THE COMBINATORICS OF STORYTELLING:

MYSTERY TRAIN INTERACTIVE

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What is an interactive story? The traditional idea of a "story" is linear -- it has a beginning, a middle, and an end. There is an apparent contradiction in the phrase "interactive story," because non-linearity[1] is essential to interactivity.

It is difficult to imagine what a non-linear story might look like. Some modernist fiction can be viewed as non-linear. In a class on James Joyce's **Ulysses**, one professor advised his students to approach the work non-linearly saying, "when you get tired of Stephen's arrogance, read a little of Molly or Leopold.[2]" He was telling his students to guide their reading not by the order of the page numbers but by their desires. In a non-linear work, the viewer must be guided by his/her model of what he/she would like to know. This explains why many viewers find multimedia interesting only if they were already interested in the basic subject matter.

Non-linear writing is often difficult to understand; **Ulysses** is accessible to a limited audience. Interactive narrative need not be elitist. The designer must provide the viewer with sufficient tools for orienting himself/herself within the work. Interactive multimedia has the power to exist on multiple levels, making it accessible to a diverse audience. A successful work reveals more on successive explorations.[3]

Non-linear is not the same as unstructured. A work without any structure becomes a database -- a laundry list of available information. The alternative to a linear story model is to use a combination of spatial, temporal, and thematic mapping to construct a *storyspace*. The viewer becomes an explorer of this storyspace.[4]

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[1]While an interactive story may offer more or less linear options, the viewer's experience of a work is always linear. The term "poly-linear" is perhaps more appropriate than "non-linear."

[2]Dr. Robert Kiely, Harvard University, 1985.

[3]Post-Modern art-historical theory discusses the value of works having multiple levels in a figurative sense. Interactive multimedia can *literally* have multiple levels.

[4]The viewer may be a constructor as well as explorer of the storyspace. The

the audience votes on who disappears -- is it The Mystery of Edwin Drood or is it The Mystery of Princess Puffer? Then there would be 738 songs needed (eight times ninety-two). The rate of growth is exponential.

