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Subject: Re: Registering CT and MRI volumes  
Posted by [Randall Frank](#) on Sun, 04 Mar 2001 20:43:04 GMT  
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Karthik,

One "standard" algorithm is Roger Wood's AIR:

<http://bishopw.loni.ucla.edu/AIR3/index.html>

Many of the more popular (particularly functional) imaging apps use variants of this approach. I have not seen it coded in .PRO yet (it actually could be done fairly efficiently), but the technique is very straight-forward and reasonably robust for small corrections. The functional imaging group I work with has had good results with it. I have been thinking about writing a DLM for it, but I was waiting until the next release which I hope will allow real-time use of the algorithm. My application is real-time fMRI. We use IDL (augmented with a lot of DLMs):

Smyser C, Grabowski RJ, Frank RJ, Haller JW, Blinger L, "Real-time multiple linear regression for fMRI supported by time-aware acquisition and processing", *Magnetic Resonance in Medicine*, Volume 45, Issue 2, 2001, pp. 289-298.

Not exactly what you were asking for, I hope you find some of it useful.

BTW: on your KB\_ISOSURFACE, might I suggest adding a DLM to compute an "optimal" complete seed set for a given dataset? The combination of that and your KB\_ISOSURFACE would yield a complete, high-performance replacement for the existing IDL DLM. I use a variant of this myself for N-D isocontouring. A good reference might be:

Bajaj CL, Pascucci V, Schikore DR, "Fast Isocontouring For Improved Interactivity", 1996 Volume Visualization Symposium, ISBN 0-89791-741-3, pp.39-46

Apologies for my long-winded response. Those of you who know me, know I can not help it...

karthik balasubramaniam wrote:

>  
> reply-to: [clunis\\_immensus@hotmail.com](mailto:clunis_immensus@hotmail.com)  
>  
> I remember spotting a thread on registering medical volume data,

> a while back. Unfortunately, I haven't been able to retrieve it at deja.com,  
> which I've been using so far(only shows me recent postings).  
> Anyways, I need to register CT and MRI volumes, and was hoping someone could  
> point me to IDL(or even C/C++) code that does volume registration.  
> I do have some literature on the topic, but thought it worthwhile sounding  
> out  
> people before reinventing the wheel.  
> Any links, references, code would be immensely appreciated.  
>  
> Also, could someone recommend me a web-based newsreader where I could access  
> old postings of this newsgroup?  
>  
> many thanks,  
>  
> Karthik Balasubramaniam  
> CAS Technologies, Chennai  
>  
> -----  
> Get your FREE web-based e-mail and newsgroup access at:  
> <http://MailAndNews.com>  
>  
> Create a new mailbox, or access your existing IMAP4 or  
> POP3 mailbox from anywhere with just a web browser.  
> -----

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rjf.  
Randy Frank | ASCI Visualization  
Lawrence Livermore National Laboratory | [rjfrank@llnl.gov](mailto:rjfrank@llnl.gov)  
B451 Room 2039 L-561 | Voice: (925) 423-9399  
Livermore, CA 94550 | Fax: (925) 423-8704

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Subject: Re: Registering CT and MRI volumes  
Posted by [davidf](#) on Mon, 05 Mar 2001 18:01:35 GMT  
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karthik balasubramaniam ([clunis\\_immensus@MailAndNews.com](mailto:clunis_immensus@MailAndNews.com)) writes:

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> a while back. Unfortunately, I haven't been able to retrieve it at deja.com,  
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> people before reinventing the wheel.  
> Any links, references, code would be immensely appreciated.

I have in front of me a pre-print of an article entitled "Volumetric image registration by template matching", written by Ardi Goshtasby's group at Wright State University. I saw this algorithm in action several weeks ago, and I must say I was extremely impressed with the speed and accuracy they have obtained.

The basic idea is to use a handful of templates from "high information content" areas of the volumes to do the matching, rather than matching the entire volumes. In this case, "high information content" means edges, etc. The algorithm can automatically select these templates and perform the matching. I saw it work well when the regions were just slightly mismatched and when they were significantly mismatched. I was impressed.

I understand the IDL algorithm will be made available for research purposes. You can write to Ardi Goshtasby at [agoshtas@cs.wright.edu](mailto:agoshtas@cs.wright.edu) for additional information. Please give him my compliments.

Cheers,

David

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David Fanning, Ph.D.

Fanning Software Consulting

Phone: 970-221-0438 E-Mail: [davidf@dfanning.com](mailto:davidf@dfanning.com)

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

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