

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 present 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 also 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. Finally, we present an example of the kind of characters UNIVERSE generates.

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 as *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, interactive 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 of a computer program.

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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. Ultimately, we hope to have UNIVERSE tell "soap opera" type stories. The aspect of UNIVERSE to be discussed here is the creation of story-telling universes (STUs) comprised of characters, their histories, family relations, and interpersonal relationships. Some of the ideas presented here are based on discussions with the writers of a television soap opera.

Extended story generation has all the hallmarks of a topic ideal for Artificial Intelligence research. Besides the obvious natural language processing issues, telling extended stories involves issues in knowledge representation (the information needed about people and events to tell interesting, believable stories), knowledge-state assessment (what the reader knows versus what the author knows versus what the characters know), organization and access of information (keeping track of characters, their histories, and all sorts of ongoing plots), planning complex interactions among plots, and author (the program, in the AI case) intent, among many other problems.²

In this paper, we will be primarily concerned with the information that must be maintained about characters and with the creation of characters as part of story telling. We will suggest the advantages in creating a set of characters that satisfy specified constraints before beginning actual story telling.

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. A 34-year-old man should not become 47 overnight, nor should bitter enemies 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

²In actual television soap operas the problems are even greater, including the constraints imposed by actors' contracts and the need to achieve high ratings.

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. It would be inappropriate for a mild-mannered school teacher to hire a hit-man to deal with a school board that fired him.

Surprises are fine. But unjustified surprises tend to be very dissatisfying to readers (or viewers). UNIVERSE creates a universe of characters before beginning to tell a story in order to maintain consistency and coherence. It would be possible to create characters only on demand in plot generation (the next phase of UNIVERSE operation) and fill in details of these characters only when needed. Sometimes UNIVERSE will do just that. However, in order to keep the qualities 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. In addition, since normal story telling will be based on an existing set of characters, as the arbitrary creation of new characters undermines coherence, initializing the STU avoids "start-up" problems.

Another way of looking at the issue of coherence is that if we wish to have characters carry out certain actions, we must be sure that the actions are motivated by properties of the characters.

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. For similar reasons, characters should also have some history. Knowing a bit about their past allows for coherence, and is another potential source of flavor.

The major relevant AI programs are Meehan's TALE-SPIN [Meehan 76] 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. The work being discussed here has a rather different goal. 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. An overall strategy for story-telling somewhat similar to the one we envision for UNIVERSE, and partially described here, is presented in [Yazdani 83].

Research by psychologists into the process of writing has also been influential in our work. [Gregg and Steinberg 80] presents recent work that suggests mechanisms for story telling. In particular, [Flower and Hayes 80; COLLINS-WRITING] suggest cognitive processes for story-telling based on the idea of constraints that require the kind of characterizations that we discuss here, and have been influential in the development of our story-telling methods.

3 Person Frames

To maintain consistency in stories, we must consider the information to be created and maintained about people.³ 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. In addition, we will focus on ways to make character information consistent and coherent.

The coherence issue is an important one here. No matter what information we maintain about characters, it is important that it be motivated. While we could just make up personality traits and goals for each character, that would be unsatisfying for a reader.

A potential solution to the coherence problem can be seen by considering how we 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*.

³What makes a character *interesting* is a complicated subject itself. In this paper we will rely on an intuitive idea of interest -- a character is interesting if somewhat unusual, but not unbelievable. More on interest can be found in [Schank 79; Lebowitz 81].

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. So, for example, if we know that a person is a doctor, it is reasonable to assume that he or she is intelligent, well-educated, and probably well-off financially, unless we are told otherwise. Further, the fact that the person is a doctor provides an acceptable motivation for any of these characteristics. A cognitive psychological analysis of the use of character stereotypes in writing appears in [Adams and Bruce 80]. Note that facets of stereotypes can always be overridden, although if too few facets are relevant, the overall identification of the stereotype must be considered questionable.

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). Besides providing coherence, this form of representation also allows for economy of storage, as we do not have to repeat information from a stereotype for each character that fits it. 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. The contents of stereotypes will be examined shortly.

