

Interactive Animation on the Macintosh II

Jonas af Klercker
associate professor
Department of Architecture
Lund University. Box 118, S-221 00 Lund, Sweden

Abstract

The efficiency of images in communication between humans has so far been used almost exclusively by TV and other mass medias. The costs have been too great to encourage the use of images in the financially restricted everyday practice of architecture. With a range of application programs for the Apple Macintosh II the vision has come close to reality.

It is now possible to create guided walks with the chance to choose different routes and views in a model of buildings and surroundings in 256 colour graphics. The makers of these programs may not have foreseen this use for their products and that is why it takes quite a lot of effort to make all the necessary images. With some supplementary routines however, this will be made much easier.

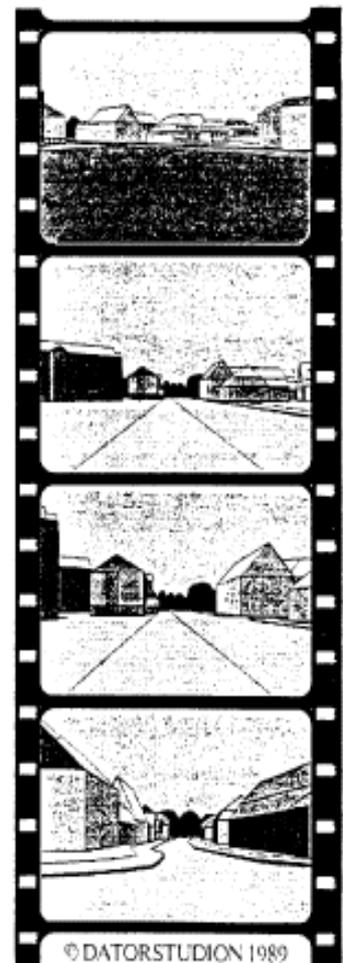
Animation can also be used to visualize different processes inside a building. We have been studying the working environment in mechanical industry. The goal of this project is to make communication possible between the workers at all levels of an organization in planning changes and has so far been very successful.

The use of this technique is only limited by our imagination and funding. Some examples to be tested in the near future are "Escape at a fire", "Animation of a Dairy", "Traffic situations in a parking lot", "CAD-working place" and others.

One of the difficulties in interactive planning with users has been to come close enough to their reality. With animated images it is possible to visualize what is going to happen and what it is going to look like in a more understandable way.

In education this must be a challenging possibility. Changes and processes are some of the most difficult subjects to describe and explain!

The software used is a handful of individual programs which, thanks to the graphics standards of the Macintosh, can exchange data with each other.



Background

Architects use images both as part of their internal design process and as means of communication with their clients. Under the pressure from demands of efficiency and the building process itself these images tend to be formal drawings, more than visualization of the ideas involved. Most people have difficulties in reading drawings, and making drawings with computer aid does not change that.

The efficiency of moving pictures has been proved by computer games. Though not looked upon as really serious the fact that even a small child can manage complex situations with very little training is indisputable. Why not use it for other, more demanding purposes?

As TV becomes a natural part of communication in our society the ability of "reading" this media will be universal and more worth using. There might be more sophisticated ways to communicate but these are part of a very strong development.

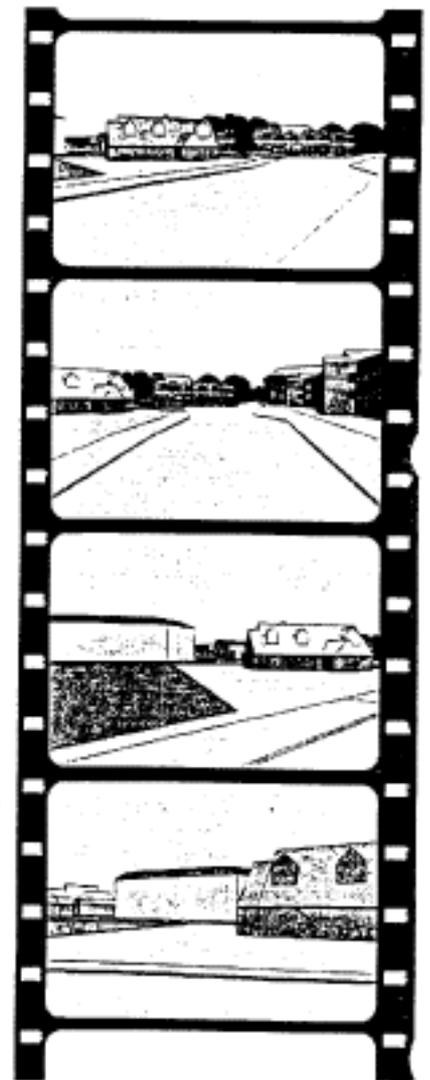
As graphics techniques have improved the possibilities have increased considerably. The only trouble so far has been that the technique has been available only on high computers. Technically it has only been interesting to do computer graphics when "everything" is possible in real time.

Now the "do it yourself" mentality of desktop publishing on PC:s has reached those making moving advertisements. Some interesting programs on the Macintosh have been on the market for one or two years now and these programs can be used for other purposes.

