of whom is close to dying from organ failures. She also has another patient who is mostly healthy. The only way that she can save the five others is to transplant this man's organs into their bodies but against his will. If she does this, the healthy man will die, but the other five patients will live.

Voice prompt: Would you transplant the man's organs?

Psychopaths' Responses:
Yes: 57.1%; No: 42.9% (Omissions 1)
Controls' Responses:
Yes: 13.6%; No: 86.4% (Omissions 0)
Group comparison: χ^2= 9.0; p= 0.003

13. Mr. Jones's plane has crashed in the Himalayas. The only survivors are one other man, a young boy and himself. To live they must find their way to a small town on the other side of the mountain. They trek for three days in the extreme cold. The young boy falls and breaks his leg, critically reducing his chances of survival. The other man suggests to Mr. Jones to sacrifice the boy and eat his remains in order to survive. If Mr. Jones accepts the proposal they will have enough strength to make it to the small town. If he does not, the boy will eventually die and they will too.

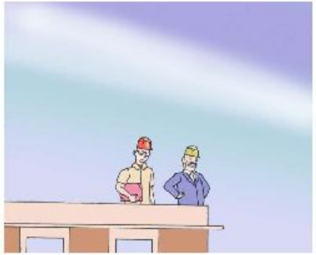
Voice prompt: Would you kill the young boy?

Psychopaths' Responses:
Yes: 50%; No: 50% (Omissions= 2)
Controls' Responses:
Yes: 22.7%; No: 77.3% (Omissions 0)
Group comparison: χ^2= 3.4; p= 0.065

11. Mr. Jones goes to the hospital to visit a sick friend. There he meets a young man who explains to Mr. Jones that his father has been admitted to the hospital and only has one more week to live. He explains that his father has a substantial life insurance policy that will expire at midnight and offers Mr. Jones $12.000 to kill him. If Mr. Jones accepts the offer, he will have to kill the old man but he will receive the money. If he does not, the insurance will expire and neither of them will receive a cent.

Voice prompt: Would you kill the old man?

Psychopaths' Responses:
Yes: 22.7%; No: 77.7% (Omissions= 0)
Controls' Responses:
Yes: 0%; No: 100% (Omissions= 0)
Group comparison: χ^2= 5.6; p= 0.018



7. Mr. Jones is a young architect who is visiting one of his construction sites with his boss. His boss is a despicable man who makes everyone miserable, including Mr. Jones. If Mr. Jones pushes him off the building he will die and Mr. Jones will be interviewed by the police, but if he does not his boss will continue ruining other people's lives.

Voice prompt: Would you push him off the building?

Psychopaths' Responses:
Yes: 31.8%; No: 68.2% (Omissions= 0)
Controls' Responses:
Yes: 0%; No: 100% (Omissions= 0)
Group comparison: χ^2= 8.3; p= 0.004

Answers

- Psychopaths: 57,1% Yes

- Control Group: 13,6% Yes

Control group were nurses!!!!

Humans in control? Yes, but as communities.

- We as individuals take different decisions in front of similar situations

- We as individuals interpret social and moral values differently

- Therefore, we need a social contract with technology to enable Communities to rule.

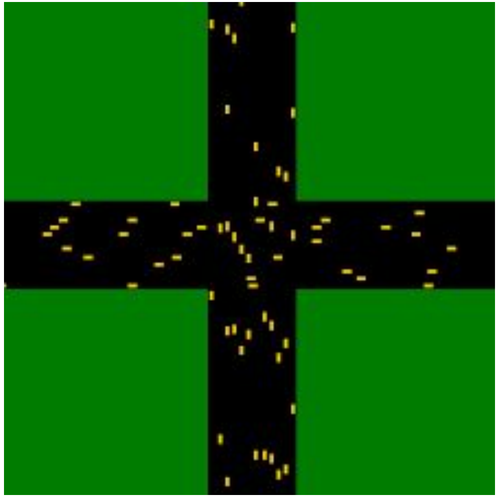
What rights do we *agree* to surrender, as a society or group, to technology in exchange for the protection of our remaining rights and maintenance of the social order?

Towards value engineering

It has to be US! We need to put people (pl.) in control, because AI must be social

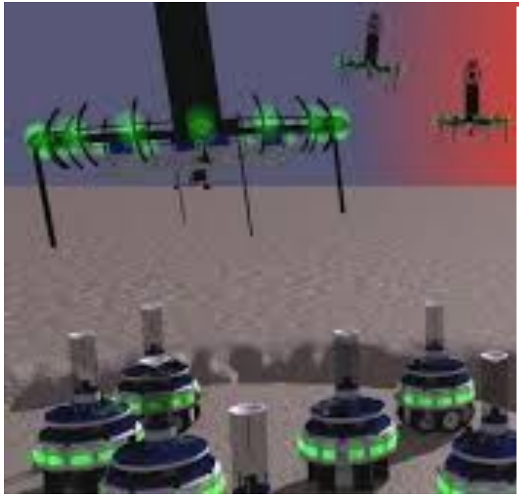
Billions of AI systems will interact among themselves and with humans. Our future society will be a colossal Multiagent System, a huge **sociotechnical community.**

