CREATING A STORY-TELLING UNIVERSE

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Abstract

Extended story generation, such as the creation of soap opera stories, is a difficult and interesting problem for Artificial Intelligence. We present here the first phase of the development of a program, UNIVERSE, to tell such stories. In particular, we introduce a method for creating universes of characters appropriate for extended story generation. This method concentrates on the need to keep story-telling universes *consistent* and *coherent*. We describe "the information that must be maintained for characters and interpersonal relations, and the use of stereotypical information about people to help motivate trait values.

1 Introduction

One of the most interesting forms of story telling is extended story generation, the continuing serial. This can occur as short fiction, movies such :is *Star Wars* and *The Empire Strikes Back,* novel series, role-playing games and, in one of its most popular forms, the television soap opera. The writer or writers of such serials face the prodigious task of creating and keeping track of literally dozens of intricately interrelated characters and numerous past and present plots. Extended stories of this type may well be forerunners of the kinds of complex, inleractive stories that will ultimately be created as computers are used as more than simple "word processors in the creation of fiction.

In this paper we will describe the first phase of development or a computer program, UNIVERSE. The goals of this program are twofold. Initially, we expect to develop a program that can serve as a "writer's aid" for extended story production, intimately, we hope to have UNIVERSE tell "soap opera" type stories. The aspect of UNIVEKSK to be discussed here is the creation of story-telling; universes (STUs) comprised of characters, their histories, family relations, and interpersonal relationships.

2 Motivation in Character Creation

Good extended story telling is constrained by the need to maintain *consistency* and *coherence*. A story is *consistent* if properties and events of the story world (including properties of characters) do not contain any internal contradictions. Bitter enemies should not become close friends without explanation.

Coherence involves the idea that events should be logically derivable, at least in retrospect, from the information available to the reader. While it is neither necessary nor desirable to provide the reader with enough information to actively predict every event that will occur in a story the events should make sense when they do occur. Most notably, actions should be based on the personalities and backgrounds of the characters involved. UNIVERSE creates a universe of characters before beginning to tell a storv in order to maintain consistency and coherence. It would be possible (and is sometimes necessary) to create characters only on demand in plot generation and fill in details of these characters only when needed. However, in order to keep the qualifies of characters consistent, and to be able to insert information into the story that will lead to later coherence (i.e. "drop hints"), it is useful to have a substantial set of characters in place when story telling begins.

Coherence provides benefits beyond merely protecting the reader from untoward surprises. In large part, coherence provides the "flavor" that makes serials so popular. It is difficult to identify with characters whose actions seem inconsistent. Part of the fun of soap operas is speculating about what, will happen next, a game that is fun only if plot actions are coherent.

The major relevant AI programs are Mechan's TALE-SI'IN [Meehan 7b] and Dehn's AUTHOR [Dehn 81]. Both of these programs focus on the ability to tell planful narratives involving small numbers of characters, and usually focusing on a single character. In contrast we are not concerned with fully representing every last detail of every character and action, but rather with having enough information available to tell consistent, coherent, and hopefully interesting stories over long periods of time.

3 Person Frames

To maintain consistency in stories, we must consider the information to be created and maintained about people. This collection of information will be referred to as a *person frame.* Previous work in this area, particularly [Carbonell 79; Schank and Lebowitz 79], was concerned with complex, plan and goal-based representations that allowed a understander to explain a person's actions. We will use here a somewhat simpler representation that provides enough information to generate believable plots by concentrating on personality traits, interpersonal relations and, to some extent, goals.

The way to maintain coherence in character description can be seen by considering how wc might answer a question such as, "Why is Aaron so cold-hearted?" Two possible answers are, 'He's a door-to-door salesman" or He got that way after his wife left him". These answers are illustrative of two ways to make characters coherent, *stereotypes* and *past events.*

Stereotypes are common descriptions associated with people in various classes such as occupations, social groups or personal backgrounds. A stereotype conveys a large amount of "default" information, and tends to provide enough coherence to satisfactorily motivate an aspect of a character's make-up. Further, the fact that the person is a doctor provides an acceptable motivation for any of these characteristics.

