

# The Spanish Steps flower scam - agent-based modeling of a complex social interaction

## (Extended Abstract)

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### ABSTRACT

We model in detail a short human interaction scenario, the Spanish Steps flower scam. The scenario involves elements of negotiated commercial transaction, deceit, clash of cultural values and manipulation of public perception. The behavior of the actors is difficult to fit into a model of utility maximizing agents (even if we allow for bounded rationality). To model the scenario, we introduce a model where agents consider *vectors* of metrics which are not directly and linearly convertible into each other. The vectors consist of a mix of *concrete* and *culture sanctioned* metrics, with some of the latter being evaluated from the perspective of the self, the peers as well as the general public.

### Categories and Subject Descriptors

I.2.11 [Computing Methodologies]: Artificial Intelligence—*Multiagent systems*

### General Terms

Human Factors, Economics, Experimentation

### Keywords

agents, social models, simulation

## 1. INTRODUCTION

In this paper we model a flower selling scam, perpetrated in many tourist sites in Italy, such as the Spanish Steps in Rome. The intention of the seller is to pressure a client (typically a woman or a romantic couple) to purchase of an artificial rose at a high price:

- The seller offers a bouquet of flowers to the client. The client declines to purchase.
- The seller offers a single flower, relying on gestures implying that it is a gift. If the client refuses to take the flower, he repeats the offer several times, pushes the flower into the client's hands, or inserts it into her bag.
- The seller waits for 15-60 seconds several steps away from the client, who assumes that the interaction had concluded.

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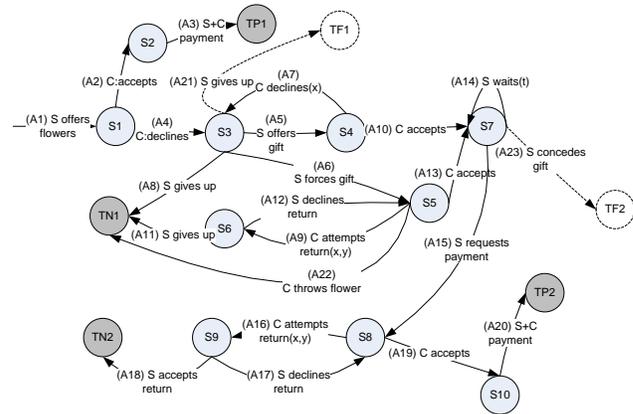


Figure 1: Action-state graph of the Spanish Steps scam.

- The seller approaches the client and requests payment.
- The client attempts to return the flower. The seller refuses to take it. The action concludes by either the client paying or by escalating her verbal efforts to return the flower until the seller decides to take it back.

The actions and states of the interaction are outlined in the action-state graph shown in Figure 1. Note however, as both the states and the actions must be further specified by *detail variables* which characterize the beliefs and mental states of the participants, and the mode of execution of the actions, actions A7, A9 and A16 are parametrized by their “loudness”  $x$  which determines how many onlookers will overhear the transaction and their “offensiveness”  $y$  which will determine how the action will impact the social metrics of the actor and target of the action. The action A14 is parametrized with the waiting time  $t$  it involves. As the detail variables encode the history of the participants, the action-state graph is *not* an MDP. To unroll the graph into a MDP would require the us to quantify the detail variables, and it would be several orders of magnitude larger.

The Spanish Steps flower scam, despite being physically simple, is based on a series of complex decisions. It is, at its roots, a negotiated commercial transaction, which, however, is initiated by a *deceit* – the implication that the flower is a gift. The deceit is facilitated by the *blocking of the normal channels of communication* – the seller is usually a good speaker of several languages, but faking reduced communication ability helps position the deceit as a misunderstanding.

The successful conclusion of the scam relies on the *manipulation of the public perception*: the client needs to have the impression that everybody around believes that he accepted the commercial transaction.