Simulation. animation and Interaction.

In natural sciences simulation and animation are often used together. With simulation we have chosen to understand running a process by algorithms. The advantage is that you can run a long time-consuming process in a short time, while one problem is that you have to simplify the process to be able to come up with a reasonable algorithm. Your evaluations can be presented in statistical tables.

Animation is more like a glimpse of real life. It runs mostly in real time so you have to chose which moments to present and instead of strict algorithms you have to have a "script". The result is mostly a visual evaluation which has it strongest point in the



human capacity to visually combine parallel processes which could be very difficult to make with algorithms. Simulation and animation of the same process are often complementary methods.

"Interactive" has become a very popular and modern word used in combination with the new medias. Being interactive in our world will mean that you can modify the process while running it. It might mean choosing between alternative ways of performing to changing the whole process with some simple commands.



Techniques

From a strict technical viewpoint, real time animated graphics are an ultimate wish. For training pilots and handling other high risk jobs this has been in use for a long time. But the computer power needed is too expensive for use in a more common situation. Of course we could sit down and wait for the time when this technique is affordable. But why do that?

On a PC the technique of processing bitmap images is in the short run what we can afford to deal with. If you want to use computer power for constructing the images you have to transform 3-dimensional object-oriented screen pictures to bitmaps.

In the Computer Studio of the School of Architecture in Lund we have developed a combined use of some standard programs for the Macintosh II for animations. We have chosen the Swivel 3-D™ and ModelShop™ for creating the pictures and VideoWorks™ for animation.

The software used is a handful of individual programs which thanks to the graphics standards of Macintosh communicate with each other. From the users point of view there is an advantage in being able to pick your own toolbox from different programs instead of having to chose a huge package. When a new version of one of the programs is released you do not have to have a new version of the whole lot!

Use of animation for visual evaluation and communication.

Together with the Departments of Working Environment and Work Psychology the Computer Studio is running a nationally funded project to develop the use of animation as means of communication in work places. The main idea is that all involved employees shall be able to take part in planning for a better working environment. To do that they have to be able to understand and discuss the consequences of suggested changes.

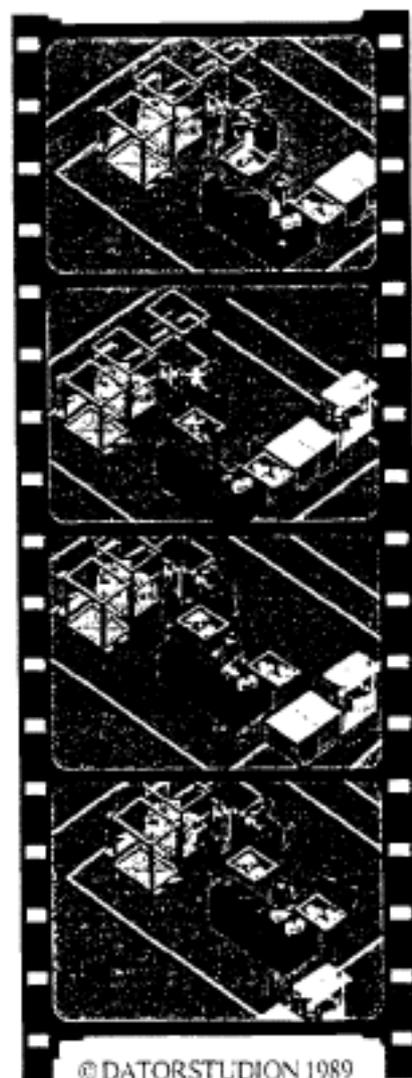
Pictures communicate with people in their own language. They can serve as something to point at for orientation, and often a short "fill in" message can be enough to make yourself understood. You can not only make your evaluation, you can communicate it and get an understandable reaction. Using moving pictures adds possibilities and has been very effective indeed so far in our "cases" in mechanical industries.

The most impressive examples of animation in architecture are computer animated videofilms of "flights" through planned, not yet existing buildings. Although it takes a lot of computer power to create the images it takes only a short time to show them. This is basically done the same way as we suggest. However, we are using a Macintosh II, instead of a large mainframe computer, and \$300-500 standard programs.

Another application must be to demonstrate mobile situations in a building. After all a building as a concept consists of its physical environment, spaces and people.

Guided Tours or Visual Walks?

As a possible user of a planned building offered a "tour" through and around it, I would very much like



to be able to stop, look around horizontally and vertically, that is use the program "interactively". This is not fully possible but as the responsible architect you can make alternatives to a strictly guided tour. By adding perspective views at certain points and make a button for alternative choice, interaction can be added to some extent.

Make the users come alive.

An interesting consequence of our research project is how to use animation to show what the building in use would look like. We have not had the opportunity to try anything apart from the industrial examples mentioned before. But there are some problems which certainly would be interesting to be able to study.

Discussions with the authorities about fire escapes for instance would be much easier to manage with an animated example which has been changed and tried again.

