

# Multidimensional Orientation Systems in Virtual Space on the basis of Finder

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The work is about orientation systems meant for data files that help users to act within the frontend of computer (MacOS: Finder). The focus is also on stereoscopic visualisation systems. It is a search for possibilities of spatial graphical user interface to furnish, establish and manage personal computer environments. In the end developments are being made like e.g. digital fixtures for desk space or a supportive agent of character. Another developed tool is the Semantic Browser. With its help it is possible to create interactively multivariate visual sensations out of a quantity of files. It is based on principal ideas on semantic dimensions of Alan Wexelblat.

## 1 Desk space

The success of WIMP-systems is not based on the superiority of one of its parts but on their coordination and consistency. These are the demands to be fulfilled to successfully create next generation interfaces for operating systems.

As said before in this work, tools were developed to show a path to a desk space-finder. Even the building of a complete finder was forbidden because of the scope, a valid concept is the needed starting point. This is described by a few key points: Input or output does not need any put on or buckle on components. The presentation has a bottom, a back, a top, a left and a right in the way of a stage. The viewer does not change his standpoint only the content / scene of the stage gets changed. The visualisation is based on the ideas of cellular-picture-space, voxel objects and radiosity procedures.

## 2 Gesture Control

Gesture control has high potentials to act as an input unit for practicable daily use computersystems with spatial user interface. This is because of several reasons: Gesture control is spacial by principle. It does not need any body contact and, because of that, interferes less in user's physical constitution. It does not need any special or additional space on the real desktop. It enables concurrent input of location and standardized commands. The hand is the first tool of man. With it things that we are able to grasp or want to grasp get closer.

Whether in future the user will learn the gestures that the system understands or vice versa remains to be seen. This question does not affect the necessity and designers duty to supply a start code. To control the system I worked out a set of gestures; the zero gesture, to take hold, the pointing at / approaching, to fetch, to leaf or hop e.g. through hierarchy, setting up a sphere for the purpose of manipulate the scene, grabbing, motion to come nearer or to withdraw, accentuate, hit-and-bang as a kind of drag-and-drop, open by tickling, delete by flicking to pieces.

The user himself also needs a representation (of his hand). I suggest a specific and maybe even personal sculptural icon wich underlines users potentials instead of the common rough chopped off hands.



Fig. 1: If you point at a file, it shows its label and preview. A 2d picture has an icon but no vicon (volume-icon).

## 3 Structure Elements

The desktopspace-finder as it is seen by the user is composed by an unclosable list of different elements. All representations / appearances of these elements can be classified in: icons, vicons (volume-icon, consists out of  $32^3$  voxel), label, preview and view. While the appearance of files or additional elements vary strongly and in the future even the styling of the system elements will be able to

be changed by the user, it is the gestalt of those system elements that settles whether the system is suitable to the user or not.

With the designing of orientation systems it is important that order functions individually. Necessary are different ordering elements that could be used by choice. The analogy with offers for furniture is appropriate. Because I think that in future foreign providers will bring a variety of „furnitures“ on the market, it was my aim to design supplies for archetypal patterns of order and safekeeping. Each tool is original, has special features and therefore it is restricting. Man needs to be able to assign specific characteristics to (even digital) things so he can remember them and therefore be able to handle them.

Besides the basic elements File and Desktop, there are further elements, representatives of prototypical putting in order: Alias (as in principle known from MacOS), Folder (as in principle known), Galaxy (representation of other desktop / home), World (a kind of 3dimensional folder with Semantic Browser instead of list), Container (for aim of long term storage), Cluster, Pinboard, Pile (among others a description of how unstored data gets stacked in the desktop), Box (like a cardboard box for old bills), Bundle (like a tramp's bundle)

