IN FOCUS: CRAFTMAN

An Authoring System for Creating and Distributing Multimedia Applications

CraftMan from Xanthus is a new multimedia authoring system designed to bring the HyperCard metaphor to the NeXT environment and combine it with the power of NeXTSTEP's object-oriented development environment and superior graphics. NeXT users, particularly in higher education, have long asked for an authoring system like HyperCard. Although CraftMan was created to heed those requests, Sweden-based Xanthus programmers Jesper Lundh and Bjorn Backlund also sensed an opportunity to create a better authoring environment with NeXTSTEP.

Lundh and Backlund consider HyperCard a great application.
They aspired to build an authoring system that would allow users to do all the same things—multimedia applications, desktop presentations, software prototyping, educational software, flat-file databases, computer-based training, and application front-ends—but they wanted the system to benefit from the power and extensibility of an object-oriented environment so users could build applications in modular, reusable blocks.

With the introduction of NeXT technology to Europe in September 1990, Xanthus chose NeXTSTEP because it was the only object-oriented development environment available and it supported superior sound and graphics features.

Transcending HyperCard's limitations

Xanthus did not want simply to do "NeXTCard." To transcend the limitations of HyperCard, CraftMan is HyperCard-like in usability, but the application abandons the limited "stack" metaphor and makes no attempt to imitate the HyperCard file format or data structures. Through extensive research, Xanthus also learned from the experiences of HyperCard users, such as struggling with limited window size and not being able to adequately protect finished applications against changes by other users.

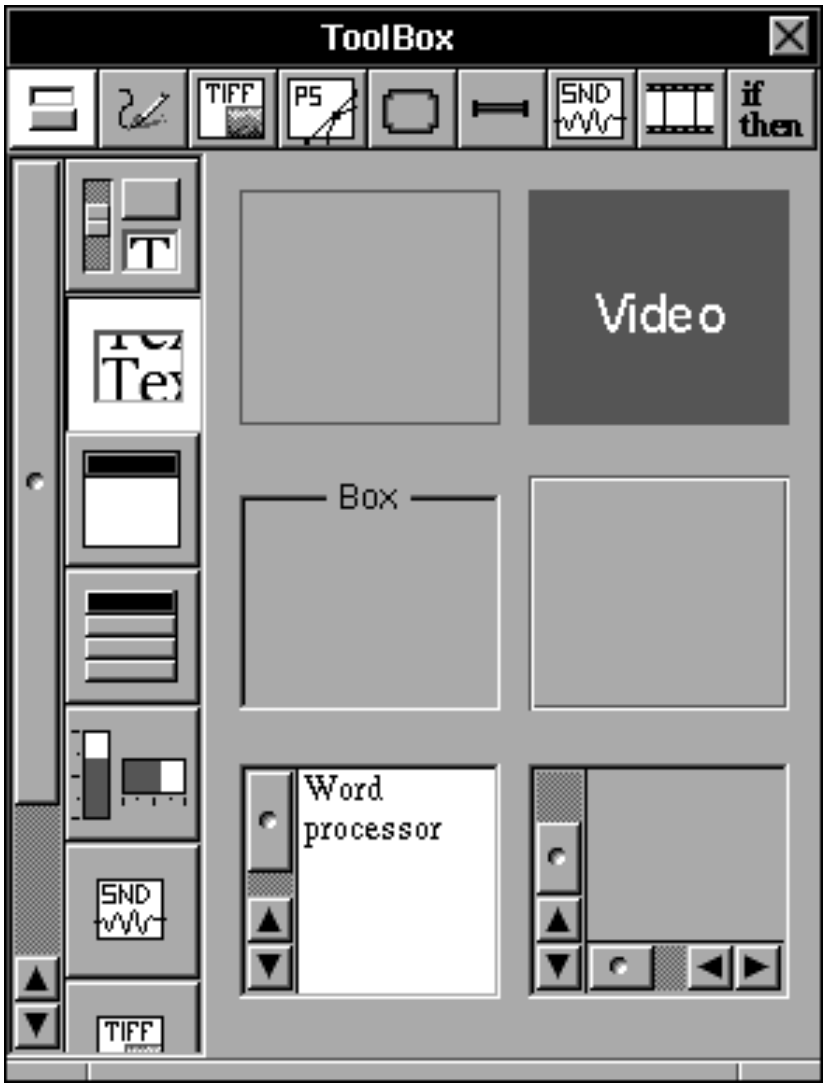
What CraftMan retains is CraftScript, an easy-to-use, truly object-oriented scripting language that is interpreted upon execution. Its English-like syntax resembles HyperTalk, but CraftScript supports list data structures as Lisp does and is object-oriented like SmallTalk or Objective C.

