

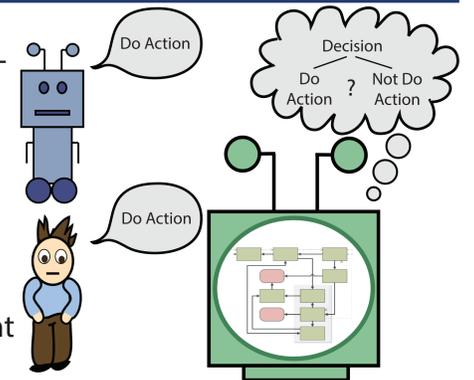
Motivation

The motivation for studying social power relates to its ability to act as a *social heuristic* in many social situation such as friends' interactions, organizations or even laboratory experiments.



Goal: Social Power Intelligence

Current approaches [1][2][4] do not take into account the particular dynamics and contrasting effects of using different bases of power. To address this we propose a conceptual framework to support agent perception, reasoning and intelligent use of social power aimed at multi-agent and agent-human interactions.



Elements of Social Power

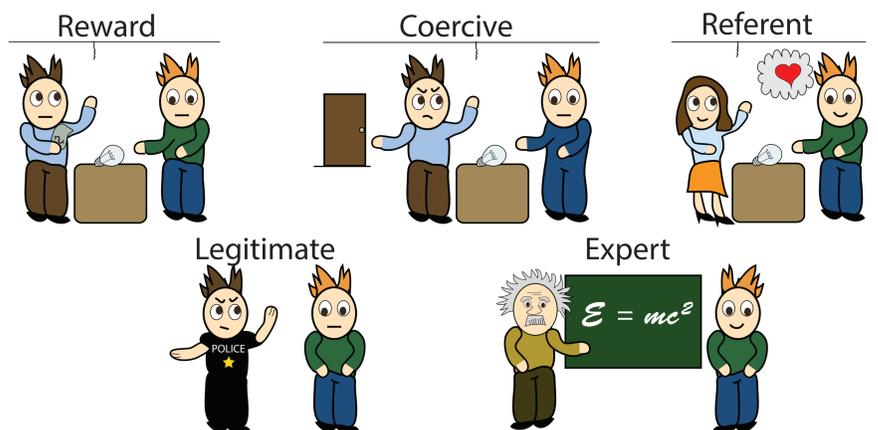
Context

Actor (A) is the agent exerting power over the actions of another.
Target (T) is the agent whose actions are affected by the Actor's power.
Action (C) the action evaluated by the Target in a given interaction.

What is it?

"**Social Power** of A over T regarding a possible change in T is the resultant potential force that A can induce on T towards that change."

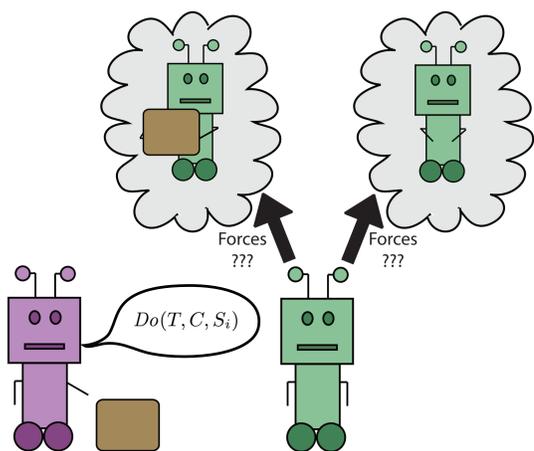
Bases of Social Power [2]



Operating Social Power

Situation

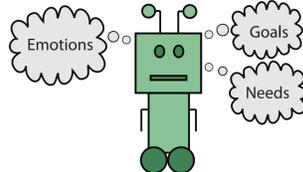
$$S_{f,c} = Do(T, C, S_i) \quad S_{f,-c} = \neg Do(T, C, S_i)$$



To operate social power we must understand the diverse factors influencing the Target's decision deliberative process. The basis of our approach derives from the concept of power as a force inducing change in a given direction.

Utility Force

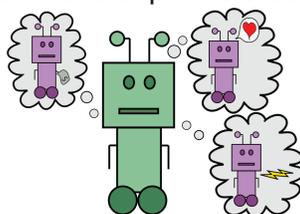
Utility plays a fundamental part in balancing the social powers in the decision of the agent regarding its goals. The utility force is calculated based on the utility of the possible outcomes.



$$utility_force(T, C) = utility(T, S_{f,c}) - utility(T, S_{f,-c})$$

Social Power Force

The social power force is represented as the sum of all identified powers at play in a given social situation. The Target can be subjected to several individual social power forces at once, from one or several power bases.

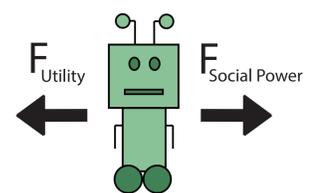


$$social_power_force(A, T, C) = \sum_{p \in IP} Force_p$$

$$Force_p = probability_p * magnitude_p$$

Decision

The agent's deliberation process may then assume a simple resultant force approach.



$$res_force(T, A, C) = utility_force(T, C) + social_power_force(T, A, C)$$

$$Decision = \begin{cases} Do(T, C, S_i), & \text{if } res_force(T, A, C) > 0 \\ \neg Do(T, C, S_i), & \text{if } res_force(T, A, C) \leq 0 \end{cases}$$

Resistance

This decision formalization takes into account the possibility of resistance at two distinct levels. First, if an utility is negative it represents an opposing force towards performing the required action. Second, for any individual social power Force the magnitude may reflect a negative social power.

Acknowledgements

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References

- [1] C. Castelfranchi. Founding agents' "autonomy" on dependence theory. In ECAI, volume 1, pages 353–357, 2000.
- [2] J. French Jr and B. Raven. The bases of social power. Studies in social power, pages 150–167, 1959.
- [3] H. Hexmoor. Absolute model of autonomy and power: Toward group effects. Connection Science, 14(4):323–333, 2002.
- [4] F. Lopez. Social Power and Norms: Impact on agent behaviour. PhD thesis, University Of Southampton, 2003.