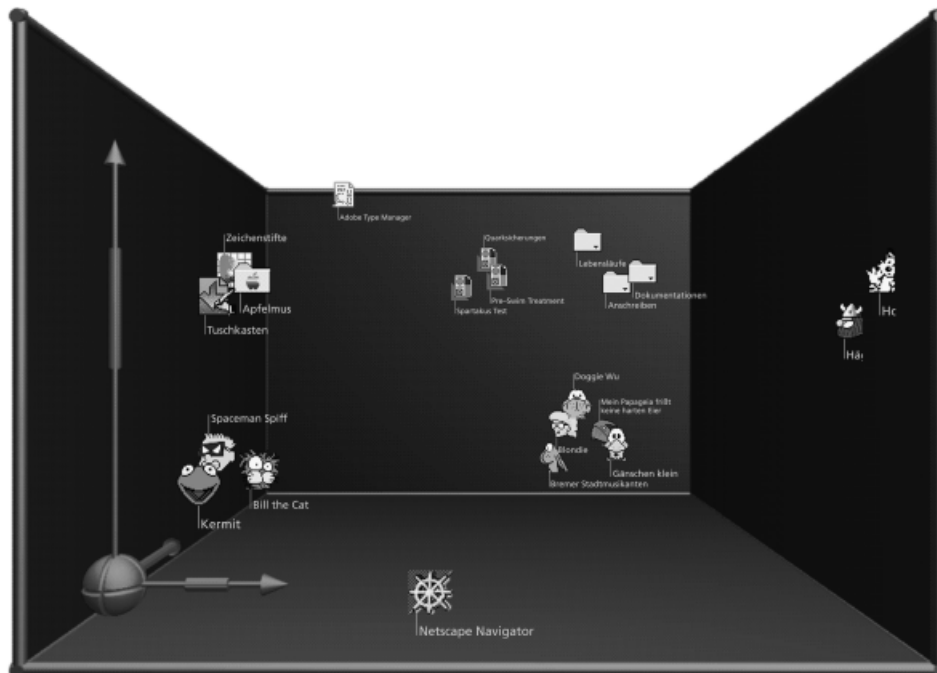


Figure 2: World with embedded Semantic Browser (origin and dimension arrows with a sleeve as choosing tool)

## 4 Semantic Browser

On one hand there is an absolute disintegration of locality in virtual space because there is no obvious frame of reference. On the other hand there is the anthropogenetical necessity of man to remember relations of subjects and as a result their meanings by spatial structures. Architecture and design create orientation structures, order by locating things in space. This ability which consists of defining a consistency of time and location for subjects and so memories in space comes into real conflict with the structural potentials of virtual space. There is not only a lack of any tradition and therefore skill but also for the first time the space itself included with its dimensions and frames of reference need to be arranged.

To create an artificial cartesian space out of really arbitrary dimensions and enter images in it which should transport meanings by their location, would not cope with the potentials of virtuality. Instead of that the user has to get the opportunity to manipulate not only the arrangement but also the space. For his individual needs of information and explanation he chooses semantic dimensions and form with their help that space from which he expects the most useful answers. Now the task for designers is to identify variables, transform them to sense causative dimensions and together with possibilities of manipulation condense them into a understandable intuitive operation. The Semantic Browser is such a design.

The user puts any semantic dimension of his choice at the origin in any angle he likes. The dimensions can be changed in direction and length and so control the extension of the semantic space. Each dimension has an additional tool. With its help a range out of the dimension is selected and so the appearance and spreading of the files are manipulated. The on the fly made sight shows a swarm of files. The figure is determined by the chosen dimensions, their directions and lengths and the scope and position of the selection tools. Another operating possibility of the Semantic Browser is to activate a dimension without putting it at the origin. So the dimension with its selection tool serves as a general filter of appearance for files without influences on their location.

The Semantic Browser can be used like e.g. list views in different environments. According to the environment the available dimensions / criterias will change practically. The criterias can be divided by principles into three groups: criterias of the system, criterias of meta-information and criterias of files. I call those criterias of the system that are related to values / variables known by the system without any research and that are available for any file. These are for example name of file, size of file, age / date (creation, emergence, change, last use), kind / creator, tag, version. Besides that there are the three spatial dimensions X, Y and Z respectively right / left, up / down and back / forward that are needed if files should be arranged in free spatial order.

Criteria of metainformation are related to values / variables that are added on the files. Nowadays the adding is made by the creation programs like Word prompted by the user or by archive programs. That is why not every file will have values / variables for every of those dimensions. Criteria could be: title (not necessarily the same as name of file), topic, author, subject (even multiple), length of text (strokes, characters, words, pages), filling of pages (different relations), size of document (width, height, depth, plane, volume), size of picture (width of, height of, number of pixel), number and depth of colour, length by time or frames, tree of descent / geneses.

Criteria of files are understandable as such criteria that point at the content of files. With their help and their implementation into dimensions it is possible to integrate e.g. retrieval systems into the Semantic Browser. Reasonable are e.g. word or text research, thesaurus (semantic lexicography) or picture research.

The integration of criteria into dimensions is critical. The perception of the recipient has to be anticipated. With the representation of the size of file e.g. a linear interpretation has to be rejected because the perceived difference between 1 MB and 2 MB is much higher than between 100 MB and 101 MB. In addition there are much more small files than big ones. A logarithmic to the base e interpretation turned out to have advantages. Also the question of discrete or continuous appearance as with e.g. alphabetical order has to be decided or both offered. Finally there are dimensions where files or values eventually appear more than ones like e.g. author because one text could have more than one author.

## **5 Outlook**

This has been some results of my work. It shows that spatial user interfaces are not far away, because the singular components already exist. Desktopspace could be the initial point to introduce the needed systems. This is possible if the aim always is to enable any individual user his intuitive access to his own files.