The CraftMan package also includes a run-time-only version called CraftManEngine. Xanthus encourages the

redistribution of this program because each CraftMan application can be created as a standalone program and bundled with CraftMan-Engine for sharing with other users.

The editing environment

CraftMan includes all the tools



ToolBox is a collection of nine tools for users to choose from to create programs. The Palette tool contains the following palettes: Gadget, Slide, Window, Menu, Gauge, Sound, and Image. ToolBox also has the ability to load custom palettes.

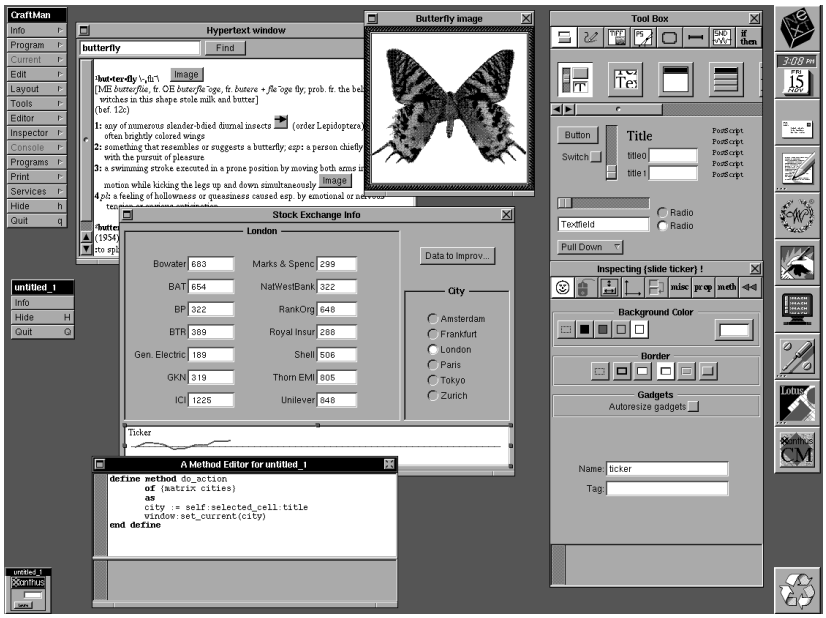
and a rich set of object, image, and sound libraries for creating event-driven applications. Even without learning CraftScript, users can develop multimedia presentations and interactive courseware applications such as tests and homework or in-class exercises.

To get started, the user needs only a basic understanding of object-oriented environments. Every tool in CraftMan is an object—an element that can be controlled with code that is inherent and unique to that object. Each object is characterized by its properties, or the values it stores, and its methods, or the scripts that make objects do things.

ToolBox is ground-zero of CraftMan's editing environment. It deliberately resembles NeXTSTEP's Interface Builder: the ToolBox's tools are graphical so that the programming is really done by dragging and dropping objects and then establishing connections between objects. ToolBox includes nine tools; several are recognizable, such as Ornament Tool for full-color drawing or Sound Tool for importing sound.

CraftMan also has a few unique tricks—like the Palette Tool. If objects are the nails of a CraftMan application, the Palette Tool is the hammer. It allows the user to drag objects into an application window from seven bundled palettes, or object collections, of everything from a button, to a window, to a hypertext cell.

CraftMan includes several libraries of images and sounds that can be pasted into any application as programmable objects. Any sound, or TIFF or EPS image can also be dragged and dropped as an object into a CraftMan application.



The figure shows two CraftMan programs: one is a dictionary with hypertext features embedded in the text; the other is a prototype to show stock exchange information.

The palette (upper right) looks much like Interface Builder and includes drawing tools, an image browser, and a complete browser for the CraftScript language. The palettes are extensible by the user without Objective C programming.

The Inspector (lower right) can inspect almost any object in CraftMan including classes and data structures like collections and dictionaries.

The CraftScript editor (lower left) is "smart" and knows how to pretty print CraftScript (indentation, keywords in bold, and constants in italics) and can expand

The Inspector Tool is the other CraftMan editing fundamental. In the Inspector window, the user names the object and can edit its basic properties. These are grouped as "aspects" and define its appearance, value, and location. The Inspector also allows the user to examine the object's methods so the user will know what messages the object can understand.

