Subject: Re: Principal components analysis
Posted by menakkis on Wed, 03 Mar 1999 08:00:00 GMT
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Mark McGillion <mm@fs1.co.umist.ac.uk> wrote:
> I am computing the principal components and derived variables of a set
> of power spectral data (using IDL v5.1). The power spectral data is a
> matrix of high dimensionality [500,400], the power spectra has 500
> points, and there are 400 examples of this spectra. The 500 derived
> variables calculated from the principle components describe the data
> completely (100% of the variance). In my case, I find that the first
> two derived variables describe over 95% of the variance, therefore I can
> easily visualise my original data in 2-dimensions. Great!
>
> What I need to know is......what contribution is made to these derived
> variables by each of the original 500 variables. Is it possible to determine
> which of the original 500 variables provided the greatest contribution
> to each derived variable?

The values of your eigenvectors will show the contributions from each
variable. The way the principal components rotation is done on one sample
SAMP (of 500 channels or variables) is like this: The first principal
component channel is TOTAL((samp - global_mean) * evec1). (Each variable
here is an array[500].) The second principal component channel is done the
same, except using evec2 instead of evec1. And so on up to a possible 500
principal component channels. (Of course this is usually done in one matrix
mult rather than a series of array dot products.) If you are using PCOMP,
you can get the (scaled) eigenvectors by using the /COEFFICIENTS switch.
e.g., The first (scaled) eigenvector will be in the first row of the returned
matrix.

I'm not sure that you can always rely on an easy interpretation of the
eigenvectors, especially when you have so many channels that are obviously
highly correlated.

Peter Mason

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