Traffic



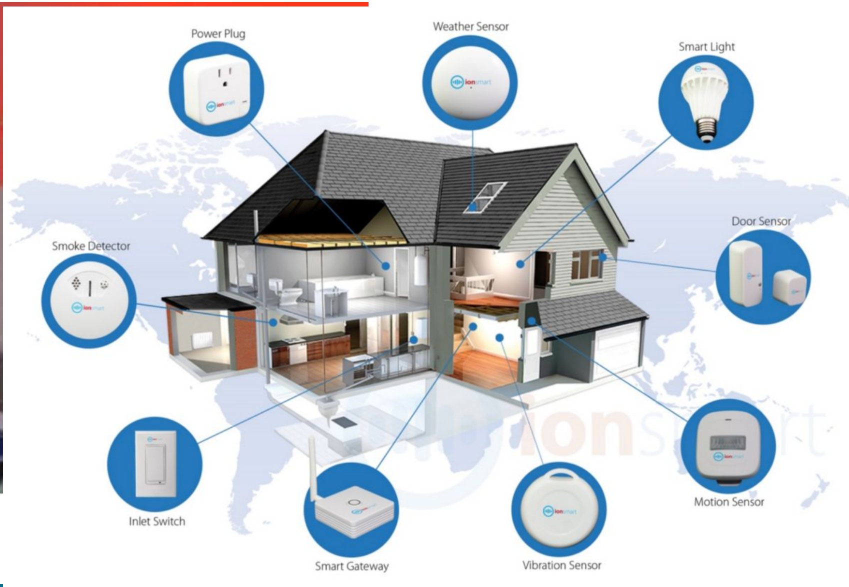
Kurt Dresner and Peter Stone

Multi-robot



IRIDIA Lab

IoT



MAS: meeting point for AI (technology) and Humanities (people).

From individual rationality to social intelligence we need:

- Communicative interaction
- Social Co-ordination
- Agreement technologies
- Social networks
- Social choice
- Agent-based modelling
- Social simulation

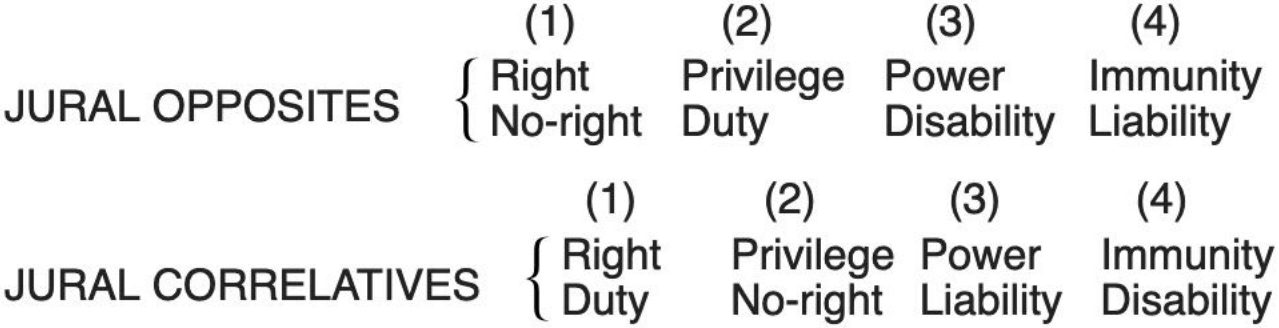
Matthew Yee-King, Roberto Confalonieri, Dave de Jonge, Katina Hazelden, Carles Sierra, Mark d'Inverno, Leila Amgoud, Nardine Osman:
Multiuser museum interactives for shared cultural experiences: an agent-based approach. AAMAS 2013: 917-924

But how to guarantee value respect when entities are autonomous?

- Values are social constructs. No universals; they are context dependent.
- No individual behaviour guarantee can be obtained when systems are **fully** autonomous.
- However, we can design **sociotechnical communities** so that unacceptable behaviour generates **repair actions** and **punishements**. (This is the **legal approach**.) And, desirable behaviour is geared via **incentives**. (This is the **economic approach**.)

Let’s get inspiration from how we humans model responsible behaviour.

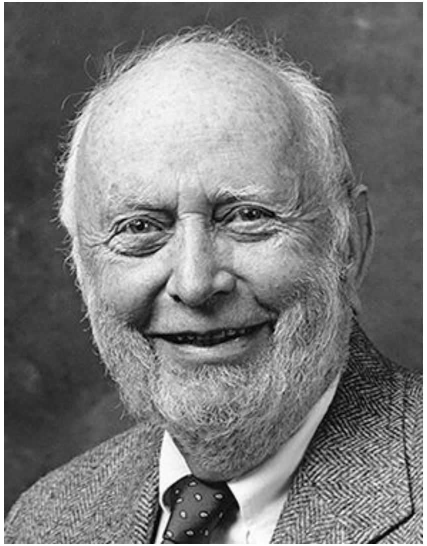
Legal Relations to fix the interpretation of ‘Right’.



		(1)	(2)	(3)	(4)
JURAL OPPOSITES	{	Right	Privilege	Power	Immunity
		No-right	Duty	Disability	Liability
		(1)	(2)	(3)	(4)
JURAL CORRELATIVES	{	Right	Privilege	Power	Immunity
		Duty	No-right	Liability	Disability

Wesley Newcomb Hohfeld. *Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 23 YALE L.J. 16 (1913).