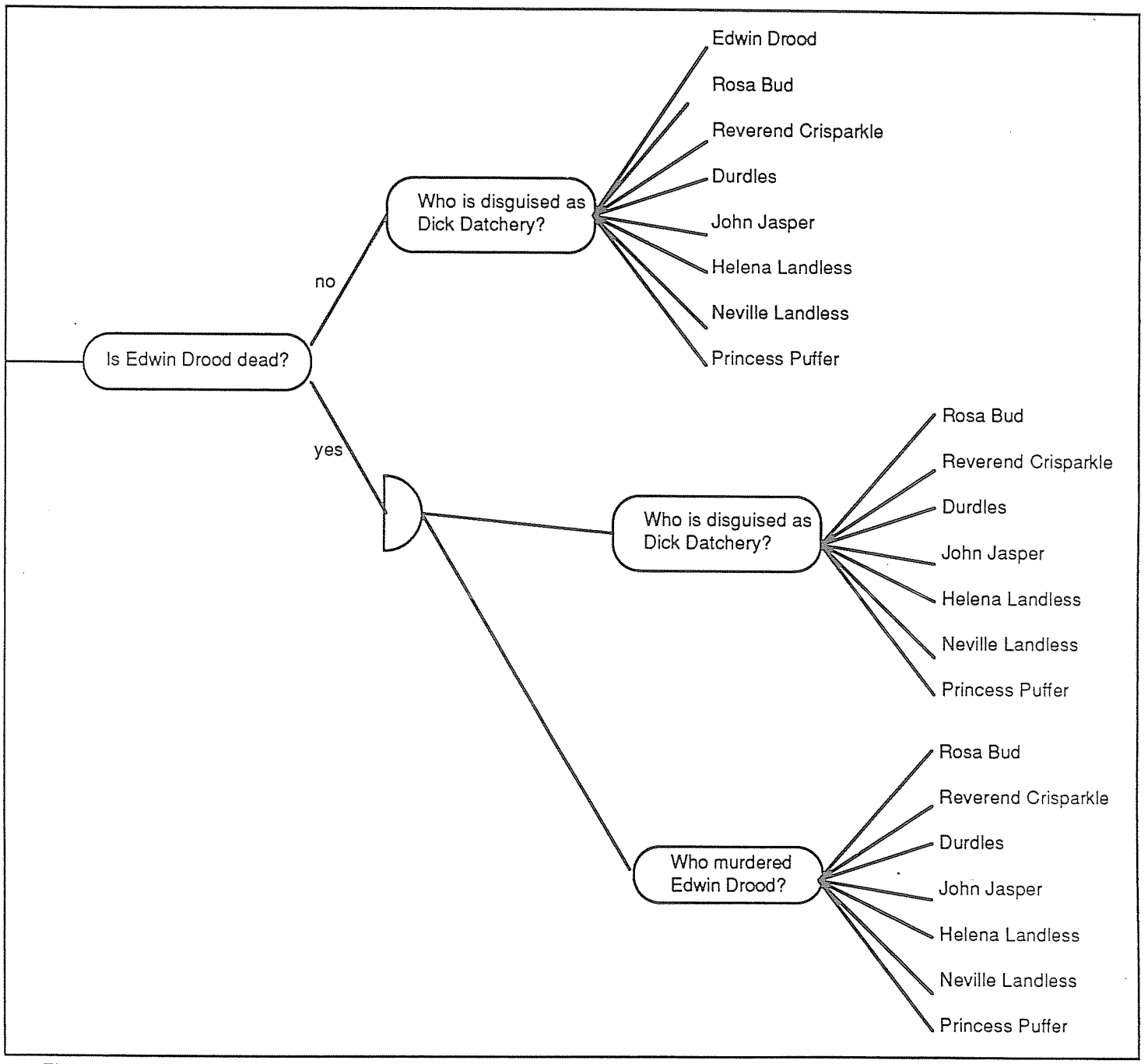

*Figure 1. The Structure of **The Mystery of Edwin Drood***

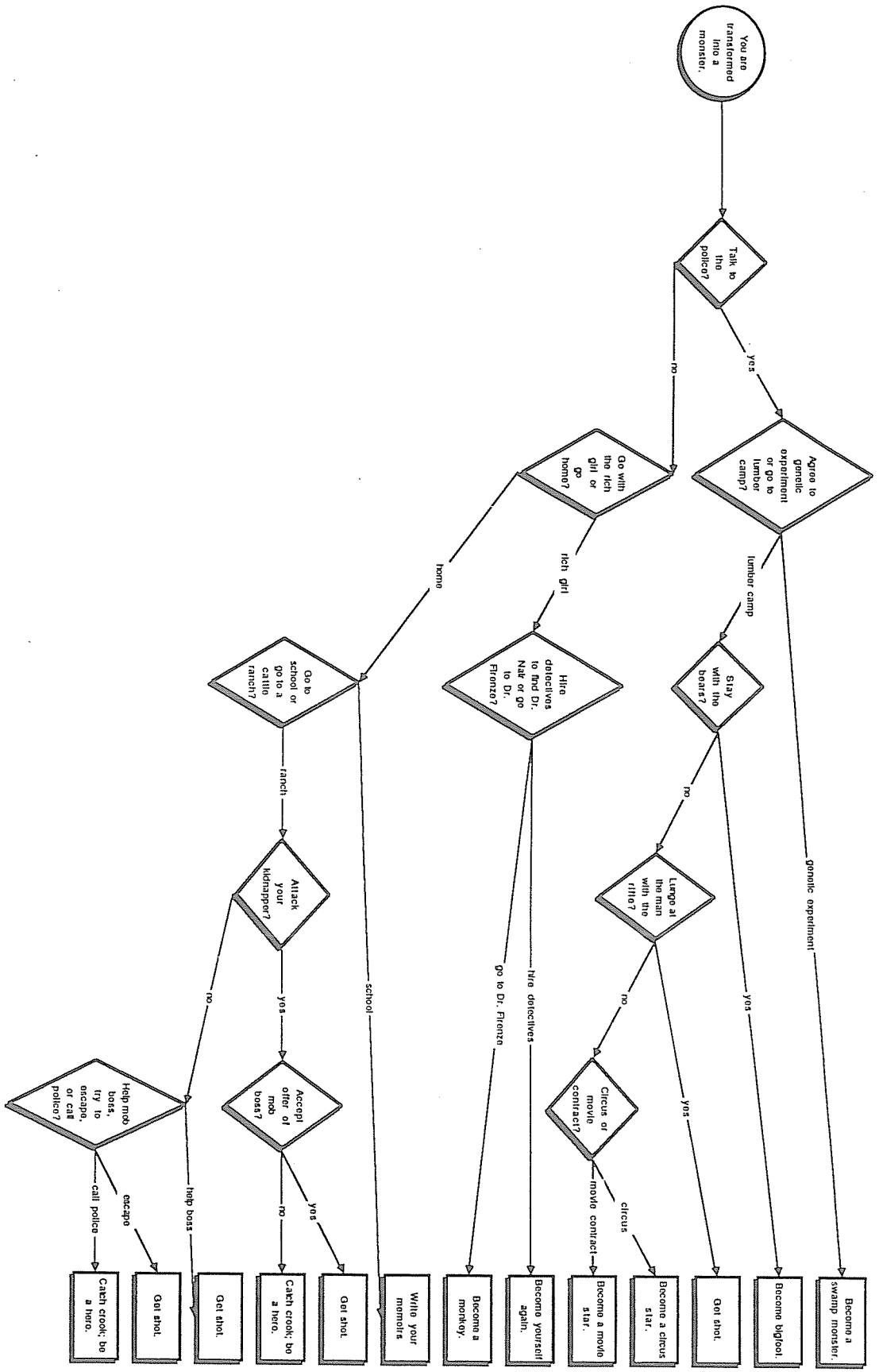

*Figure 2. The Structure of **You are a Monster***

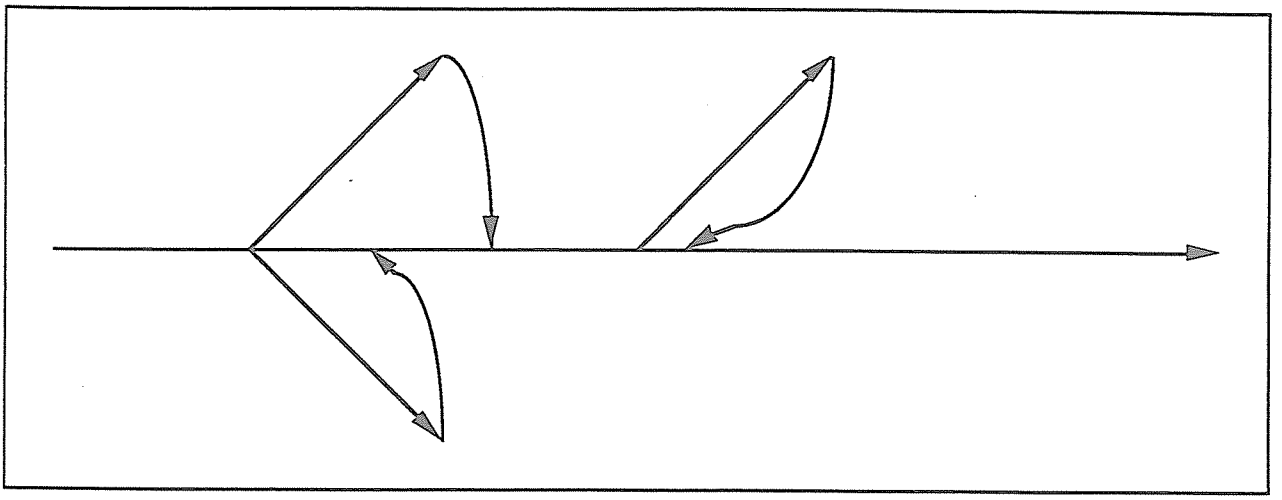

Figure 4. Looping

For interactive training, looping serves a purpose -- it reinforces the correct answer. (It also assures the client who paid for the interactive training that every student or employee will see every precious bit of training that has been payed for.) This faked interactivity becomes tedious. The participant gradually discovers that no real choice is being offered, and may feel manipulated.

