

Designing and Implementing Knowledge Bases for Narrative Animations System

David Ramamonjisoa
 Faculty of Software and Information Science, Iwate Prefectural University
 152-52 Sugo Takizawa Iwate, Japan 020-0193
 david@soft.iwate-pu.ac.jp

1. INTRODUCTION

The current technology such as semantic web and ontology allows everyone to build rapidly vast knowledge bases for a specific domain. A development of story animation knowledge bases is presented. The knowledge bases are used to produce movie animation given a story. Databases are expressed in the form of ontology by extracting textual entities and parsing each sentence of the story. Rules are obtained by analyzing the process of manually produced movie animation.

2. ONTOLOGY DEVELOPMENT

Ontology of a story is developed in order to have a common knowledge for the subject. It helps considerably to understand the world in the story and describe the entities that make up the story [1][2][3]. Figure 1 depicts a story (on the top) ontology with HAS-A relationship which can be interpreted as a story has one or more episodes and settings. Figure 2 shows a possible agent ontology with IS-A relationship, for example a princess is a woman and a woman is a person.

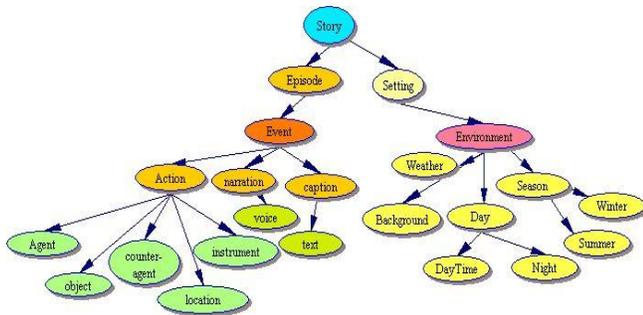


Figure 1. HAS-A Relationship story ontology

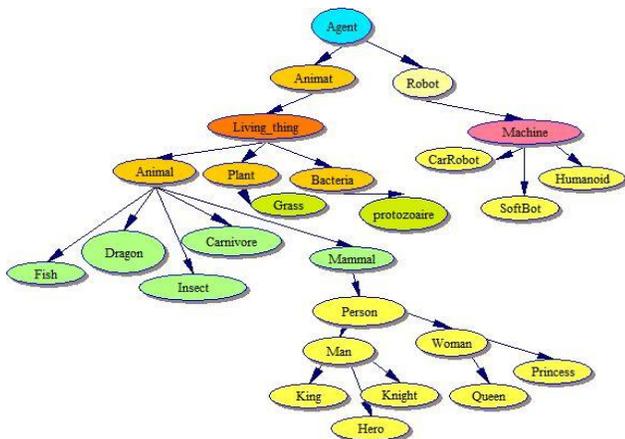


Figure 2. IS-A Relationship agent ontology

With description logics, events, locations or characters in the story can be categorized and classified hierarchically. Scenes are dependency structures of those entities. These descriptions are very useful for the design of the world in the 3D animation and 3D characters. It allows autonomous castings and settings.

3. RULE BASED SYSTEM

3.1 Reasoning on entities relationships

Each entity has a class or category. The membership, equivalence, and consistency of each class are done by a reasoning system.

3.2 Rules for producing animation movies

Rules are expressed as predicate logics or if-then forms [4]. Example of rules is described as follows:

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DECLARE ALL CHARACTERS, OBJECTS, SCENES IN THE BEGINNING OF SCRIPT
IF ACTOR(KING) THEN CHOOSE ADULT & MALE CHARACTER
IF ACTOR(PRINCESS) THEN CHOOSE (BABY | YOUNG PERSON) & WOMAN
IF ACTOR(ANIMAL) THEN CHOOSE FICTIVE CHARACTER
DEFINE NARRATION AS ALWAYS BEFORE OR DURING THE SCENE
IF (CHANGE SCENE) THEN (OFF SCRIPT: REMOVE ALL PREVIOUS OBJECTS IN THE PREVIOUS SCENE AND ADD OBJECTS RELATED TO THE NEW SCENE)
IF CHARACTER'S ACTION IS DEFINED IN THE DATABASE THEN FIND THE SCRIPT EQUIVALENT
IF THE SCENE IS COMPOSED OF MANY ACTIONS WITHOUT CONVERSATION THEN USE (BGM | SOUND EFFECT)
IF CHARACTER IS TALKING THEN CLOSE-UP CAMERA ...
    
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3.3 Inference

Given a story, an automatic classification of the world and characters is deduced. The inference allows that deduction. It also extracts any facts about the story and produces its possible animation scenario and script code.

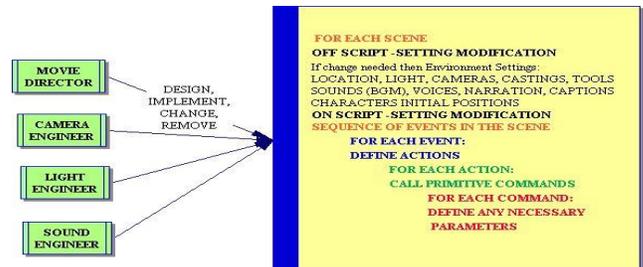


Figure 3. Narrative animation production system

4. CONCLUSIONS

Story and Agent ontology was designed to describe the world structure. Rule-based system is used to reason on the designed world. A movie animation production analysis has been realized to build knowledge base on castings, animation techniques and to generate a procedural script code (as in Figure 3).

5. REFERENCES

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