Subject: Re: IDL virtual reality (was 3D Object IDL)
Posted by george on Thu, 09 Aug 2001 08:36:20 GMT
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Hi There,

Many thanks for the help on this one. It seems that full virtual reality is actually very possible. Rick, thanks for the programs - I really wasn't expecting custom built applications - but I am glad that I have got some people excited.

This was a question from Dick:
> (Question: can you really get good pixel-for-pixel alignment across the
> whole display with two projectors? I've never seen it done, but of course
> this will be important for good results.)

I have been working with a 3D video film maker for a while now. We have been making a variety of 3D films and the best way to show these is to use the 2 projector system. It is bright, clear and can easily be shown to between 50 and 100 people with no problems. All you do is put a polarising filter over each projector. This ain't fancy - we have always hired projectors and just taped a filter over the front. The 2 filters are set so the polarisation is 1) vertical and 2) horizontal. You can then buy polarising glasses. These are just cheap plastic glasses with polarising filters which are aligned horizontal and vertical for each eye. I am not sure which "lens" in the glasses is horizontal and which vertical - but obviously this needs to be set up so that the left eye is getting the light from the projector with the "left" scene, and likewise the right eye. OK - I imagine I am really just stating the obvious here. Now, the 2 images from the 2 projectors are aligned on the screen. But (this is the answer to Dicks question) the actual accuracy of the alignment is not as important as he implies. Ideally, you would want pixel by pixel accuracy - and the 2 projectors to be colocated etc. - but in such an ideal situation you would also want the viewer to be located totally "on axis". In reality, any slight deviations from this perfection is sorted out by the brain. I.E., suppose you are projecting a sphere into your 3D space (and lets face it - spheres are pretty popular). If some aspect of the system means that the two images are not totally properly located - then all that happens is that the brain compensates. you may have the impression of an object which isn't perfectly spherical - but not enough to ever give you worries. Other practical problems are the fact that the viewers are at different distances from the screen, and some are off to left/right etc. etc. The best effect is when the viewer is located relatively far back and "on axis". But all that happens as you move nearer is that the effect becomes more "radical" - the sphere moves towards you - appears very much to be hovering in space - and you eventually embarrass yourself

by trying to reach out and touch it !! But I don't think that pixel by pixel alignment is totally necessary. Remember the left eye only sees what is coming from the left projector
(and likewise for the right). Even if the 2 projectered images were misaligned by a centimetre or so - the brain would still recombine the separate images as a 3D scene.
From our experiences, using twin projectors is by far the best method for full virtual reality. You get a bright, full colour, totally 3D image with no flicker (flicker is a problem with the flicker glasses - unless you get a very high-end projection system that works at twice normal refresh rate - Also, flicker glasses are expensive and you have 50 people wired together !!).
I will dig out some literature on the polarising glasses - but I bet 10 minutes on google would give you the answers.
Lastly, our work so far has been video films - these are at comparatively low-resolution (i.e. standard TV resolutions). With IDL driving relatively modest projectors you could easily have a full 1024 * 768 system - and even higher if you can get someone to part with the money.
The whole system then becomes: computer with double head graphics card -> twin projectors -> 2 polarising filters taped over the lenses -> polarising glasses. I haven't done it with IDL yet but I reckon the results will be spectacular!!
I think the best way to set this all up would be to create the full 3D system and then sit down with the glasses on and "tamper" with all the free parameters (distance between the "IDL cameras"), i.e. just build a widget interface and adjust until you get the best results.

OK, I have written too much - time to get on with it.
I will report back with any progress.

Cheers,

George.
