

# Modelling Social Power Intelligent Agents

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**Abstract.** Social power, regardless of its pervasiveness and acknowledged impact in a multitude of human social processes remains little explored in IVAs. As such, to address this gap in social intelligence and consequently virtual agent believability, we briefly introduce the core processes for a cognitive architecture for social power intelligent agents.

**Keywords:** social power, cognitive architecture, social intelligence

## 1 Introduction

Social power is one of the most pervasive concepts in human societies due to its function as a *social heuristic* [1] for decision making. It combines diverse (and in themselves) complex decision influencing social concepts such as formal/informal norms, resource/action dependencies or social status[2]. Given its impact in a multitude of social processes[2] and interactions we argue it is fundamental to endow social intelligent virtual agents with such cognitive structures.

## 2 Cognitive Architecture for Social Power Intelligence

To create an agent architecture that can endow agents with power awareness and the ability to generate behaviors based on plans including power strategies our main inspiration was Raven's Power Interaction Model [1]. It defines the main stages underlying the cognitive process of a social power episode associated with an influence attempt, from both an influencing and influenced perspective.

From an influencing agent's perspective, its influence cognitive process is triggered by a motivation to influence (e.g. satisfy need or meet a role requirement). Next an assessment of its powers over the target of the influence is performed and an interaction planning is executed taking into account all the situational factors and possible effects. When the targeted agent detects the influence attempt it decides on its compliance based on the powers that the influencing agent has over it and expected effects of complying with the required action.

Based on the cognitive stages identified in [1] we conceptualized an agent architecture for a social power intelligent agents which integrate three fundamental core social power processes in a typical agent architecture. Next we will briefly introduce the conceptualized core social power processes.

### 2.1 Power Situational Analysis

This process identifies and quantifies the (believed) social power forces relevant to a given interaction. To do so the agent must not only detect powers directly mapped from the social power underlying factors (e.g. rewards, liking relations, expertise relations), but also their interdependencies (e.g. norms and coercions/punishments) and relation to beliefs regarding other agents' beliefs.

### 2.2 Power Effects Assessment

This process identifies the effects (or outcomes) of a current (or possible) social power interaction. Some inspirations to model these effects come from French and Raven[3]. For example, when reward power is used referent power increases (related to identification based on liking or attraction). In the case of coercions the effect is opposite.

### 2.3 Power Interaction Planner

The purposed of this process is to perform planning for social power-based interactions. This capability enables an agent to reason about possible influence situations and choose its best option to influence other agents by integrating all its knowledge about social powers, their effects and its own power utilization preferences. An agent can influence others in many different manners, for example it might simply ask another agent to do something or it might ask that same thing while emphasizing a legitimate reason for it. These modality considerations are what we call power strategies and are used to give emphasis on one or several bases of power.

## 3 Summary

In this work we briefly introduce theoretical background to inspire social power modeling in IVAs. This interdisciplinary link is the basis for the development of a IVA cognitive architecture that can endow agents with reasoning and interaction capabilities in social contexts with an ecology of power.

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