Personality Modelling for Interactive Storytelling

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ABSTRACT

Personality models for interactive storytelling must meet a different set of requirements than scientific personality models. This paper presents the considerations that apply to the creation of such personality models.

Categories and Subject Descriptors

Design

Keywords

interactive storytelling, personality models

1. INTRODUCTION

The increasing use of non-player characters (NPCs) in entertainment software has challenged designers to improve the behaviors these NPCs are capable of engaging in. This has, in turn, imposed increasing demands on the personality models used for such characters. A great variety of experiments have been tried; as yet, no satisfactory general solution has been found. NPCs are generally acknowledged to be mechanical, stilted, and worst, boring. The advent of interactive storytelling brings the problem of personality modelling to the forefront of entertainment software design.

2. BRIEF HISTORY OF NPC MODELS

Dungeons & Dragons by Gary Gygax (1976) provided the source model for most games using some kind of personality model. Its personality model included just six personality traits: Strength, Dexterity, Constitution, Intelligence, Wisdom, and Charisma. These traits were not personality traits in the sense we use; their values were inputs to algorithms that determined the success or failure of attempted actions. Yet this basic architecture has dominated the thinking of most personality models used in entertainment software. Personality traits are most often seen as capabilities. The attempts at modelling personality in terms of behavioral proclivities have been much simpler.

More recently, we have seen attempts based on other sources. A number of attempts have been made to apply personality models from the field of psychology. The behaviors elicited by such models tend to be unsatisfying as entertainment. There have also been some models taking advantage of some of the work being done in computer science. For example, **Black & White** by Peter Molyneaux (1999) used a heuristic personality model that generated behavior that was interesting but not dramatically compelling. Perhaps the most germane effort in this direction, **The Sims** by Will Wright (1998) uses a surprisingly simple personality model. Physical factors such as bladder fullness, hunger, and tiredness dominate; there are a few emotional factors, such as the need for socializing and the need to be entertained.

3. BASIC REQUIREMENTS

We can specify the basic requirements for any personality model. These are:

3.1 Behavioral completeness

Any personality model must address all possible NPC behaviors. If NPCs can engage in romantic behavior, then personalty traits associated with romantic behavior must be included. Indeed, the descriptive resolution of the traits must be appropriate to the behavioral concentration of the entertainment. A standard shoot-em-up game will need a great many traits to specify the fine points of a character's ability to shoot and avoid being shot; it will not need personality traits for social interaction. By contrast, a game analogous to a "chick flick" would need personality traits addressing social interaction in close detail. A "Julia Roberts" game, if such a product could be contemplated, would surely have a trait describing how good a kisser the character might be; an "Arnold Schwarzenegger" game most assuredly would not.

3.2 Dramatic significance

Personality traits should be selected for their utility in making dramatically interesting decisions. This is perhaps the greatest failing of the personality models used in computer games. Such models emphasize dramatically uninteresting factors such as the speed with which a character can run or the amount of injury the character can sustain without dying. A good personality model for interactive storytelling should concentrate on traits that contribute to dramatically interesting decisions. For the most part, these are traits connected to emotional relationships between people, such as affection, loyalty, gullibility, and so forth.

3.3 Orthogonality

In a perfect world, we would simply apply the ideas of vector analysis to the problem and look for a complete set of vectors that span the vector space of the problem. Sadly for us, (and luckily for storytellers) human personality is not understood well enough for us to define such a set of traits. Nevertheless, orthogonality of traits is certainly to be aspired to. For example, trust and affection

are often correlated despite the fact that they are formally independent sentiments. Accordingly, these two traits must be replaced by another pair that more orthogonally express the underlying relationships.

3.4 Conciseness

Personality models for interactive storytelling exist to be used; formal elegance is less important than functional utility. While a model with several hundred traits might satisfy the most demanding critic, it would be hopelessly unwieldy for use by storybuilders. Accordingly, some roughness of approximation is necessary in order to keep the model small enough for a storybuilder to master.

4. DIMENSIONS OF TRAITS

Personality traits, for purposes of interactive storytelling, can be broken down by a number of dimensions. The first of these is the temporal stability of the trait. Factors such as integrity and greed are stable traits; they are unlikely to change during the course of a story. Moods are intrinsic emotions subject to rapid change such as anger and fear. In general, moods are stimulated by experience and spontaneously decay to zero, although there are a few experiences that can accelerate the decay of some moods.