New Institutional Economics

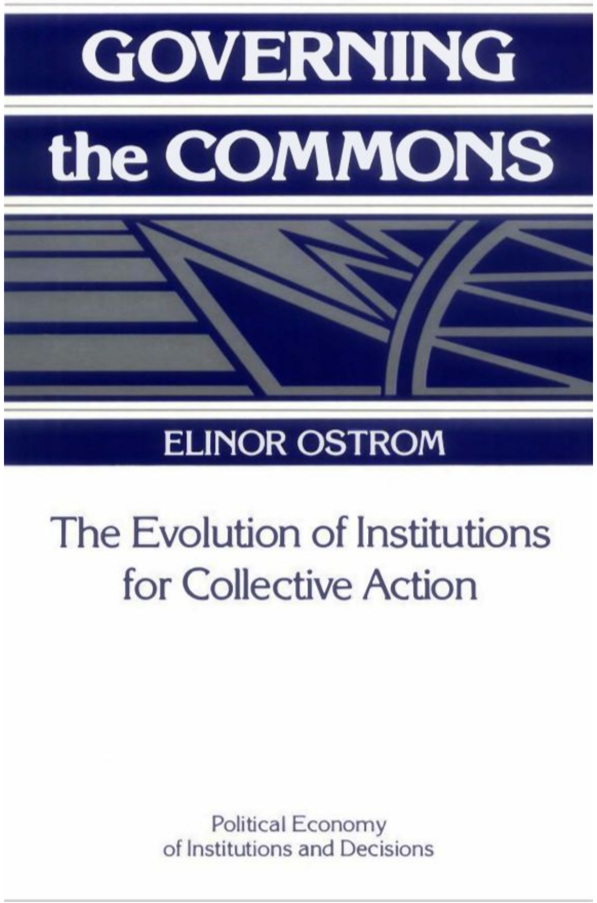


Douglass North: "Transaction costs, institutions, and economic performance." (1992)

“humanly devised constraints that structure political, economic and social interactions”.

Sustainable Collective Action. Self-Governing Institutions.

New Institutional Economics, Nobel 2009



GOVERNING the COMMONS

ELINOR OSTROM

The Evolution of Institutions for Collective Action

Political Economy of Institutions and Decisions

L'Horta watering communities

- May 29, 1435, 84 irrigators approved formal regulations on how to share water.
- Some rules had been in use from much earlier.
- Rules talk about maintenance, fines, officials, and use of water depending on the environment.
- They are an example of situatedness.

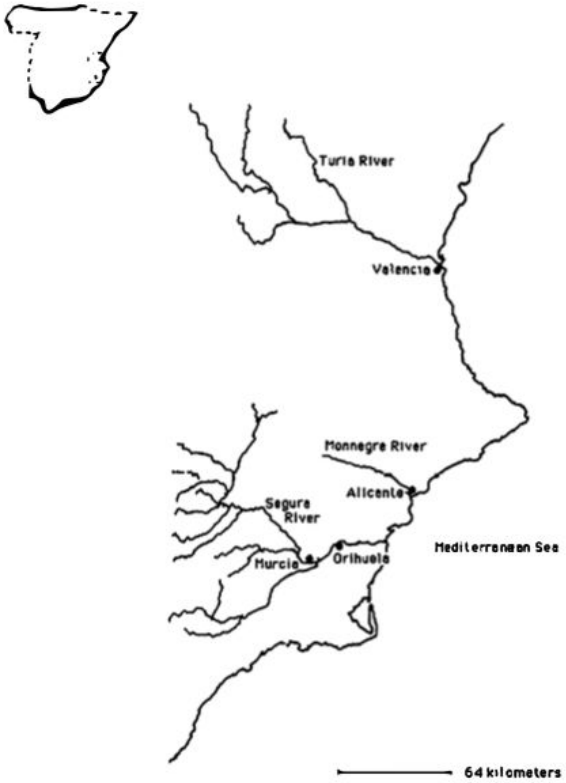


Figure 3.1. Location of Spanish *huertas.*

Human communities are often successful

Ostrom’s principles and the *Horta*

Boundaries: irrigation rights come with the land.
Appropiation and provision: proportional to size of land.
Collective choice: election of officials in the court.
Monitoring: ‘turno’ system makes monitoring high and easy.
Sanctions: surprisingly low frequency. 0,8%.
Conflict: weekly meetings.
Rights to organise: no external interference