However, there are useful lessons to learn from this technique. In narrative, part of what makes looping possible is the interchangeablility of certain story elements. It doesn't matter whether you find the blaster or the space suit first -- as long as you have both before you meet the space squid. And it doesn't matter at all whether you find the diamond in the space squid's stomach. Thus, there are:

- events which are obligatory but can occur in a random order, and there are
- events which are optional.

Both of these types of events are used in what I will call the *cocktail-party approach* to interactive narrative. In **The Name Game**, a videodisc program by MindBank Inc., the participant is invited to stop a spy plot. To stop the plot, you must obtain clues from people at a cocktail party. Clues are earned by remembering people's names. At any time, you may leave the cocktail party to open your attaché case, which contains "agent training" -- a set of short tutorials on tricks for remembering names.[11] You may approach anyone you see at

FORM AND CONTENT

The laserdisc game **Murder, Anyone?** uses aspects of both the broomstick approach and the cocktail party model.[12] **Murder, Anyone?** is played by two teams. In an opening video segment, the character Derrick Reardon is murdered. The object of the game is to guess the murderer, the motive, and the method. After the introductory video, the first team selects either a one or a two. No significance is attached to the choice; players select a number randomly. There are a total of four such decision points. This creates sixteen different plots, allowing the game to be played multiple times.

The sixteen plots are not represented by sixteen different video presentations. The designers used the technique of voice-over narration to conserve space on the disc. Players are instructed to listen to audio track one if they have chosen story one, or audio track two for story two. For example, here are the two different audio tracks for a scene in which the private detective, Stew Cavanaugh, is seen sitting in the library interviewing the family physician, Dr. Theodore Morfield:

> *Audio track one:*
> **Detective Cavanaugh** (voice over):
> If you like your doctors slightly seedy, then Theodore Morfield is right up your alley. He had spent most of his years tromping through the jungles of South America, but now he was staying with the Reardons, a kind of live-in medico only the rich and the sickly can afford. It seems that Derrick was both.
>
> *[Dark, murky video of Dr. Morfield examining Derrick Reardon. Audio is voice over.]*
>
> **Dr. Morfield:**
> I don't know why anyone would kill him. He had only six months to live anyway.
>
> **Detective Cavanaugh:**
> Who all knew about this?
>
> **Dr. Morfield:**
> His wife, his sister, his brother.
>
> **Detective Cavanaugh:**
> Was it you who diagnosed the disease?

[12]**Murder, Anyone?** Cincinnati: Vidmax, 1982. This laserdisc game has no computer software. Players are intstructed to jump manually to disc frame numbers.

a different video segment for each of these choices conserves space on the video disc.

The nature of the subject matter is what makes this technique work. The factual information presented in these sequences is different, as the excerpt above shows. Each video segment contains a set of clues. Many of the most specific clues are in the final video segments (G, H, I, and J), because no video follows them. The players put the clues together to form a theory of what has happened. Which clues are significant changes between different story lines. The creation of a whole out of loosely connected pieces draws on aspects of the cocktail party model.

The content of **Murder, Anyone?** is inseparable from its form. The mystery theme allows for information conservation; combinatorial explosion is curbed by reusing segments in different storylines. The game format transforms the lack of narrative coherence into a challenge for the players.

