Subject: Re: Maximum likelihood question (ENVI)
Posted by Mort Canty on Thu, 08 Jan 2004 15:48:38 GMT
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Hi Jonathan,

I posted the self-same question to this newsgroup shortly after ENVI 3.6 appeared and after not having received a satifactory answer from RSI. Unfortunately it got no takers here. Maybe someone will take pity now that there are two of us.

Cheers

Mort Canty

PS I use the probability vectors for Richards' post-calssification "Probabilistic Label Relaxation" method.

"Jonathan Greenberg" <greenberg@ucdavis.edu> schrieb im Newsbeitrag news:gC4Lb.7043$ux1.4730@newssvr27.news.prodigy.com...
> I'm trying to generate images of true probabilities from maximum likelihood
> rule images. Since the final probability rule images were modified (from the
> RSI website): "In the ENVI 3.6 implementation, the rule images (one per
> class) contain a maximum likelihood discriminant function with a modified
> Chi Squared probability distribution.", I am unclear as to how to get BACK
> to true probabilities. Typing in the % probability into the rule classifier
> doesn't really get me what I need. Could I get the "true" probability for a
> given class (let's say we have two classes, A and B) and calculating:
>
> Rule image A/(rule image A + rule image B) ?
>
> Or is there some other technique I need to perform to get a true probability
> image? Thanks!
>
> I'm planning on using this in combination with Bayesian logic tools, which
> is why I need, for each pixel and for each class the posterior probability
> (0 to 1). As I mentioned, the rule classifier is only good if I want to
> perform a new classification based on the rule images, not if I want to see
> directly what these probabilities are.
>
>
>

Subject: Re: Maximum likelihood question (ENVI)
Posted by Jonathan Greenberg on Thu, 08 Jan 2004 19:04:13 GMT
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Mort:

Did RSI send you ANYTHING? Could you post them to the newsgroup? Also, is there a program to do the Richard's method, or did you code it directly from a publication? Thanks!

--j

On 1/8/04 7:48 AM, in article btju5i$cm0j$1@zam602.zam.kfa-juelich.de, "Mort Canty" <m.canty@fz-juelich.de> wrote:

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Subject: Re: Maximum likelihood question (ENVI)
Posted by Mort Canty on Fri, 09 Jan 2004 07:47:51 GMT
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Jonathen Greenberg writes:

"Jonathan Greenberg" <greenberg@ucdavis.edu> schrieb im Newsbeitrag
news:BC22E9A9.18624%greenberg@ucdavis.edu...
> Mort:
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> --j
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Jonathan:

Right, after some searching in the dead letter department I found it:

Dear Dr. Canty,

Fist of all our apologies for the delay.

From Research System we now received the requested background information on
rule images regarding the Maximum Likelihood supervised classification.

It is important to keep in mind that the "probabilities" calculated by ENVI
3.5 and prior versions are not true probabilities. The values that ENVI
reports as probabilities are normalized discriminant function values.
Therefore, the probabilities reported by ENVI do not behave as true

probabilities would. For example, if for some pixel the discriminant function values are all small (i.e., the pixel is not similar to any of the classes), then the probabilities reported by ENVI will still sum to one. If true probabilities were calculated in this case, then the probability for each class would be small, and the sum of probabilities would be significantly smaller than one.

Therefore the ENVI developers had received a request to change ENVI's Maximum Likelihood classification to use the non-normalized gi(x) values in the rule images.

This request had been considered for ENVI 3.6.

Now the rule images, one per class, contain a maximum likelihood discriminant function with a modified Chi
Squared probability distribution. Higher rule image values indicate higher probabilities. The final classification allocates each pixel to the class with the highest probability. The negative values should indicate unclassified pixels that do not fit the parameters established in the initial classification.

To convert between the rule image's data space and probability, use the Rule Classifier. For the classification threshold, enter the probability threshold used in the Maximum Likelihood classification as a percentage (e.g., 95%). The Rule Classifier will automatically find the corresponding rule image Chi Squared value.

It is even possible to find the rule image Chi Squared value that equals the probability threshold, entered as a percentage. Please follow these steps:

1. Display a rule image
2. Select Enhance->Interactive Stretching...
3. In the Interactive Stretching Dialog box, select Histogram_Source->Band
4. You can now move the cursor in the Input Histogram to determine Chi-Squared value (or DN) which match the cumulative probability in percentage. The output information is on the lower left corner.

Hope this is helpful!

It wasn't. I want, like you, to access the class membership probabilities programmatically. I don't know if there exists any software for PLR. I coded it in IDL from Richards' description in his book "Remote Sensing Digital Image Analysis".

Mort