
Subject: Principal Componets Analysis

Posted by [David Fanning](#) on Tue, 04 Sep 2007 00:33:37 GMT

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David Fanning writes:

> Well, I'm ashamed to say, I had read part's of Mort's book
> earlier in the week and found I needed, well, more remedial
> help. Quite frankly, I didn't understand a word of it. :-(
>
> The Lindsay Smith tutorial, on the other hand, was crystal
> clear (<http://tinyurl.com/3aaeb6>). So much so that I came
> back to my office and wrote up the example in IDL, just
> to see if I could follow it.

Well, I'm back, this time with a spelling of "principal" that might even make this discussion of Principal Components Analysis (PCA) available to people who can spell correctly on Google searches. (And I have bookmarked the difference between "principle" as a fundamental truth or law, and "principal" as the first in rank, in my dictionary. How you get to be my age without knowing this is beyond me.)

I've been pretty much obsessed with PCA for the past couple of weeks. For one thing, I felt badly about telling Mort I couldn't understand a word of his excellent book. (It does grow on you when you finally find yourself up to speed again on some of the mathematical notations.)

Anyhow, I've wanted to understand this. Probably for the same reason I've been studying Spanish so diligently lately: it just seems like it might come in handy some day. Does anyone know if they use PCA in Costa Rica?

PCA *is* fairly straightforward. At least after you understand it, it is. Getting there is something else. I suspect there are more of you out there like me who would appreciate a--shall we say--less mathematical approach to the subject.

I found MUCH became clear after reading the above mentioned Lindsay Smith tutorial:

<http://tinyurl.com/3aaeb6>

But there were still a few unresolved problems for me. One of these was why there are two ways to do PCA in IDL, and why you don't get the same answer when you use

them. I discovered, eventually, that you DO get the same answer, but this took me a whole lot longer to figure out than it probably should have.

I also wanted to understand the use of PCA for images, so I looked into that a little bit, too.

All this to say that I have written what I am calling a PCA Tutorial, although that is probably a lofty title for a piece of writing that is more like the blind leading the blind. :-)

I would appreciate feedback on this from those of you who know a lot more about it than I do. I tried to let the Smith tutorial do the heavy theoretical lifting. What I wanted to know was how to do this in IDL. So that is the focus here. (I did find what I think is an error in the Smith tutorial, for what it is worth.)

You can find the tutorial here:

http://www.dfanning.com/code_tips/pca.html

Any and all comments welcome.

Cheers,

David

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

Sepore ma de ni thui. ("Perhaps thou speakest truth.")