Stereotypes therefore comprise an important part of character descriptions. The description of a character in UNIVERSE contains a list of one or more stereotypes from which the character inherits properties (unless overridden). The stereotypes used here serve much the same role for person descriptions as generalization-based Memory Organization Points [Schank 82; Lebowitz 83) do for events. Figure 1 shows a few of the over 50 stereotypes currently included in UNIVERSE.

doctor	professor	store-owner
warden	flake	nasty-person
klutz	swineer	family-man
socialite	hari-krishna	bowler
movie-fiend	sports-fan	junkie

Figure 1:   Some stereotypes used in UNIVERSE

Past events are used primarily to provide variety and flavor and explain aspects of a character that do not fit stereotypes. By including historical events in an STU, it is possible to nave interesting variations in the various characters, along with adequate justification to assure coherence. (To achieve the coherence, it is, of course, necessary to refer to the various past events so that the reader is aware of them.)   In the ultimate version of 'UNIVERSE, as the program tells stories it will naturally affect the history of the characters involved.

Figure 2 a few of the plots that can be run historically by UNIVERSE during STU creation.

lawsuit	divorce	illness
consultant	abuse-charges	robbery
big-loss	threatened	rackets
famous-rider	break	takeover

Figure 2:   Sample historical plots

The final important class of information needed about the characters in an STU involves not individual characters, but interpersonal relationships between characters. Crucial to the selection of consistent plots is the need to monitor the way characters relate to each other.   To achieve consistency of this sort, we must maintain information about relationships between, potentially, every pair of characters in our universe.

Figure 3 summarizes the information stored in a person frame.   Traits, goals and the role of marriages will be discussed further in later sections of this paper.

Name, Stereotypes,
Trait modifications,
Individual goals, Interpersonal relations,
Marriages, History (list of events)

Figure 3:   Person frame information

3.1 Stereotypical frames

UNIVERSE stereotypes provide two basic types of information about the characters they describe — descriptors of physical and personality traits (which we will concentrate on* here), and typical goals. Personality traits are particularly useful in selecting characters for a given plot (or plots Tor a character). In a blackmail plot, the blackmailer should not be a nice person, and the person blackmailed, or his family, should have something worth extorting.

Goals tend to be important in a somewhat different context.   UNIVERSE will make use of certain plot schemata, known as meta-plots, that are abstract in terms of the events they describe.   "Revenge" would be an example. To "execute" such plots, it is often necessary to have information about various characters' goals -- particularly long-term goals — in order to understand what is important to them".

The selection of traits to be used in stereotypes is certainly not self-evident. We need a selection of traits wide enough to indicate which characters should participate in which plots and how thev should fare in such plots. The traits chosen for UNIVERSE are shown in Figure 4. No claim is made that this listing is exhaustive. It allows for a wide range of behaviors to be explained and can be easily extended.

sex $_t$	age	phys-att
moodiness	promiscuity	niceness
wealth	competence	intelligence
religion	race	nationality
social-back	time-used	

Figure 4:   Person stereotype traits

3.2 Interpersonal relationships

While it is important to have individual characters adequately represented, it is also necessary to represent interpersonal relationships (IPRs) between characters. We have chosen to do this with a set of numerical scales based on those from the psychological experiments of [Wish et al. 76), extended for Al use in jSchank and Abelson 77]. This work posited three scales -- positive-negative, intimate-distant and dominant-submissive— to describe the way people relate to each other.   To these we have added a fourth scale, attractedness, appropriate for soap opera universes. More complete sets of scales are being considered for later versions of   UNIVERSE.   Our scales can include asymmetric perceptions of each participant in an IPR.

