

ExperMedia/2: A Multimedia Expert System Shell for Domain Experts

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ABSTRACT

This video describes ExperMedia/2: an OS/2 multimedia expert system shell for development of intelligent multimedia/hypermedia computer-aided training and certification applications¹. ExperMedia/2 (EM/2) takes full advantage of modern multimedia workstations. Hypertext, hypergraphics, high resolution images, audio, software motion video, animation, and expert system are technologies that in synergy are far more useful than each by itself. ExperMedia/2 greatly reduces the initial startup cost and allows domain experts (non-programmers) to develop the multimedia applications without much dependency on media production specialists. ExperMedia/2 applications reside entirely on hard disk or on removable, rewritable media (optical storage) and can be used as a stand-alone or in a network configuration.

EM/2's modular architecture gives the designer the flexibility to both add and modify applications as the need arises and the information becomes available. Additional modules for training, documentation, diagnosis and certification can easily be added to the system as the organization expands.

A major departure of EM/2 from previously reported computer-aided training and intelligent tutoring systems is the seamless integration of training, certification, and on-line documentation with the knowledge-based control and management². In addition, EM/2 provides a visual programming environment for the knowledge-based diagnostic development, a WYSIWYG hypermedia editor, and a library of multimedia and hypermedia templates for developing interactive training and on-line documentation.

This video provides a brief overview of some of the capabilities of EM/2. The video includes the following sections:

- 1) Introduction
- 2) What is ExperMedia/2 ?
- 3) Interactive Multimedia Information Presentation
- 4) Interactive Hypermedia Training
- 5) Multimedia Knowledge-based Diagnostics
- 6) Summary

The following is a brief description of the contents of each section in the video.

1) INTRODUCTION

The introduction gives an overview of IBM semiconductor manufacturing plant in Vermont, where advanced emerging technologies are used in various stages of manufacturing. EM/2 is used to develop state-of-the-art multimedia and hypermedia applications for operator training, tool diagnostics, process control and on-line documentation.

2) WHAT IS ExperMedia/2 ?

ExperMedia/2 is an OS/2 multimedia expert system shell. Its primary potential applications are tool maintenance and troubleshooting, process control and diagnostics, operator training and certification, as well as on-line documentation. EM/2 provides a seamless integration of training, certification, on-line documentation, and access management with knowledge-based diagnostics.

3) INTERACTIVE MULTIMEDIA INFORMATION PRESENTATION

Managing business information with speed and efficiency is essential to today's productive work

environment. From distribution and storage to retrieval and use. EM/2 provides hypertext, hypergraphics, software video, and animation for creating efficient and interactive on-line documents. Using powerful hypertext and hypergraphics, a user can quickly access any portion of a document on a complex tool or manufacturing process with a simple "point-and-click". This section reviews several examples of such on-line documents developed in EM/2 and at use at IBM Vermont manufacturing plant. Hypergraphics is widely used in tool repositories where user can click on a specific component or a part of a tool and get its detailed description. Hypergraphics is also used to navigate inside complex tools and structures.

4) INTERACTIVE AND COOPERATING HYPERMEDIA TRAINING

Compared to traditional classroom training, training applications developed in EM/2 provide effective, consistent and less costly training. This section reviews several on-line training applications developed in EM/2. These applications encourage learning by discovery and take intimidation out of the learning/training process. The control and management modules monitor the progress of the trainee and schedule/recommend additional training modules based on the user area, assignments, and previous training records. Some of the advantages of such training are:

- *Shorter training process*
- *Improved training quality*
- *Consistent training*
- *Controlled training objectives*
- *Reduced trainee intimidation*
- *Active learning environment*
- *Learner-directed training*
- *Integrated certification*
- *Reduced instructor dependency*
- *Easily updated courseware*
- *Training customized to student*

5) MULTIMEDIA KNOWLEDGE-BASED DIAGNOSTICS

Accurately identifying the cause of equipment or process failure is critical to improving productivity and reducing tool down-time in manufacturing. This

section reviews several examples of manufacturing tool diagnostic applications. The interactive diagnostic process guides the user to identify and fix equipment problems. Tool diagnostic modules can use still images, slide shows, animation, and motion video to improve the quality of diagnostic advice being delivered. In addition, the diagnostic modules can call upon the training and on-line modules at any time during diagnosis. This becomes necessary during 2ns and 3rd shift hours where the expert technicians and manufacturing engineers may not be readily available. The knowledge-based control and management modules ensure that the user is certified and capable of carrying the diagnostic tasks.

Process control is very similar to tool diagnosis described above. In process control, product progress is monitored. When any deviation from the desired specifications are observed, The operator is notified. Knowledge-based modules can then be consulted to identify the manufacturing process problem and possible corrections.

6) SUMMARY

EM/2 provides a visual programming environment for the knowledge-based diagnostics development, a WYSIWYG hypermedia editor, and a library of multimedia and hypermedia templates for developing interactive training and on-line documentation.

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REFERENCES

- [1] A. Hekmatpour, E. Millham, L. Grant "ExperMedia/2: An OS/2 Multimedia Expert System Shell for Domain Experts," presented at the Conference on Educational Multimedia and Hypermedia Conference (ED-MEDIA 93), Orlando, June 1993.
- [2] A. Hekmatpour, G. Brown, R. Brault, G. Bowen, L. Grant, E. Millham, "FTDD973: A Multimedia Knowledge Based System and Methodology for Operator Training and Diagnostics," Proc. of Conference on Intelligent Computer-Aided Training and Virtual Environment Technology, NASA/Johnson Space Center, ICAT/VET-93, May 1993.