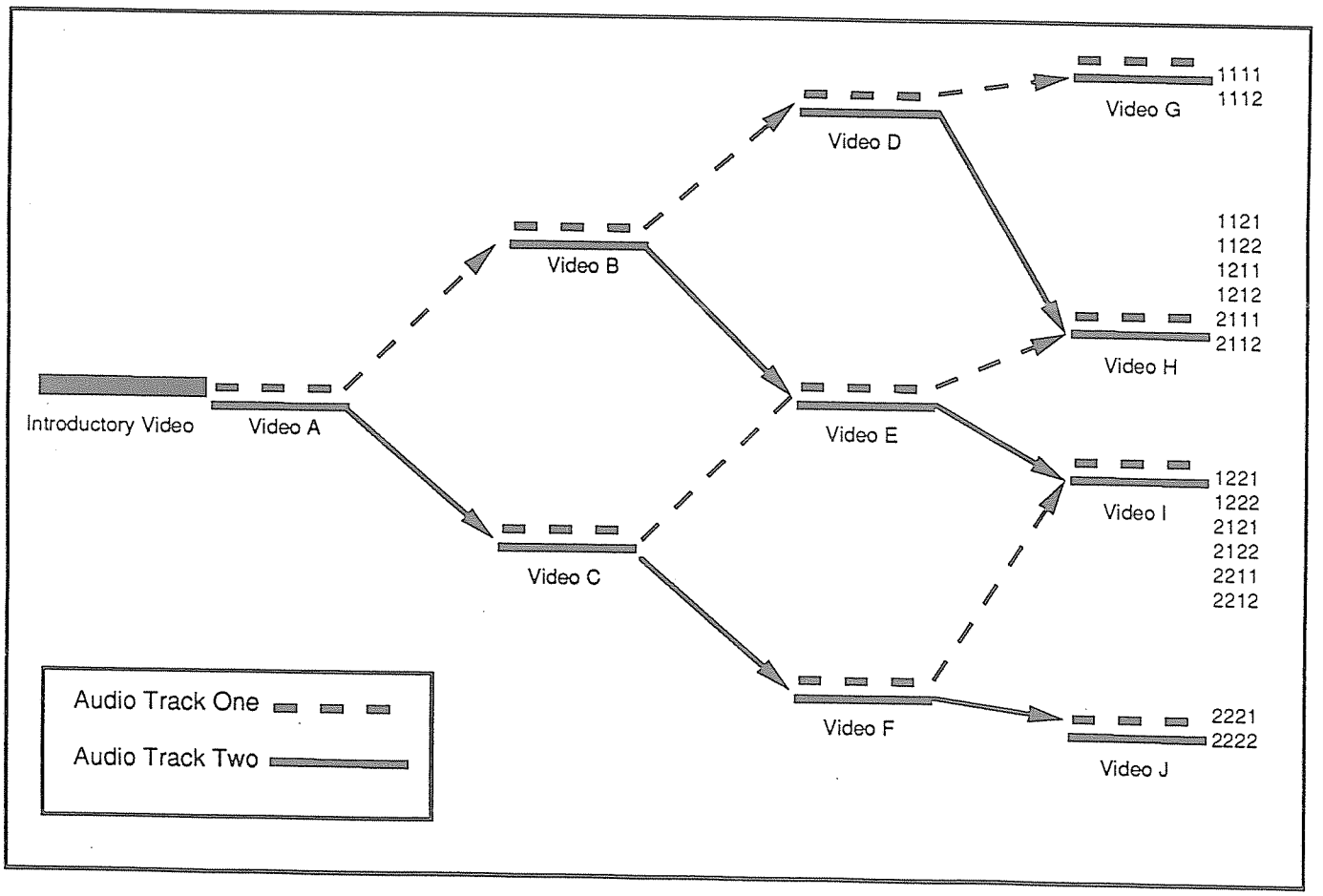

Figure 6. The Structure of ***Murder, Anyone?***

covered is finite, which limits the amount of information needed. By using sequences of still frames rather than running video, the amount of information needed was further cut down by a factor of 30. Short video "stories" were placed within certain buildings to add interest. The combinatorics of the problem were quite manageable -- only one hour of video disc was needed. This style of interactive multimedia has come to be called "surrogate travel." No real story is told; the participant is simply allowed to explore a place.

The possibilities of both spatial and temporal mapping are limited. However, by using both simultaneously the author can create a *storyspace* for a true interactive narrative. Jim Jarmusch's film **Mystery Train** is ideal material for this approach.

MYSTERY TRAIN INTERACTIVE

Mystery Train is made up of three separate stories strongly linked both temporally and spatially. Spatially, characters of all three stories see the same statue, pass the same bar, and stay in the same run-down hotel. Temporally, the stories occur simultaneously. The temporal linkage is established by things that characters in all three stories hear: trains go by, the song "Blue Moon" played on the radio at 2:17 am, and a gunshot.

