On practice of views design in computer visualization systems

V.L. Averbukh, A.A. Baranov, P.A.Vasev, A. Yu. Kazantsev, A.V. Lazareva, T.A. Fliagina

Yekaterinburg

Let's consider the concept of modelling entity, that is the object of the computing model which is subject to investigating, the object, which states and behaviour, properties, attributes and features are under interest for the researchers and, hence, are subject to visualize. For correct and effective visual representation it is necessary to understand accurately, what states and features of the given object are under interest, because representation of features, states and changes of states there is a primary goal of visualization.

View one may define as the abstraction of a graphic display containing the specification of visual objects, their attributes, their interposition, possible dynamics and ways of interaction. Thus visual forms of abstract data are not connected by the restrictions imposed by certain computer graphic systems.

During the process of visualization a modelling entities are linked with views so, that their essence, behaviour, features and attributes are represented in the concrete graphic display precisely identifying all visual properties in which attributes of a corresponding view are transfered.

One may consider views as the standard or *ad hoc* techniques of visual data representation, some kind of visual procedures which at realisation in concrete visual environments and, after the substitution of real data are displayed onto graphic devices. Besides that, in such "procedure" (that is in the **view**) the possible changes of images (including animation, and permisible ways of interaction with a picture) may be specified. Change of significant and meaning pictures at possible interaction with the image - is a visualization outer side. These pictures (graphic displays) are a realization of the abstract concept of a **view**.

Visualization design is needed in understanding what is the set of the base modelling entities, what are the objects of special interest. Also it is necessary to understand, what is the main goal of visualization, what objects will be shown in each concrete case, how objects under user interest have to be displayed. Hence one may clarify whether there is a possibility to use standard views and methods of interaction or it is necessary to search new views and interaction techniques. It is important to understand, the role of dynamics for representation of the processes under consideration, what methods of human-computer interaction it is necessary to use in the chosen views. Visualized objects often are of the abstract nature, but withal users may wish to receive the visual images reflecting its idea about the phenomena.

Practice of view designing shows, that except studying of mathematical and computer models of the phenomenon it is necessary to think over the organisation of visual space, that is to define, how cameras, light sources, etc. will take places; where and how windows will be displayed. Work in this respect is similar to work of the designer and taking into account factors of engineering psychology, ergonomics, Gestalt-designing, etc.

Our experience of researches and developing in the field of computer visualization shows the broad possibilities and efficiency of the multiwindow interface, including, based on located in various windows, but the interconnected visual objects. Interesting results are received using in the interface of virtual devices and tools, and also techniques of creation of artifact − the special kinds of artificial visual objects. At the same time there are unsolved problems of three-dimensional dynamic views designing.