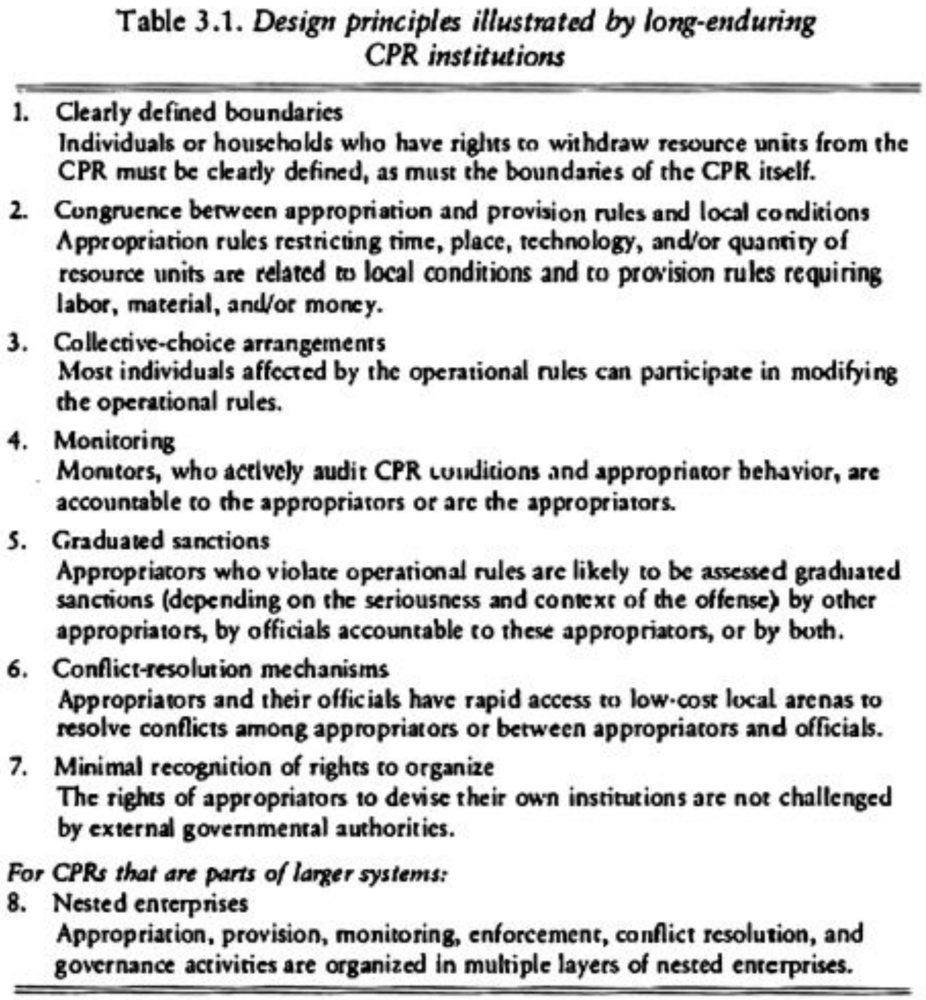


Table 3.1. *Design principles illustrated by long-enduring CPR institutions*

1. Clearly defined boundaries
   Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.
2. Congruence between appropriation and provision rules and local conditions
   Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money.
3. Collective-choice arrangements
   Most individuals affected by the operational rules can participate in modifying the operational rules.
4. Monitoring
   Monitors, who actively audit CPR conditions and appropriator behavior, are accountable to the appropriators or are the appropriators.
5. Graduated sanctions
   Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both.
6. Conflict-resolution mechanisms
   Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7. Minimal recognition of rights to organize
   The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.

For CPRs that are parts of larger systems:

8. Nested enterprises
   Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

Community norms

- Each farm on a canal receives water in a rotation order.
- If a farmer fails to open his headgate when the water arrives there, he misses his turn and must wait for the next rotation.
- Each farmer decides how much water to take.
- The households to receive timber form teams and equaly divide the work.
- Workers will make equaly sized piles of logs.
- A lottery determines which pile goes to which household.

But…

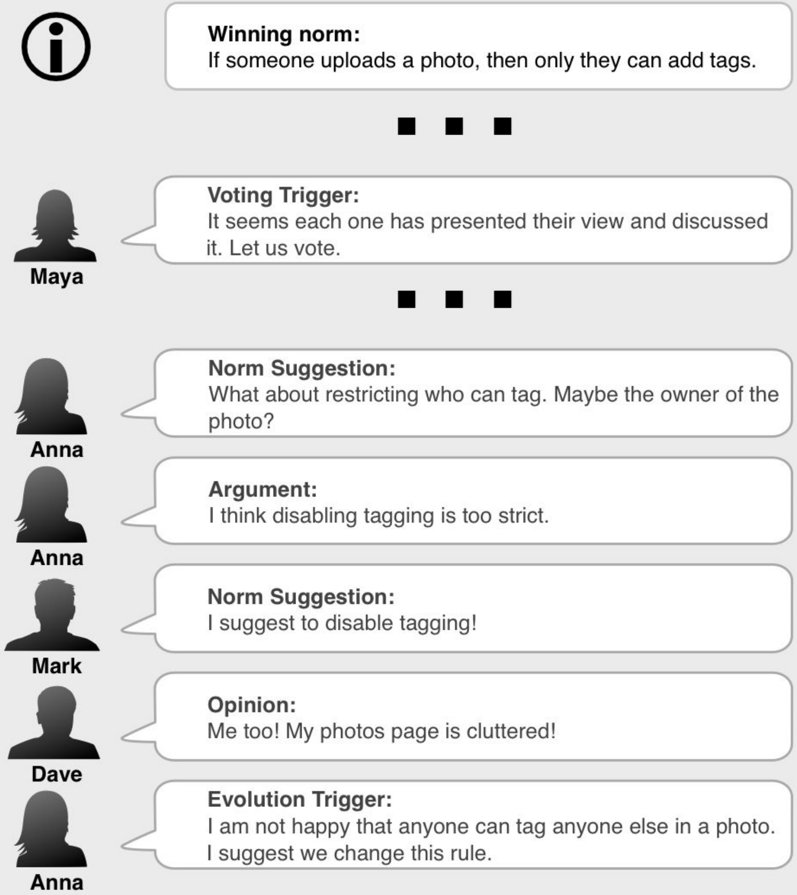
- How are norms created?

- How do they relate to human shared values?

Two illustrative examples in a digital world

1 Birth of Norms:

Members of the Anthropology Class of 2019 agree on a new norm:



Winning norm:
If someone uploads a photo, then only they can add tags.

■ ■ ■

Maya — **Voting Trigger:**
It seems each one has presented their view and discussed it. Let us vote.

■ ■ ■

Anna — **Norm Suggestion:**
What about restricting who can tag. Maybe the owner of the photo?

Anna — **Argument:**
I think disabling tagging is too strict.

Mark — **Norm Suggestion:**
I suggest to disable tagging!

Dave — **Opinion:**
Me too! My photos page is cluttered!

Anna — **Evolution Trigger:**
I am not happy that anyone can tag anyone else in a photo. I suggest we change this rule.

2 Norm Formalisation (automated):

The norm in [restricted] natural language is formalised.

$$\begin{aligned}&\text{upload\_photo}(\text{Someone}, \text{Photo}) \Longrightarrow\\ &\quad \neg\, \text{tag}(\text{SomeoneElse}, \text{Photo}, \text{TaggedPerson})\\ &\quad \wedge\, \text{SomeoneElse} \neq \text{Someone}\end{aligned}$$

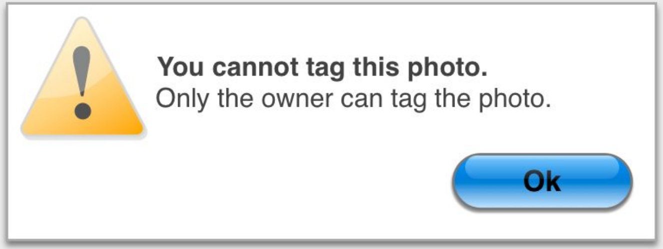
3 Norm Operationalisation (automated):

The formal norm is operationalised.

```
alert("You cannot tag this photo. Only
the owner can tag this photo.");
```

4 Norm Enforcement (automated):

The photo cannot be tagged by anyone other than the owner.