Past events are used primarily to provide variety and flavor and explain aspects of a character that do not fit stereotypes (though it is possible to create a wide variety of characters merely by combining stereotypes). By including historical events in an STU, it is possible to have 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.

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. If two characters are best friends, we might not expect one to have an affair with

the other's spouse. If such an event did occur, and the other friend become aware of it, we would expect the interpersonal relationship to change. To achieve consistency of this sort, we must maintain information about relationships between, potentially, every pair of characters in our universe. Many interpersonal relations will be created and modified when historical are added to the particular universe. Creating interpersonal relations is a prime motivation for including historical events.

One class of interpersonal relations that is important enough to require special handling is family relations -- husband/wife and parent/child. As will be shown when the creation of STU's is presented below, past and current marriages and the offspring that result can provide the motivation for many of the characters and interpersonal relations in an STU (particularly for soap operas). For each character, we maintain a list of the marriages, including offspring. For more complete coverage, in the future we will probably extend this to other long-term, marriage-like relationships (such as affairs and couples "going together" or living together).

Figure 1 summarizes the information stored in a person frame. Traits and goals will be discussed further in the next section, when stereotypes are presented. The only component in Figure 1 not described so far is the character's name. The only interesting point about names is that in most extended stories, character names behave just like good computer programming variables -- neither first or last names are ever duplicated (with the exception of families, of course).

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

Figure 1: 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, and typical goals. Personality traits are particularly useful in selecting characters for a given plot (or plots for 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 many uses of goals are discussed extensively in [Allen 79; Appelt 82; Carbonell 79; Cohen and Perrault 79; Meehan 76; Schank and Abelson 77; Wilensky 78].

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 they should fare in such plots. If no character's behavior depends on a given trait, it is pointless to include that trait in descriptions. The traits chosen for UNIVERSE, along with the values they can take on, are shown in Figure 2. No claim is made that this listing is exhaustive. However, it allows for a wide range of behaviors to be explained, and can be easily extended.

In Figure 2, many of the traits possessed by characters in UNIVERSE are assigned numeric values. While this undoubtedly does not capture all people know about these traits, it seems adequate for determining who can plausibly do what. Fine differences in numeric values are rarely significant. Generally only gross differences in values, or comparative values are important.

Figure 3 lists the trait values for several stereotypes used in UNIVERSE. (Note that these stereotypes reflect the author's view of how such characters are portrayed in popular literature, which may not bear strong connection to the real world!) Where a stereotype has no value for a given trait, it does not contribute to our knowledge of that trait for any character described by that stereotype.

| | |
|--------------|---|
| type | occupation, job, group, avocation, habit, trait |
| sex | male or female |
| age | child, teen, young-adult, middle-aged, old |
| phys-att | -10 to 10 |
| intelligence | 0 to 10 |
| moodiness | 0 to 10 |
| guile | -10 to 10 |
| self-conf | -10 to 10 |
| niceness | -10 to 10 |
| competence | -10 to 10 |
| promiscuity | 0 to 10 |
| wealth | 0 to 10 |
| religion | Catholic, Jewish, etc |
| race | black, white, etc |
| nationality | Irish, Polish, etc |
| social-back | preppie, the docks, etc |
| time-used | days, nights, evening, weekends, etc |

Figure 2: Person stereotype traits

| <u>frame</u> | <u>lawyer</u> | <u>swinger</u> | <u>waiter</u> |
|--------------|---------------|----------------|---------------|
| type | occupation | trait | job |
| intelligence | 6 | | |
| phys-att | | 7 | |
| moodiness | | 6 | |
| guile | 7 | 8 | |
| self-conf | 6 | 6 | |
| niceness | 0 | | 5 |
| competence | | 6 | |
| promiscuity | | 9 | |
| sex | | | |
| age | | | |
| wealth | 6 | | 2 |
| religion | | | |
| race | | | |
| nationality | | | |
| social-back | | | |
| time-used | days | nights | evenings |

Figure 3: Sample stereotype frames

We will not discuss goals in detail here, since, as mentioned above, they are well-described elsewhere in the literature. Suffice it to say that we are concerned primarily here with long-term goals (such as the achievement and preservation goals in [Schank and Abelson 77]) rather than short-term, planning-type goals (although those will be important in actual story telling). Examples of the kinds of goals dealt with in

stereotypes are that doctors want to make money and establish big practices, pro athletes want to become famous, and everyone is trying to find happiness.

