Subject: Re: Help with MNF in ENVI
Posted by Peter Mason on Wed, 21 Apr 2004 00:32:39 GMT
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Zhihong Pan wrote:
> Hi, All
>
> First post here, need help for MNF transformation in ENVI program.
>
> I can use MNF_DOIT for transformation of an image. But now I want to
> apply the existing MNF transformation to a few spectra but ENVI
> doesn't support it. I assume the transformation matrix is saved in the
> MNF statistics file but not sure about the details. Any comments
> appreciated.
>
> BTW, this might not be the correct forum for ENVI question. Any
> recommends of forums for ENVI program?
>
> Thanks

It seems to be okay to post ENVI questions here.   <cringes>
Anyway...   I was also faced with this issue a few years ago.   I did some
experiments and, IIRC, in an MNF stats file the forward transformation
matrix is saved in the spot where the *covariance* matrix is usually saved.
The MNF eigenvalues are saved in the eigenvalue spot.   Not sure about the
eigenvectors spot - possibly the reverse transformation matrix.
It has been some time since I checked this and things might have changed,
but assuming they haven't, this is how you'd get the goodies to do your own
MNF transform:
    envi_get_statistics, stats_file_name, cpos=cpos, mean=avg, cov=fmnf,
eval=mnfeval
(You don't actually need MNFEVAL for the transform but it's handy for a
plot.)
More detail:
The image mean (AVG) is always computed for all bands while the MNF stats
can be computed for a subset.   CPOS is an index array showing which bands
were used.   Last I checked, an ENVI stats file doesn't contain band
wavelengths so the only check that you can do to see if the stats file
might be spectrally compatible with your spectra is along these lines:
Compare your full number of bands against N_ELEMENTS(AVG) and the size and
contents of your selected-bands index array against CPOS.
In order to do the transform you will have to extract the MNF's input
channel subset from AVG:
    AVG_SUB=AVG[CPOS]
The transform for a spectrum SPEC then goes something like this:
    (SPEC-AVG_SUB) ## FMNF
(# or ##?   You ask too much of me :-)   FMNF or TRANSPOSE(FMNF)?   Again,

you ask too much :-)   A couple of experiments with an image and you'll be there.)

BTW, if you are thinking of transforming, say, resampled spectral-library spectra using MNF stats calculated for an image, remember that it'll only work if the spectra are of the same kind as what's in the image (e.g., both reflectance) and are scaled the same (e.g., both 0 to 10000).   (This in addition to having the same #bands and wavelengths.)

HTH
Cheers
Peter Mason