Imagine **Mystery Train Interactive**. At 2:17 am, the participant could find out what is happening in different places in the hotel. In front of the bar, the participant could move through time to see what takes place there. Thus, there are two basic ways to explore the story: to select a time and explore spatially, or select a place and explore temporally.

A third way to explore the story space is thematically. One could, for example, look for pictures of Elvis, or references to the legend of Elvis' ghost on the highway. Thus, the participant becomes a part of the same quest as the characters.

A variety of supporting materials would enrich the storyspace. Who has watched **Mystery Train** without wanting to learn more about Carl Perkins? Whenever a singer such as Elvis Presley or Carl Perkins are mentioned, the viewer would have access to a digital library of the artist's music. The library is

database stores data. A knowledge base uses a more sophisticated approach to representing information, and is capable of keeping track of complex relationships between data. How best to represent information of this nature is a current topic of research in artificial intelligence. One approach is called a "frame system" or "semantic net." A partial description of a shot from **Mystery Train** appears on the next page.

The author working with this scene would not need explicitly to select which links to include. Instead, he/she would simply describe each shot, and enter this information into the knowledge base. The system would contain a set of simple rules of inference and could construct links based on knowledge of the material[15].

This makes it easy for one to add new material to the system. The author doesn't need to search through the entire database to find the relevant places to construct new links, but can simply put information about the new entry into the knowledge base. The system simply needs to be told that in this new entry one sees the bellhop swat the toy fly. The system itself makes the connection that this might be relevant to the scene where the Japanese tourist swats a live fly. This approach is particularly suitable for applications which change frequently such as news archives or tourist information kiosks.

Notice in the diagram that "to swat" is a kind of "to hit." This allows "to swat" to inherit properties from "to hit." The system now knows that swat needs a subject (who is doing the swatting), and two objects (what is being swatted and what the swatting is being done with.)

The process of describing (or "logging") an entry in the knowledge base often reveals new information. In making the diagram on the previous page, I added "silly" as a description of the appearance of the Bellhop's uniform. It then occurred to me that the Hotel Manager's suit is also rather silly. This is not a trivial point. The scene would have a different impact if the Hotel Manager were wearing an expensive, conservative, banker-style suit. The change in costume would effect the perceived relationship between the characters.

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[15]In an ideal system, a set of image and audio processing tools would give the system some knowledge of the content of the scene automatically.

The knowledge-base approach makes it easier for personal annotation to be included on top of the public knowledge base. Thus, the cinematographer perusing *Mystery Train Interactive* might add a *slot* for camera angle to many of the frames, write text comments, and draw sketches on the use of camera angle. A later user could choose to load in the cinematographer's annotations.

The most important added power of a knowledge-base approach is that the viewer can define his/her interests. One viewer might want to move through spatial links only, exploring Memphis. The cinematographer might want to examine shot properties. An Elvis fan might follow the theme of Elvis trivia either spatially or temporally through the story. Each of these themes is like a thread in a complex web. When more threads are activated, the system begins to behave like a database of information. When fewer threads are activated, it begins to behave more like a linear film.

GRANULARITY

What is the smallest unit of video that can be manipulated -- a shot, a sequence, a scene, or a story? At the shot level, if the viewer of **Mystery Train Interactive** moves from the bellhop swatting the toy fly to the tourist swatting the live fly, narrative coherence might be lost. Although there is a logical basis for linking these two shots, they do not form an understandable narrative.

Could the computer recognize that they do not form a coherent narrative? That would require higher-level reasoning. The computer would need a model of the story and a model of the spectator. By tracking what the spectator does and does not know, the computer could evaluate which links would be meaningful.

Let us suppose that the link has been determined to be relevant. For example, suppose that the participant is not a first-time viewer and has expressed an interest in studying the use of violent imagery. Is the link made at the shot, the sequence, or the scene level? A cut directly from the toy fly to the live fly makes the connection explicit, but would probably look awful and make little narrative sense.

To make transitions at the shot level, the computer would need a complete theory of editing. Could one create an expert system to understand gesture,

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