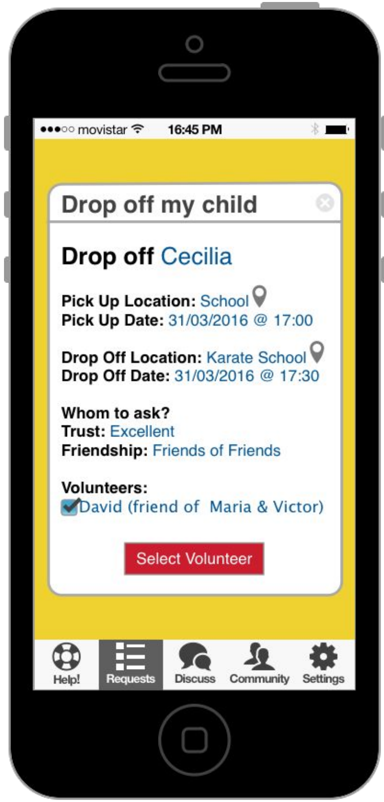
You cannot tag this photo.
Only the owner can tag the photo.

Single mothers community in uHelp.

Download on the App Store

uHelp

GET IT ON Google play



Drop off my child

Drop off Cecilia

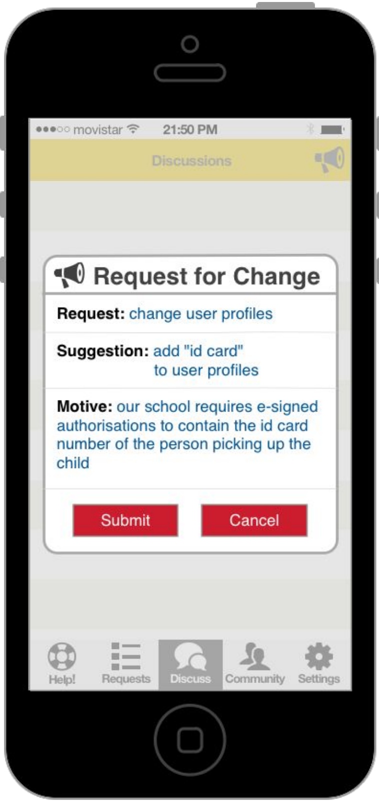
Pick Up Location: School
Pick Up Date: 31/03/2016 @ 17:00

Drop Off Location: Karate School
Drop Off Date: 31/03/2016 @ 17:30

Whom to ask?
Trust: Excellent
Friendship: Friends of Friends

Volunteers:
☑ David (friend of Maria & Victor)

Select Volunteer



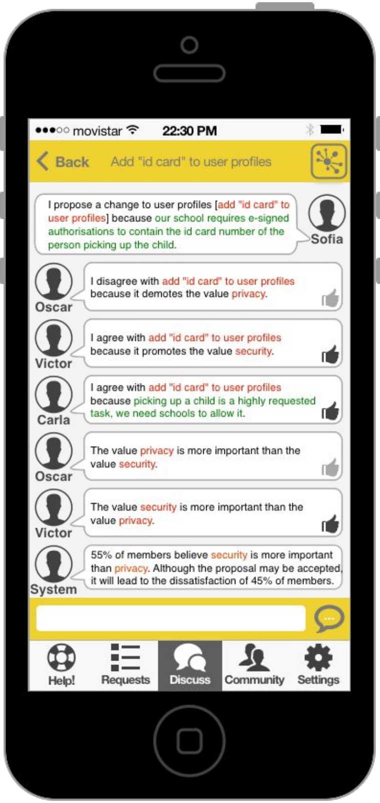
Request for Change

Request: change user profiles

Suggestion: add "id card" to user profiles

Motive: our school requires e-signed authorisations to contain the id card number of the person picking up the child

Submit | Cancel



Add "id card" to user profiles

Sofia: I propose a change to user profiles [add "id card" to user profiles] because our school requires e-signed authorisations to contain the id card number of the person picking up the child.

Oscar: I disagree with add "id card" to user profiles because it demotes the value privacy.

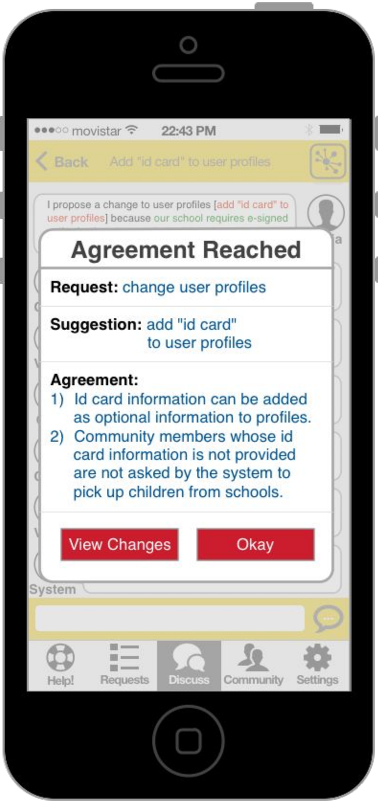
Victor: I agree with add "id card" to user profiles because it promotes the value security.

Carla: I agree with add "id card" to user profiles because picking up a child is a highly requested task, we need schools to allow it.

Oscar: The value privacy is more important than the value security.

Victor: The value security is more important than the value privacy.

System: 55% of members believe security is more important than privacy. Although the proposal may be accepted, it will lead to the dissatisfaction of 45% of members.