4.1 Order levels

Traits can also be broken down by the realization that most relationships can be described as perceptions of traits. For example, we can refer to integrity as a "first-order" trait; it is intrinsic to a personality. Trust then becomes a "second-order" trait: it is the degree to which one person perceives the other to possess high values of integrity. There is even a significant "third-order" value here, as demonstrated in the a statement such as, "No, Tom doesn't trust Mary at all." Variations on this basic statement are the subject of a great deal of human interaction generally referred to as gossip.

4.2 Accordance

Perception is not an objective process; a person's willingness to perceive high values of a trait in another is largely a matter of the perceiver's own personality. Gullible people readily accord high values of trust; suspicious people are reluctant to accord high values of trust. Thus, a personality model should include an accordance variable for each perceived variable.

5. RANGES

The mathematicallysophisticated thinker has no concern with the numerical ranges of the variables, as such ranges can always be compensated for by the use of simple additive and multiplicative coefficients. However, the people who will actually use a personality model are likely to have their talents concentrated in fields other than mathematics, and so some consideration of the numerical ranges of the variables is in order. In general, absolute ranges of 0 to 10 are most readily appreciated by normal, healthy minds. Of course, integer arithmetic must be avoided because of the many problems of round-off error, which are even more confusing to civilians.

A more difficult problem arises from the problem of whether to make the numerical range of the variables unipolar or bipolar. The unipolar model places zero at the lower end of the range, while the bipolar model places zero in the middle of the range. The decision between these two models is made on the entirely subjective basis of whether one sees human personality as a bipolar, ying-yang construct, or a unipolar, absolute construct. If we contrast greed with magnanimity, it is easy to see these two variables as opposite extremes of a single bipolar variable. On the other hand, if we contrast assertiveness with acquiescence, it is just as easy to see assertiveness as the maximum value and acquiescence as the zero value of a unipolar variable.

While neither model can be proven to be superior, the bipolar model seems more utilitarian. Its primary advantage is that arithmetic operations with bipolar variables can more readily reflect the effects of double negation. For example, consider the following equation for the reaction of an observer O to an action performed by actor A on actor B:

Pleasure(O) = Affection(O, B) * Benefit(Action)

The pleasure that O feels in learning of the action is proportional to the affection that O holds for B, multiplied by the Benefit of the action done upon B. If negative values of Affection indicate disaffection, and negative values of Benefit indicate injury upon B, then the equation correctly handles all positive and negative combinations of Affection and Benefit.

6. NOMENCLATURE

The greatest difficulties arise from the nomenclature applied to the variables. There exists no set of mathematically consistent personality terms that can be applied to the variables in a personality model. For example, trust is not precisely the same thing as the perceived integrity of another; it includes a dash of reverse affection. And is affection the perceived goodness of another? How do we distinguish between affection and love? To what extent does romantic love include an erotic element? These kinds of questions can derail or at least delay any personality model.

The solution is to dispense entirely with all subjective interpretations of the meanings of the various terms and rely on simpler, behaviorally-defined variables. Thus, we define integrity as the inclination to tell the truth in all circumstances, and to honor all agreements. Instead of referring to the second-order variable as trust, we simply call it "perceived integrity".

It may be necessary to assemble some of the more commonly-used terms from the foundation variables. For example, fear is a particularly difficult relationship to define, because it depends on the person's perceptions of at least two personality traits of the feared person: the capacity to do injury and the willingness to do injury. The willingness to do injury may in turn be founded on factors such as affection, loyalty, and virtue.

7. OPERATIONAL SIGNIFICANCE

It is especially important to realize that the worthiness of a personality model is not determined by its completeness or elegance. The only purpose of a personality model is to make behavioral choices, and its merit is determined only by the degree to which it makes such computations simple. A variable in a personality model is useful only to the extent to which it clearly differentiates between a variety of competing behavioral options.

8. A SAMPLE PERSONALITY MODEL

I offer an example of a personality model that I find useful; I will not suggest that it represents any optimum; in certain design environments this model would surely be found wanting. This model is taken directly from my most recent version of my technology for interactive storytelling, the Erasmatron.

8.1 First-order variables

Honest
Virtuous
Powerful
Intelligent
Attractive

8.2 Accordance variables

AccordHonesty
AccordVirtue
AccordPower
AccordIntelligence
AccordAttractive

8.3 Second-order variables

PerHonest
PerVirtue
PerPowerful
PerIntelligent
PerAttractive

8.4 Third-order variables

PerPerHonest
PerPerVirtue
PerPerPowerful
PerPerIntelligent
PerPerAttractive

8.5 Moods

Passion/Disgust
Joy/Sadness
Anger/Fear