Figure 4 shows a selection of the over 50 stereotypes included in UNIVERSE. (Many more could easily be added.) It is possible to explain quite a variety of characters simply through stereotypes.

| | | |
|---------------------|-------------------|---------------------|
| doctor | professor | store-owner |
| high-school-teacher | actor | gambler |
| gangster | bureaucrat | politician |
| pro-athlete | receptionist | construction-worker |
| life-guard | truck-driver | taxi-driver |
| warden | flake | nasty-person |
| klutz | swinger | family-man |
| preppie | Californian | New-Yorker |
| socialite | hari-krishna | bowler |
| party-goer | video-game-player | concert-goer |
| movie-fiend | sports-fan | junkie |
| big-eater | drunk | flirt |

Figure 4: Some stereotypes used in UNIVERSE

3.2 Creating a character "to spec"

The process of STU creation, and story telling in general, often requires the creation of characters with specified traits (to justify participation in a past plot, or as the child of other characters, perhaps), not necessarily characters with given stereotypes. Similarly, as a writer's aid, UNIVERSE can supply stereotypes to motivate a pre-specified personality. Thus we need a procedure to find a set of stereotypes that reasonably describes a character, given a set of trait values.

Even though it is difficult to come up with an *optimal* set of stereotypes, it is not hard, using heuristic methods, to come up with a *reasonable* set. UNIVERSE does this by first selecting an occupation for the character that has the minimal total discrepancy from the traits specified. Then, for each trait specified but not yet perfectly described, another stereotype is picked that does not alter existing values, but brings the person closer to the desired value for the trait. This process tends to leave only minor variations to be accounted for by personal idiosyncrasy.

This "create to spec" algorithm tends to yield interesting, but believable combinations of

stereotypes such as teacher/swinger (ala *Looking for Mr. Goodbar*) or warden/video-game-player/movie-freak.

3.3 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 AI use in [Schank 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.

We do not claim that the four scales used to represent IPRs in UNIVERSE describe all that can be known about how two people interrelate. [Deutsch 82] suggests a broader set of scales that may be used in later versions of UNIVERSE.

One important way in which our use of scales differs from the description in [Schank and Abelson 77], is that we allow there to be two sets of values for each IPR that reflect each character's perception of the relationship. There is no obvious reason to assume that IPR scales are reflexive. Each character's actions should be based on their perception of the relationship, not some absolute value. In fact, it would be possible to make a case for an even more complicated system where there is information about characters' perceptions of other characters' perceptions (i.e. I think he thinks I like him, even though I really don't; see [Allen 79; Clark and Marshall 81], for examples), but for the most part, the scheme used in UNIVERSE allows events to be generated coherently.

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. This is an important reason why STUs incorporate a history of events.

Stereotypical IPRs include values for each character's perception of any of the scales used to describe an IPR. They may, optionally, also include person stereotypes that describe either or both of the characters in the IPR. Figure 5 illustrates a typical stereotypical IPR, that between a doctor and patient. There are no stereotypes for the patient, as any character can play this part in a doctor-patient IPR. Each scale runs from -10 to 10, with greater values indicating stronger positive feelings, intimacy, dominance or physical attraction.

doctor-patient
 possible doctor stereotypes: doctor psychologist
 possible patient stereotypes: <none>

| <u>scale</u> | <u>from doctor to patient</u> | <u>from patient to doctor</u> |
|--------------|-------------------------------|-------------------------------|
| pos-neg | 1 | 3 |
| int-dis | 0 | 0 |
| dom-sub | 6 | 2 |
| attract | | |

Figure 5: Doctor-patient stereotypical IPR

Figure 6 illustrates a typical IPR of the sort we would like to build up. It describes the state of affairs between two people, John Smith and Mary Jones, his ex-wife. (As throughout this paper, the specific numbers should be taken with a grain of salt.) The relationship is described by a stereotypical IPR that exists between ex-spouses. This stereotypical IPR is modified as shown (John is still strongly attracted to Mary, who, unfortunately for John, hates him). The values in parentheses come from the stereotypical IPR. We would expect this relationship to lead to plots involving John's attempts, presumably unsuccessful, to regain Mary's affections.