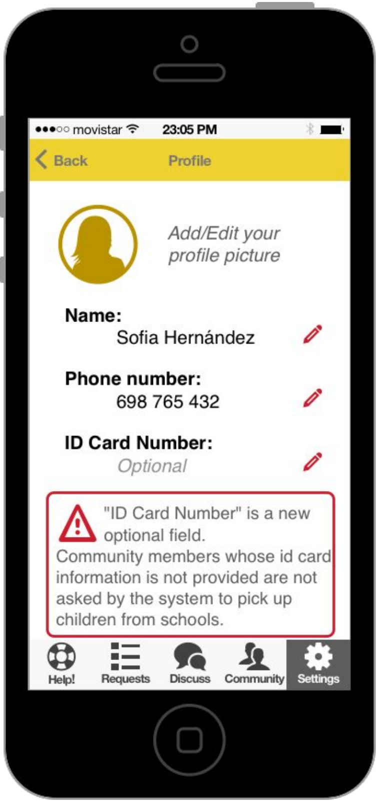
Agreement Reached

Request: change user profiles

Suggestion: add "id card" to user profiles

Agreement:
1) Id card information can be added as optional information to profiles.
2) Community members whose id card information is not provided are not asked by the system to pick up children from schools.

View Changes | Okay



Profile

Add/Edit your profile picture

Name:
Sofia Hernández

Phone number:
698 765 432

ID Card Number:
Optional

"ID Card Number" is a new optional field. Community members whose id card information is not provided are not asked by the system to pick up children from schools.

From Values to Norms

Context

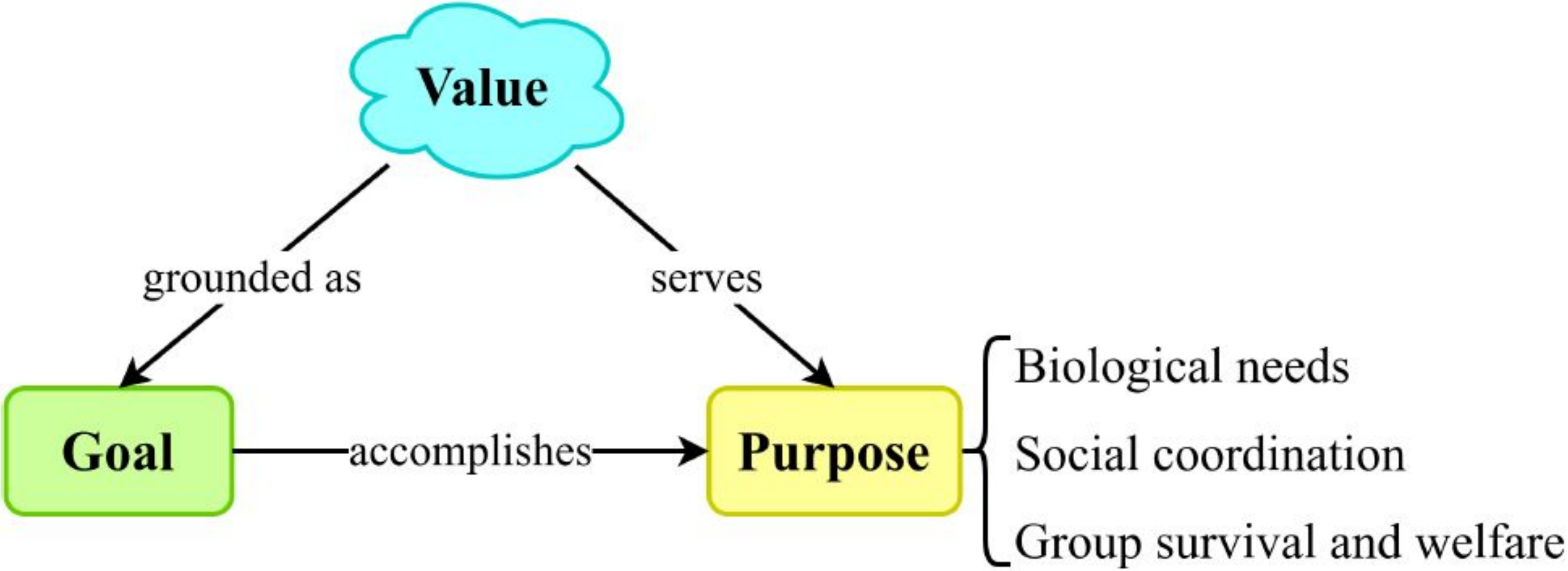
The future is a **massive multiagent system**:

- Humans
- Software agents

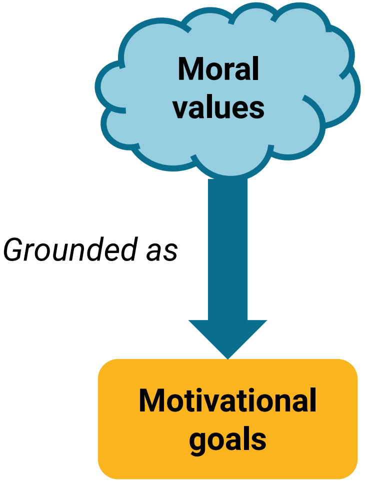
We (humans) are responsible for **embedding values** into autonomous agents.

➔ Programmers need to turn **values into code**

Turning Values into Code. Schwartz’s theory



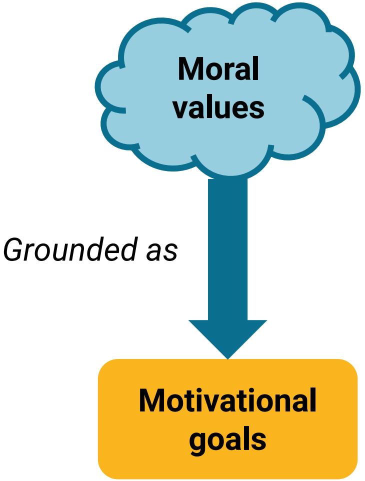
Turning Values into Code



Based on Schwartz's Theory of Basic Human Values, abstract values are **grounded into permanent goals** that agents pursue:

1. Proxies for values
2. How values manifest in the real/virtual world
3. State of affairs + history of actions
4. Permanent status
5. Value hierarchy → goal hierarchy

Turning Values into Code



Once values are turned into permanent goals, the autonomous agent can **evaluate the state of the world** as it relates to every value instilled in it.

