

disadvantages include: (1) greater demands on storage, bandwidth and computing resources, (2) cognitive overload, and (3) system complexity.

Hypermedia is a style of building systems for information representation and management around a network of multimedia nodes connected together by typed links [15]. The advantages of hypermedia include: (1) ease of documentation, (2) ease of conceptualization and/or visualization, and (3) dynamic expansion of information hyperspace. The disadvantages are also well recognized: (1) disorientation due to “lost in hyperspace” phenomenon, (2) cognitive overload, and (3) system complexity.

In this chapter, we will give a focussed survey of current research in MSE to apply multimedia technology to the practice of software engineering, or to apply software engineering principles to the design of multimedia systems. Since multimedia is basically multimedia objects plus links, in the following survey the concept of *links and association* will come up time and again as the central theme. The survey is by no means exhaustive, but the topics presented in this survey are a fair representation of the current research issues in multimedia software engineering.

2. Project Management Using Multimedia Tools

One successful application of multimedia technology to software engineering is in project management using hypermedia CASE tools [26]. Since the traditional project management tools lack the ability to capture a multitude of decisions and do not provide document control, a new Decision Based Systems Development paradigm (DBSD) was developed [25]. In decision based systems development, usually the following steps are to be taken:

- Identification and articulation of the problem.
- Identify alternative solutions.
- Choose decision criteria.
- Justify alternatives.
- Evaluate conditional decisions.
- Put the decision into context.
- Build decision view.

Multimedia technology allows the decision makers to use text for problem description, graphs and diagrams for representing problem space, and different colors and symbols for denoting status and the latest information. Moreover, hypermedia allows the linking of documents and people in a variety of ways.

In the Decision-based Hyper-multimedia CASE (DHC) tool, objects in an extended document base are linked by five types of links: (1) *Reference to problems/decisions in problem space* or SEE links, (2) *Reference to a single on-line document* or REFER on-line links, (3) *Reference to a Decision View of a document*

set or VIEW links, (4) *Timed reference to a contact person* or CONTACT links, and (5) *References to off-line documents* or REFER off-line links.

Some link types may be motivated by unix/DOS system commands. For example REFER is similar to *xloadimage* for bit-mapped pictures in DOCS.

This DHC tool was applied to Low-Visibility Landing and Surface Operations (LVLASO) project at NASA Langley Research Center. The impact on LVLASO is that the DHC tool is applicable to early stages in systems development. Also, brainstorming was easily documented and not lost. It encourages people to be more goal-oriented so that tasks that did not clearly fit in were immediately dropped. Finally, it keeps people up to date with decisions. Future additions may include a CONTACT hyperlink, group Decisions by functional areas, and better GUI. The importance of this project is that it indicates the desirability of having many different types of links for information/people association.

3. Software Documentation

Another successful area of application of multimedia technology is in software documentation. By exploiting the nature of hypermedia, powerful multimedia-based program documentation systems can be developed.

3.1. *RST documentation model*

Reliable Software Technologies Documentation Model uses standard C comments with the addition of design documents on the WWW [4]. Standard C Comments are added to program lines whose purpose is not clear, to the beginning of each function or procedure to explain its purpose and the Pre and Post conditions, and to the header function to describe its purpose.

The following information is also maintained:

- CVS revision history.
- Requirements document.
- Relevant research.
- Architecture diagram.
- UML diagrams.

RST documentation web page includes the following information:

- Welcome to the new program web page.
- Short description of the project goals and the specific problem to solve.
- Related links.
- Project design document.
- Project specifications document.
- Architecture document.
- Research Links: Link1, Link2, Link3.