CraftScript

CraftMan is bundled with a complete set of already-programmed objects, so users can create scores of applications simply by using these objects. Writing CraftScript comes into play when the user wants to create methods or programming scripts for new objects. Fortunately, the language is readily accessible: CraftMan includes several tools that ease the user toward CraftScript proficiency, including a debugger that makes suggestions if a method is not implemented properly.

CraftScript also makes CraftMan a useful tool for teaching object-oriented programming concepts or interface design, especially for nonscience and nonengineering majors. Computer science faculty or students could also use CraftMan to prototype applications to be written in higher-level languages.

Integration with NeXTSTEP

Via CraftScript messages sent to the host system or over a network, a CraftMan application can start up or terminate any NeXT application, as well as open files and import or export data without any Objective C code. An application for presenting semester-by-semester budget forecasts to faculty members, for example, could automatically pull data from an a Improv or Wingz spreadsheet. CraftMan applications can also serve as front ends to other applications like a relational database.

Multimedia applications

Slideshow is one of the fundamental

objects included in CraftMan. CraftMan applications can be built as Slideshows, where the application runs as a sequence of slides, each with a host of visual effects. Slideshow serves a similar function to a HyperCard stack, but as an object, Slideshow is not a static image but can send and receive CraftScript messages.

CraftMan also provides a video object. Once placed in an application, it can show video from one of the video input ports on the NeXT-dimension board and understands simple messages like start and stop. CraftMan cannot interface directly with external devices, but Xanthus is planning to release DiskoMan, an application for remotely controlling RS-232 videodisk players. A CraftMan application can launch another application like DiskoMan so videodisks can be incorporated into CraftMan presentations.

Database object

CraftMan includes a database object that has the sorting and searching capabilities of a flat-file database that can be customized to handle everything from class lists to grade reports to archival notes for an art collection.

User Palettes

Any object and its method can be saved and pasted into a User Palette—one of CraftMan's most important features. Because object-oriented code is reusable and modifiable, user palettes can be saved as separate files and shared with other CraftMan users. In the education community where sharing university-developed software is common and encouraged, users have the benefit of exponentially growing code libraries. Within a few months of the program's release, Xanthus expects that users will be able to develop sophisticated programs just by using objects that other users have created.

A focus on education

As a company, Xanthus is geared toward higher education users. Partially funded by the Swedish Board for Technical Development, Xanthus began as a spin-off from two Swedish research institutes, Swedish Institute of Computer Science and Swedish Institute for Systems Development. CraftMan's creators know that the higher education market is the proving ground for the product.

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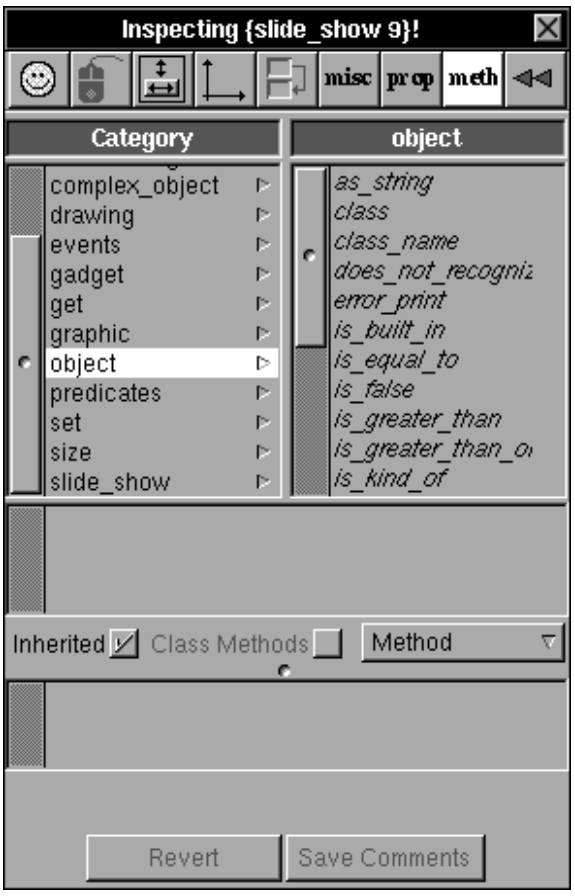

The Inspector, one of the fundamental tools of CraftMan, can inspect eight different aspects of almost any object.