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Pad++: A Zoomable Graphical Sketchpad For Exploring Alternate Interface Physics

In the paper *Pad++: A Zoomable Graphical Sketchpad For Exploring Alternate Interface Physics*, the authors analyze new ways of designing user interfaces, more specifically with a program they created called Pad++. They hypothesize that a new type of interface based on zooming and panning a single page may have benefits that outweigh the traditional flat 2d pages that are hyper linked together.

One problem that arises is that the information still has to be well organized by the person inputting the information. Without a good structure, the benefits of a new interface are entirely removed, and may even be harmful, as a user would have problem navigating an area they are unfamiliar with if it doesn't have a good layout.

The zooming that gives more information the further you go in is a good idea. It is good for browsing a large selection, as you are exposed to a large variety of topics that you can choose to view in more depth. This is simulated in interfaces today with a headline and a “view more information” link. I think that this type of layout is especially useful when you want people to see a range of topics. In Pad++ they have the middle button and right button be zoom in and out. In modern windows mouses the scroll would be more effective for this I believe. This would also free the right button for more actions. The scroll is good for zooming in and out because it is a easily understood parallel. You roll it forward to zoom in, and backwards to zoom out.

Analyses on movement like the pan-zoom problem are interesting. The conclusions that were reached seem to be effective, and could be used in other scenarios that go beyond the range of just user interfaces.

Speed is essential to an interface that relies of intuitive navigation. You can lose the analogies that make the interface effective if you have to wait for delays.

The implementation allows for 10 frames per second, which would appear bad by today's rates, but with better processors, it would likely run faster on modern computers. The optimizations made are essential for fast processing in environments with many objects.

It is easy to add the original layout, but if you want to change the setup, you need to reconfigure the whole pad file. If you could apply a method like CSS that allows you to change the display without modifying the content, you could help people optimize their own designs.

Having navigation and searching already provided by the interface makes processes smooth and useful even when not designed by a professional.

Adding physics to interfaces allows for more variation that is less constrained and potentially more optimized for a specific layout. However, by adding zooming you are adding a third dimension to a flat screen. This requires spacial estimation abilities by the user. While this is intuitive in many people, some people have problems with this, which can lead to the slow adoption of a new technique.

While metaphors can be harmful if the analogy is not understood, I believe a more useful modification would be to change the icons based on demographic. For example, in a culture not accustomed to recycling bins, you could change the icon and call it something else. This would maintain the familiarity of a waste area, but without the unfamiliar connotations.
In chapter 3 of *The Illusion of Life* by Ollie Johnston and Frank Thomas, the authors discuss processes used by Walt Disney to increase realism and to emphasize the emotions and actions desired in his animations. These processes are summarized as Squash and Stretch, Anticipation, Staging, Straight Ahead Action and Pose to Pose, Follow Through and Overlapping Action, Slow In and Slow Out, Arcs, Secondary Action, Timing, Exaggeration, Solid Drawing, and Appeal.

In real life, flesh moves when an action happens, and shapes are constantly varying. To simulate this action and make it visible, squash and stretch are used. By keeping volume the same when changes in shape are made, you are able to keep the illusion looking realistic. You can convey emotion through just the variety of shapes that you use. I thought that the use of the sports page in the newspaper to see the wide variety of shapes formed by movement was innovative and intelligent. Photographers of athletes try and catch them in the most contorted positions, as it lends dynamism and action to photographs. This applies to animations as well.

Anticipation gives time for the viewers to notice what is happening. If an action occurs without a set up first, it may go unnoticed. If an action is meant to be seen, you can emphasize it by making a set up, and therefore anticipation for the future action.

One tip I thought was especially interesting under the category “staging” was to only do one thing at a time. By not having multiple motions you keep the action simple and understandable. Also, by putting images in silhouette you keep actions more clear. If you view an image head on, lines can become confused.

Like in squash and stretch, follow through imitates real life. Once actions are complete they don't stop dead, they continue their movement until a natural ending occurs. Adding it to animations adds realism to a scene. By continuing an action you can also ensure that it is noticed. By exaggerating a pose and continuing the movement, the action is seen and life is added to the movement.

Movement in real life isn't linear, it is based on arcs. To go between poses you can't simply draw a line between them. This is an issue in current computerized animations as well. The first thought is to simply combine the images in varying ratios over time, but this leads to blocky unrealistic motions. All joints are based on arc movement.

Adding a secondary action to a scene can also reinforce or add emotions to movement. One thing that I found unintuitive was that if the secondary action is small, such as a change in facial features, you should emphasize it through the other procedures discussed in order to make sure it is noticed, even though it is the secondary action. This ensures that both actions are seen and processed.

I found the summaries of timing to be particularly interesting. One action can convey anywhere from pain to appraisal based on the speed an action occurs. This can easily translate to a user interface. If a circle move quickly across a screen it can convey eagerness or excitement, while if it moves slowly it can show disapproval or lethargy.

Avoiding “twins” is more information that is useful in many contexts. By making an image symmetrical it appears stiff and flat. Variety adds realism and interest to an image.

The end discussion of the limitations of technology was interesting. Although the same issues of large expanses of color don't apply, it is interesting to see what advancements are made through the limitations, and what more can be accomplished with those same limitations having changed over the years.