Why do some clients accept to pay for the flower, well knowing that they are cheated? Conversely, why does the seller, in some cases, give up, without pushing the selling process to the extremes? It is obvious that as long as we consider a utility function which maximizes financial value, the actors do not act as rational agents.

## 2. RELATED WORK

A number of recent approaches implement agent based models of human social, cultural and emotional behavior. For instance, Bosse, Jonker and Treur [1] model a theory of neurologist Antonio Damasio about the three levels of perception of the emotional state. Miller et al. [4] operationalize the Brown and Levinson politeness model [2], while in a follow-up work [5] investigate how the relationship between culture (as exemplified by Hofstede’s cultural factors) and conversational politeness levels affect directive compliance. The POLLY system [3] also rely on the Brown and Levinson model to generate dialog for language learning.

## 3. CULTURE SANCTIONED SOCIAL METRICS

Our model assumes that the agents explicitly maintain a vector of *metrics*, separated in two classes. *Concrete* metrics such as financial worth or time are easily measurable and come with their native measurement units (e.g. dollars or euros for financial worth, seconds or minutes for time). The second class of metrics we consider are *Culture Sanctioned Social Metrics* (CSSMs). We say that a culture *sanctions* a metric if it (a) has a name for it, (b) provides an (informal) algorithm for its evaluation, (c) expects its members to continuously evaluate these metrics for themselves and salient persons in their environment and (d) provides rules of conduct which depend on these metrics. A person can know more than one culture, and simultaneously evaluate CSSMs according to multiple cultures. However, evaluating the CSSMs can be a significant cognitive load, and busy people might not necessarily perform highly detailed evaluations of their ongoing environment. Similarly, there is no guarantee that the agents would obey the rules of a culture concerning a certain metric (but they would be aware of the transgression). CSSMs can be evaluated from the perspective of the self, peers or general public.

To model the Spanish Steps scenario we used two concrete metrics: financial worth  $W$  and time  $T$ . The CSSMs used were *dignity*  $D$  and *politeness*  $P$ . Both sides consider the values from the perspective of the self and the public; the client also considers a peer (the other member of the romantic couple). With these assumptions, the vector of metrics for the client is  $\{W^c, T^c, D^c, D_p^c, D_r^c, P^c, P_p^c, P_r^c\}$  while the vector of the seller is  $\{W^s, T^s, D^s, D_p^s, P^s, P_p^s\}$ .

## 4. BELIEFS AND PUBLIC PERCEPTIONS

The impact of an action on a CSSM is modulated by the beliefs of the agent about specific aspects of the current context. To model observed behavior of the real world players in the Spanish Steps scenario, we need to consider at least the following beliefs:

$B_{\text{gift}}^c$  the client’s belief that seller intends the flower to be a gift  
 $B_{\text{agr}}^c$  and  $B_{\text{agr}}^s$  the client’s and, respectively, seller’s belief that the general public thinks that a transaction had been agreed upon.

We have used the Dempster-Shafer theory of evidence [6] to trace the beliefs, with the actions of the participants being considered as evidence for and against the beliefs. Beliefs are *dynamic*, in the sense that the passage of time, without any specific event can also constitute an evidence. For instance,  $B_{\text{gift}}^c$  increases with the time the agent is holding the flower without being asked for payment.

## 5. EXPERIMENTAL RESULTS

We have implemented the model in the YAES simulation environment and used it to trace the evolution of the CSSMs in a number of scenarios observed from the real world. We found that the model can provide satisfactory explanations to different outcomes of the scam. For outcomes where the seller was successful, the perceived beliefs had evolved such that the client can not escalate its efforts without massively lowering his public and peer politeness and dignity. We have also modeled situations where the seller, being in a rush, did not wait enough in action A14 to establish the public perception of an accepted transaction  $B_{\text{agr}}^c$ . In this situation, the client can escalate its efforts without being penalized in public perception, thus the scam will fail.

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