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. Certainly we could assign values to characters randomly, or arbitrarily assign traits and create characters "to spec". We could specify properties for characters and interpersonal relations only when needed for a plot (a necessary mechanism in any case). None of these plans gives much coherence to the story universe.

person1 : John Smith
 person2 : Mary Jones
 ipr stereotypes: ex-spouse

| scale | <u>from person1 to person2</u> | <u>from person2 to person1</u> |
|---------|--------------------------------|--------------------------------|
| pos-neg | 7 | -6 |
| int-dis | (4) | (4) |
| dom-sub | (0) | (0) |
| attract | 9 | (4) |

Figure 6: A sample IPR

To see how to add coherence to our set of characters, consider the universe of characters in a typical television soap opera, *Days of Our Lives*. Figure 7 lists most of the 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)
 Melissa -- child under guardianship of Mickey and Maggie
 Julie and Doug -- granddaughter and husband
 David -- Julie's son
 Trish -- David's ex-wife
 Scotty -- their son
 Marie -- another Horton daughter (ex-nun)
 Alex -- her ex-husband
 Jessica and Joshua -- granddaughter and fiance
 Stephano -- the bad guy
 Tony -- his son
 Renee -- Tony's half-sister (a fact recently discovered)
 Liz -- Tony's estranged wife
 Don -- Liz's ex-husband (sort of, she was actually still married to Tony then, it gets complicated)
 Marlana -- another of Don's ex-wives
 Johnny -- her foster son
 Roman -- Marlana's fiancee
 Kayla -- his sister
 Anna -- Roman's first wife, presumed dead in an accident

Figure 7: A sample soap opera universe

The first thing we see from Figure 7 is that the relations among the characters are quite complex (an informal count showed at least 205 identifiable interpersonal relationships), and that many of the characters are related to each other by past and present marriages

of one sort or another.⁴ 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 thus 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. When 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 to have interconnections among characters. Often the details are not too important as long as the events that occur are reasonable (e.g. no one is married and divorced 62 times).

The simulation of characters' lives can be separated into two phases -- when they are married and when they are not. The kinds of events that can occur in these two states, at least the events we are concerned with here, are sufficiently different that it simplifies matters to treat them separately. UNIVERSE breaks the simulation of characters' pasts into "life cycles" and "marriage cycles".

Figure 8 shows the basic "life cycle" for characters.

⁴In addition the relationships change quickly. For example, Roman's wife Anna, presumed dead, showed up with their daughter a week after Figure 7 was made. Notice, though, how the fact that Anna was only presumed dead allowed her to return consistently.