As with individual character information, values of scales can come either from stereotypes or past events.   Past events seem to be more important in shaping interpersonal dynamics.   While there are a reasonable quantity of stereotypical IPRs ~ among family members and people in occupations, for example - events such as shared crises, conflicts at work, marital conflicts, and the like, tend to be more significant in explaining how one person relates to another.

4 Building Up an STU

Having specified the kind of information we would like to maintain about the characters in a story-telling universe, we are still left with the problem of how to generate that information.   We could specify properties of characters and interpersonal relations randomly or only when needed for a plot (a necessary mechanism in any case). However to see how we might add coherence to our set of characters, consider the universe of characters in a typical television soao opera, *Days of Our Lives.* Figure b lists some of the 40 or so current active characters in this NBC soap opera.

Tom and Alice — Horton family patriarchs
Mickey and Maggie — son and wife
Sarah — their daughter (by artificial insemination)
Stephano — the bad guy
Tony — his son
Renee -- Tony's half-sister
Liz — Tonv's estranged wife
Don — Liz s ex-husband (sort of, she was actually
   still married to Tony then)
Marlena — another of Don's ex-wives
Roman — Marlena's fiancee
Anna — Roman's first wife, presumed dead

Figure 5:   A sample soap opera universe

The first thing we see from Figure 5 is that the relations among the characters are quite complex (an informal count showed at least 20.> identifiable interpersonal relationships), and that many of the characters are related to each other by past and present marriages of one sort or another. Past and present husband-wife and parent-child relationships add coherence to the character set in most soap operas.

We would like to have this same sort of coherent intricacy among the characters created by UNIVERSE. The most feasible way to achieve this is to, in effect, do a simple simulation of the past lives of the characters in the STU, creating spouses, children and other assorted characters as necessary. We view marriages as a *motivation* for characters rather than as arbitrary relationships that should be established after we have created a set of characters.

The simulation used by UNIVERSE involves cyclical character creation. A queue is maintained of characters who have been created during the simulation, but have not had the details of their lives filled in. Each character is, in turn, removed from the queue, and UNIVERSE steps through his or her life, creating spouses and children. wnen the present is reached further details of the character, such as occupation and other descriptive stereotypes are filled in.

The selection of the specific events that occur can be done either by a user (in "writer's aid" mode) or somewhat arbitrarily. The latter is not as unreasonable as it may sound, as' the idea is often to have many interconnections among characters, regardless of what they might be.

5 Adding More Background

Although the cyclic character creation process described in the previous section provides the framework for the STUs created in UNIVERSE, it is not quite enough by itself. There are three main problems with the universes created: 1) Almost all the characters are related in one way or another; 2) Almost all the IPRs in the universe have to do with marriages and children. 3) There is no history, other than marriages and offspring, to the characters, which is detrimental to coherence.

Fortunately, we can solve all three of these problems with a single mechanism, one related to the main thrust of the UNIVERSE program. The answer is to simply add history to the characters' backgrounds by "executing" in the past simplified versions of the plots UNIVERSE will create for the present.

It is crucial to note that the past plots run by UNIVERSE need not be executed in the same detail as during actual story telling. Instead, it is enough to merely determine how each plot affects the characters involved and the IPRs among them, and modify their histories appropriately. UNIVERSE can add coherence to its current stones by referring to events in the past. In addition, the mechanism for *selecting* the plots to be run need not be the same as for real story telling. Instead, we can select a given plot in order to obtain a desired [PR, without requiring the same level of motivation as is needed in real story telling.

6 Conclusion

We have shown here a method for generating extended story-telling universes, consisting of characters, interpersonal relationships and historical events. The method of creating characters focuses on maintaining *consistency* and *coherence.* The methods described are flexible enough that they can be extended to address additional problems, such as specific author intent, by adding constraints in the character generation process. The work described here provides the framework for the extension of UNIVERSE to actual story telling.

Acknowledgements

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