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THE MAXIMUM LIKELIHOOD METHOD FOR ESTIMATING ARGENTINE CROP AND SOIL TEST SITES USING REMOTE SENSING DATA

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Our object is to study Pattern Recognition of different kind of crops in Argentine training areas by means of Maximum Likelihood Estimators just to get their multispectral signatures or distinctive spectral characterics.

We suppose multivariate normal populations with means μ_k, coveriance matrix A^k and normal density functions:

$$f(X) = (2\pi)^{-n/2}\left|A^k\right|^{-\frac{1}{2}} \exp\left[-\tfrac{1}{2}(X-\mu^k)^1\ (A^k)^{-1}\ (X-\mu^k)\right]$$

where n is the dimension of X.

Given a random sample $X_1,....X_n$ of size n, the likelihood function is given by

$$L(\theta_1,\theta_2,..-\theta_k) = \prod_{i=1}^{n} f(Xi,\ \theta_1,\ \theta_2,...\theta_k)$$

The i^{th} pattern will be treated as a column vector X_i of high dimensionality, that measures the spectral reflectance of a pixel of land and assigns statistically that plot to a class of land of use.

$$X = \begin{pmatrix} X_1 \\ X_2 \\ \cdot \\ \cdot \\ \cdot \\ Xn \end{pmatrix}$$

Besides we'll try to study the application of the maximum likelihood principle to pattern classification making use of Bayes' formula for conditional probabilities.