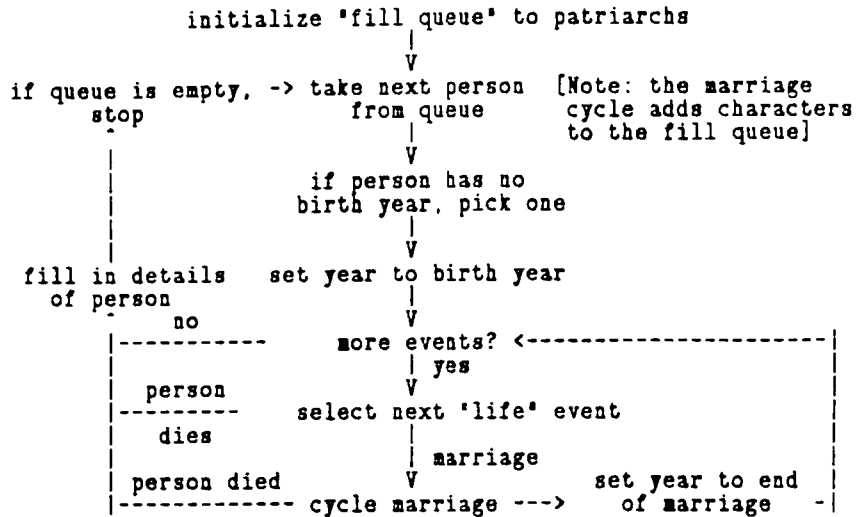


Figure 8: UNIVERSE character "life cycle"

The heart of the process shown in Figure 8 is the loop that steps through a character's life, checking for "life-changing" events. For an "unattached" person, the events currently handled by UNIVERSE are death and marriage. In the case of a marriage, UNIVERSE switches over to the "marriage cycle". Other possible appropriate events, including affairs and assorted relationships, can easily be added to this framework.

Once the major events in the character's life have been determined, additional details about the characters, including appropriate stereotypes, are filled in. In order to use the algorithm described in Section 3.2, it is necessary to have a set of traits to aim at for each new character. UNIVERSE selects several personality traits from the person's parents, for coherence, and several more, for variety, either at the user's request or more or less arbitrarily.

Figure 9 shows the processing that occurs to simulate a marriage between two characters.

The marriage cycle operates in much the same way as the life cycle. The marriage is stepped through, determining whether any marriage-related events, including having a child, getting divorced, or either spouse dying, have occurred.

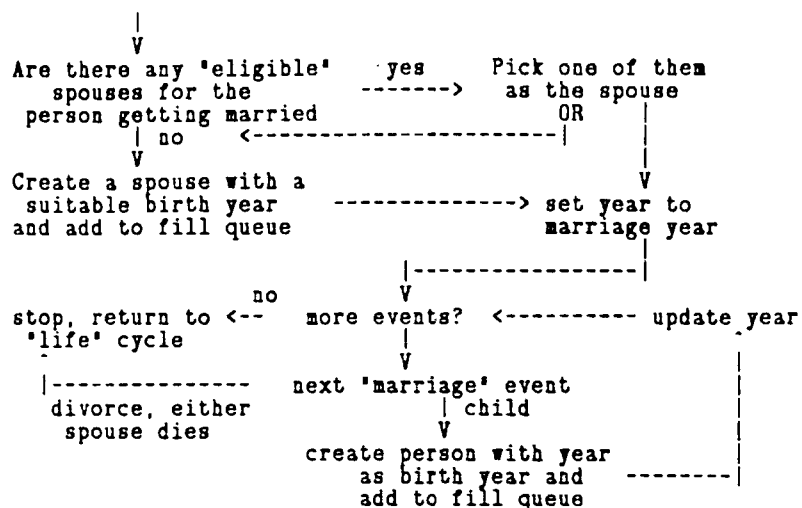


Figure 9: UNIVERSE "marriage" cycle

An important feature of the marriage cycle occurs when it begins. The first thing to be done is to select a spouse for the person getting married. By allowing both the possibility of selecting as a spouse an already existing eligible character (where eligible is defined as someone who is single, of appropriate age and sex, and not directly related to the person in question) or of creating a new person with appropriate characteristics, we create many interesting interrelationships among the characters. We are able to have a complex web of past and present marriages, along with the associated children, while maintaining consistency.

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 stories 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 IPR, without requiring the same level of motivation as is needed in real story telling. The currently implemented method for selecting historical plots in UNIVERSE is rather arbitrary. We will focus on the information needed about plots, and the advantages gained by having them.

"Executing" historical plots solves all the problems mentioned above. The plots will sometimes call for the creation of new characters, providing a source of unrelated characters, without ruining the framework of the universe. Furthermore, such plots will provide interesting and novel, yet coherent, IPRs (e.g. Mary dislikes Hank because he threw the big basketball game in high school). Finally, almost by definition, these plots add historical flavor to the characters in the STU.