The **human designer is in charge** of deciding how a value is grounded:

→ **control over the meaning of values**

Promoting Values with Norms

Technical norms encompass:

Do's and don'ts over the actions that an autonomous agent can take,

under what **circumstances**

with what **effects**

→ **Norms are the main value-promoting mechanism** ←

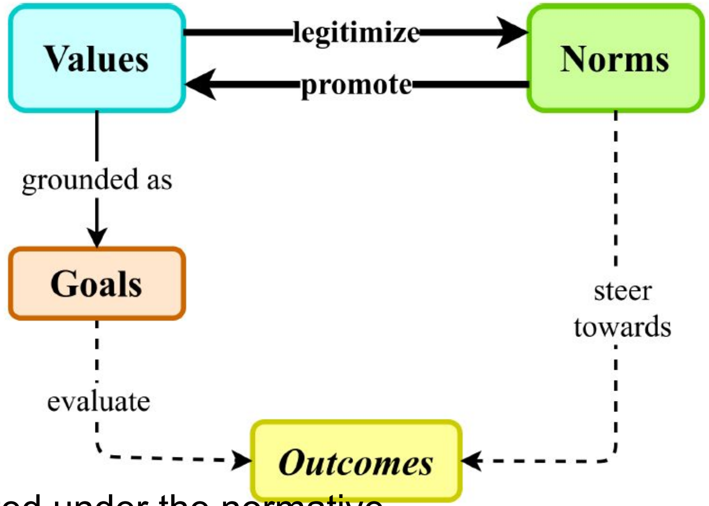
Promoting Values with **Norms**

Norms can change the incentive structure and **steer the system** towards outcomes that are better viewed in terms of values (i.e. closer to the grounding goals).

When that is the case →

norms are aligned w.r.t. values

$$\text{Algn}_{N,v} = \mathbb{E}\left[f_v\left(\text{out}(\mathcal{P}^N)\right)\right]$$



PN is the random variable of the subset of paths restricted under the normative system N. fv is the semantics function of value v.

Methodology

1) Define the variables that determine the state
2) Define the (parametric) norms that regulate the transitions
3) Define the set of values of interest
4) Apply an optimisation algorithm to find the parameters that maximise alignment
5) Analyse the shapley value of norms and value compatibility
6) Iterate from 2

Nieves Montes, Carles Sierra:
Value-Guided Synthesis of Parametric Normative Systems. AAMAS 2021: 907-915. Extension in JAIR in Press.

Example

tax system, taxes get collected, grown and redistributed. Some agents cheat and try to evade

<u>1) Values</u> = {*equality*, *fairness*}

<u>2) Normative system:</u>

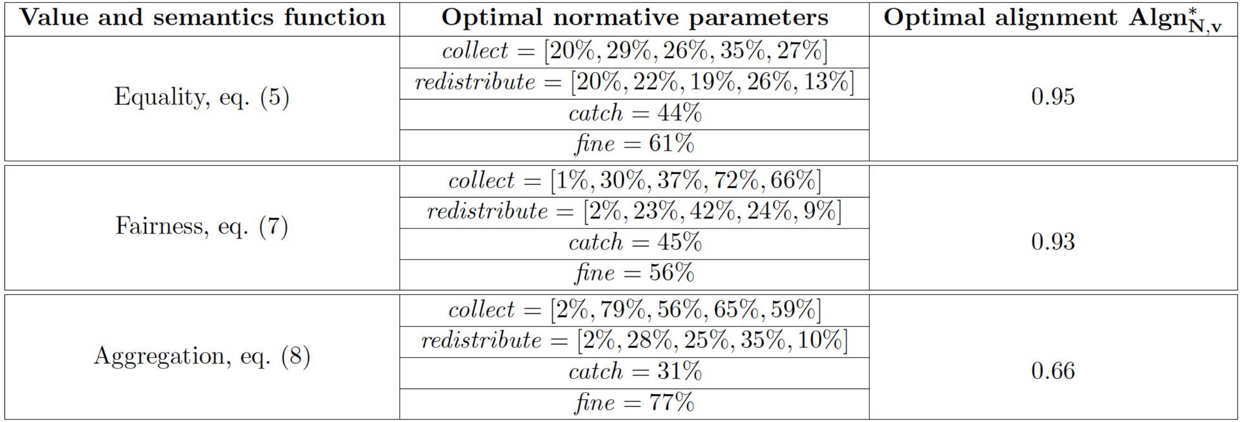
n_1: how much should each agent pa

n_2: how to redistribute

n_3: how often should evaders be detected

n_4: how much to fine evaders when detected

3) Optimise



Value and semantics function	Optimal normative parameters	Optimal alignment $\text{Algn}^*_{\text{N,v}}$
Equality, eq. (5)	*collect* = [20%, 29%, 26%, 35%, 27%]	0.95
	redistribute = [20%, 22%, 19%, 26%, 13%]	
	catch = 44%	
	fine = 61%	
Fairness, eq. (7)	*collect* = [1%, 30%, 37%, 72%, 66%]	0.93
	redistribute = [2%, 23%, 42%, 24%, 9%]	
	catch = 45%	
	fine = 56%	
Aggregation, eq. (8)	*collect* = [2%, 79%, 56%, 65%, 59%]	0.66
	redistribute = [2%, 28%, 25%, 35%, 10%]	
	catch = 31%	
	fine = 77%	