We have also had discussions with people who want to study traffic problems in a parking lot and how to arrange a modern dairy. In our own environment we are going to animate how to sit and arrange a CAD-working place.

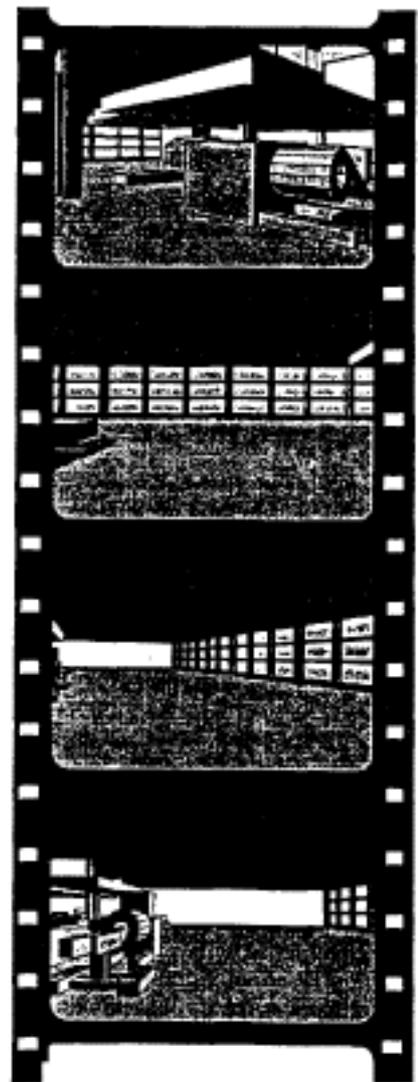
And there is much more....

Interactivity

For information only the use of an animated tour through a computer model would be quite enough. But as a planning tool for a building committee the possibility to do changes and try again is obvious. What can you do about it in the limited environment of a PC ?

The problem is of course the limitation of computer memory. The program VideoWorks™ has an effective way of handling bitmap images. This means that you can run sequences of up to 12 images of 300x400 pixels on a Macintosh II with 4 Mbyte RAM. It does not give you a fluent film impression but it is impressive enough.

As each sequence occupies some 130 Kbyte on your harddisk. Your interactive package can consist of quite a lot of alternatives. The problem is to find a nice way to control the choices. We have been using VideoWorks Interactive , which is a variation of the ordinary program for this purpose. HyperCard™,



and the clones of that program which recently have been released, are other alternatives.

Animation in Education

There has been a lot of ideas about different technical gear to support teaching. Computer aided learning is only one in a long row. There are some cases though where the human capacity is limited and some aid might be of importance.

For instance to describe continuous processes like change of temperature in a wall construction, organization of a building site or construction of a perspective view might be easier to make understandable by a well prepared sequence of images. Some colleagues have already suggested the use of 3-D computer models for students to explore old and famous buildings. An alternative could be to do it with an animated, interactive tour.

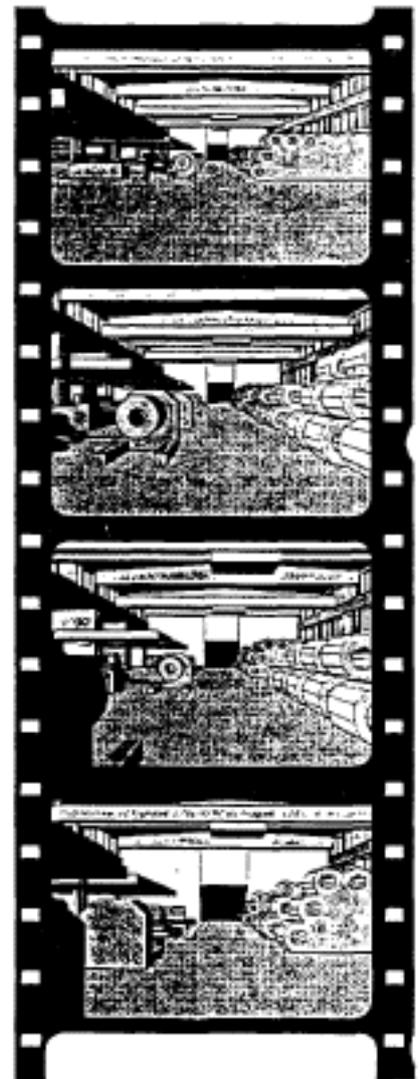
One of the more difficult things to describe to students are the organization of the use of a suggested project. Sometimes it is too much trouble and beyond the pedagogical goals to involve "real" users. At least in our imagination it would be very interesting to give an overview by animation.

Or why not use animation to introduce how to use new computer programs?

How to show animated images.

Finally, when you want to show the result of your efforts you will find that there are problems to arrange a bigger screen than the computer monitor. There are videoprojectors, but they are expensive and rare although many new auditoriums are getting equipped with them.

Alternatively there are ordinary video facilities but to be able to use them you have to transform your programme onto videotape. This has recently been made possible with expansion cards. The video technique, though, uses less resolution so the quality of the images are decreased considerably. Also the possibilities of interactivity are decreased unless you use a videodisk as your storing medium.



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