Figure 10 shows the information that is needed for a plot to be executed historically. This same information will be useful, although it will have to be augmented, in actual story telling. The most relevant information in Figure 10 is the description of how character traits and IPRs should be modified for each character. It is this information that will allow a novel but coherent universe to be built up. Also significant are the constraints on the characters (which will usually involve individual character traits or IPRs) that force consistency upon past events.

Figure 11 shows some of the plots that can be run historically by UNIVERSE during STU creation. Clearly the variety here will allow a multitude of interesting STUs to be built up.

plot name
 time frame [e.g. days, months, years]
 role list [including prototypes specified for each role]
 constraints on role fillers
 how character traits should be modified
 how IPRs should be modified

Figure 10: Plot components

| | | | |
|----------------|---------------|--------------|-------------------|
| lawsuit | divorce | illness | malpractice |
| consultant | abuse-charges | robbery | competition |
| client-suicide | confidante | student-pass | cutback |
| big-loss | threatened | rackets | bribe |
| famous-rider | break | takeover | attempted-suicide |
| sports-scandal | overdose | crime | diet |
| pig-out | feast | | |

Figure 11: Sample historical plots

The execution of sufficient historical plots adds coherence to the STU as many of the characters end up with IPRs between them, with believable motivations for the IPRs.

6 A Sample UNIVERSE Character

As an illustration of the product of UNIVERSE's character creation process, Figure 12 shows a typical character created.

The character "Jessica Donadio" was created as part of a typical UNIVERSE STU. The need for the character arose when the life of "Douglas Davidson" was cycled, and a decision made that he should be married. In the cycle of their marriage, they had two children and were subsequently divorced. Jessica later had a second marriage (created when her life was cycled), which also ended in divorce.

Jessica's marriages and offspring account for most of her IPRs. In each of these cases the various scale values (the numbers listed) reflect stereotypical IPRs. One additional IPR, with "Bruce Smith" arose from a "past event", revenge in this case, where they interacted.

```

Name: JESSICA DONADIO (&PER7)
Born in: 1918
Marriages:
  DOUGLAS DAVIDSON [&PERO] [1951/1959]
    - - MARK DAVIDSON [&PER8]
    - - RENE DAVIDSON ROGERS [&PER9]
  IVAN SCHAAD [&PER14] [1959/1967]
IPRs:
  EX-SPOUSE      DOUGLAS DAVIDSON [&PERO]      -5/-5//4/4//0/0//4/4
  DIV-WOM        8/4//4/4//6/2// /      MARK DAVIDSON [&PER8]
  DIV-WOM        8/4//4/4//6/2// /      RENE DAVIDSON ROGERS [&PER9]
  EX-SPOUSE      IVAN SCHAAD [&PER14]    -5/-5//4/4//0/0//4/4
  EX-SPOUSE      BRUCE SMITH [&PER45]     /-4// / //6/-4// /
History: REVENGE/1964 [&PL7]
Stereotypes: MASSEUSE PARTY-GOER EGOMANIAC
Trait modifiers: (PHYS-ATT -1) (AGE A)
Overall description:
WEALTH          6
PROMISCUITY     7
COMPETENCE      7
NICENESS        0
SELF-CONF       8
GUILE           7
MOODINESS       5
PHYS-ATT        5
INTELLIGENCE    4
GOALS           (BECOME-FAMOUS MEET-FAMOUS-PEOPLE ASSOCIATE-RIGHT
                FIND-HAPPINESS)
AGE             A
SEX             F

```

Figure 12: A Sample UNIVERSE Character

The stereotypes used to describe Jessica were selected in order to explain several character traits that were selected arbitrarily. The remaining traits are the result of the stereotypes selected. Had Jessica been created as the offspring of other characters, there might have been additional constraints placed on her stereotypes, in order to maintain religious or racial consistency, and several character traits might have been assumed inherited. While no constraints were set up for Jessica based on the need for her to be an appropriate spouse for Douglas Davidson, this would be a logical addition to the model presented here.

7 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.

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