Example

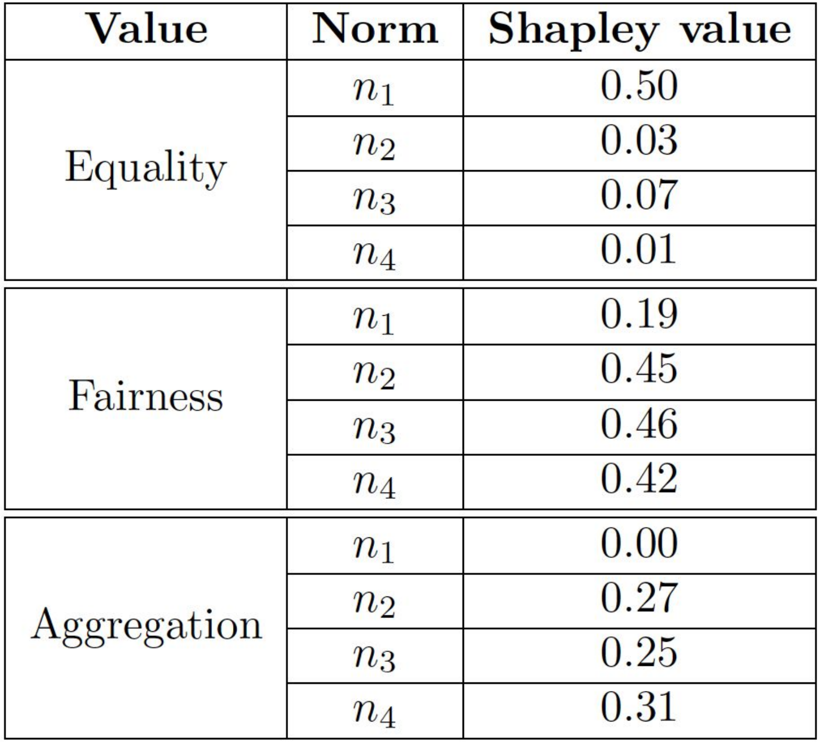
Interactions among individual norms

In normative system *N*, how much is norm n_i responsible for alignment with value *v*?

Shapley values

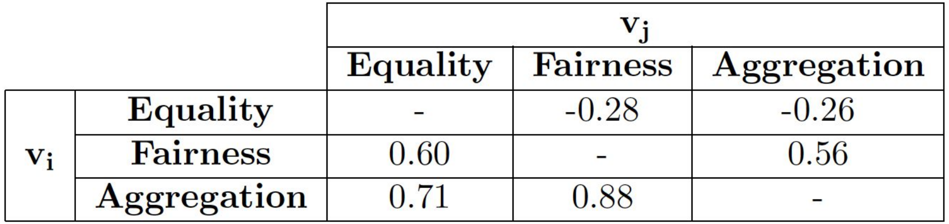
For equality: collecting taxes

For fairness: dealing with cheaters



Value	Norm	Shapley value
Equality	n_1	0.50
	n_2	0.03
	n_3	0.07
	n_4	0.01
Fairness	n_1	0.19
	n_2	0.45
	n_3	0.46
	n_4	0.42
Aggregation	n_1	0.00
	n_2	0.27
	n_3	0.25
	n_4	0.31

Example



		v_j		
		Equality	Fairness	Aggregation
v_i	Equality	-	-0.28	-0.26
	Fairness	0.60	-	0.56
	Aggregation	0.71	0.88	-

Interactions among values

Can normative system N promote more than one value simultaneously?

Value compatibility

Promoting *fairness indirectly leads to equality*, but *not the other way around*.

Methodology

1) Define the variables that determine the state

2) Define the (parametric) norms that regulate the transitions

3) Define the set of values of interest

4) Apply an optimisation algorithm to find the parameters that maximise alignment

5) Analyse the shapley value of norms and value compatibility

6) Iterate from 2

Nieves Montes, Carles Sierra:
Value-Guided Synthesis of Parametric Normative Systems. AAMAS 2021: 907-915. Extension in JAIR, In Press

Challenge: Agents Autonomously Handle Norms

Agents try to adapt the system's norms to promote their understanding of values:

Agents autonomously **propose, negotiate and agree on the norms** to be implemented.

Norms will not reflect any individual value structure, but an **aggregation** of them → the **emergent social values**

The agents are responsible for embedding values into norms, not the outside designer.

Summary - Our Value Engineering Proposal

- **Values** are coded into agents as **permanent goals**, designed by an outside human team.
- Technical **norms promote values** by shifting the system towards outcomes that come closer to the grounding goals.
- Agents **autonomously negotiate** over which norms to adopt and use **value alignment** to assess any proposal.
- Norm negotiation is a form of **value aggregation** of individual values into emergent **social values**.

In conclusion

Take-Home Message

Leverage **agent autonomy** to promote **ethical behaviour**

through the crafting and selection of **norms**

+

Keep **humans in control**

who decide the meaning of **values**

Value engineering aims at

- Empowering people to self-regulate their communities, interactions and objectives.

- Helping communities to satisfy Ostrom’s principles to guarantee sustainability.

- Supporting **explainabilty** and **transparency**.

- Providing tools for the analysis, coding and deployment of norms.

And generates plenty of open research questions

- When are two values similar?
- How to extract a normative position from text?
- How to deal with ethical conflict, i.e. conflicting norms?
- How to assess the impact of a normative change?
- How to learn norms from behaviour?
- How to synthesize code that implements norms?
- How to model incentives with norms?
- How to assess the sustainability of a normative system given a set of values shared by the humans?
- Is any set of norms acceptable?
- How to reconcile top-down and bottom-up generated norms?

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A research program for the MAS community

Thank you

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