

**PEDITOR Modules for Pattern Recognition**

Module [References]	Description* of Module Function
<u>Raw pixel manipulation and single category analysis:</u>	
<b>WINSTAT</b> [11,12,13]	compute window file statistics (one signature per file) from a packed file
<b>PRINCIPL</b> [15]	create principle components from a one signature statistics file
<b>AUTOCLIP</b> [15]	outlier pixel deletion from packed files using principle components analysis

Clustering training-derived packed files into one or more groups:

**FCLUST** [2,3,4,13,14] ordinary ISODATA clustering with splitting options added in 1991

View, compare, edit, and combine signature statistics from different files:

**STATED** [11,12,13,14] interactive (GUI) statistics file editor  
**STATCOMB** [ “ ] combine signature statistics from different sources (**STATED** batch mode)  
**STATCOV** [ “ ] assign cover type names to statistics (**STATED** batch mode)

Classification/categorization:

**FCLAS** [11,12,13] pixel level Gaussian maximum likelihood classifier

Other available modules (under study or seldom used):

**PCLASSY** [4,8] NASA CLASSY - large area unsupervised clustering/classification algorithm  
**CLASMOTH** [15] smoothing of classified pixels using a weighted 3x3 matrix  
**EPS** [15] edge preserving smoothing on raw pixels  
**PRINCPWN** [15] conversion of a window file of pixels to its principle components  
**DISPRNCP** [15] display principle components file from **PRINCPWN**  
**PRCLAS** [7] Bayesian classification based on the X, T, L patterns.  
**SAMECAT** [7] count same category pixels left & right  
**AVCHAN** [7] smooth raw pixel data by creation of averaged channels  
**STATASC** [7] output/export statistics file to ASCII for SPLUS  
**CLAS** [11,12,13] early 16-bit version of FCLAS  
**CLUST** [2,3,4,13,14] early 16-bit version of FCLUST

\* Several references are also listed below that give an overview of the approach used in PEDITOR to apply the pattern recognition algorithms. Considering them in chronological order, the 1984 paper by Holko and Sigman [6] shows the use made of the early Landsat data available from the MSS sensor. Two papers compare the Landsat Thematic Mapper and the Spot MSS sensors for crop area estimation via the PEDITOR system. The 1990 Allen paper [1] discusses the use of two date multitemporal imagery in an Arkansas test area. Bellow's 1991 paper [5] looks at both sensors for an Iowa test. Both have writeups of the modified-supervised approach used to create signature statistics and how they are applied in a maximum likelihood classification. A updated overview of the PEDITOR approach is given in 1995 by Ozga and Craig [9]. Finally, batch processing in PEDITOR is covered in 2000 by Ozga [10].

## NASS PEDITOR PATTERN RECOGNITION REFERENCES

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- [2] **Ball, G.H., Hall, D.J.** (1967) "A Clustering Technique for Summarizing Multivariate Data," Behavioral Science, volume 12, pp. 153-155, March 1967.
- [3] **Bartolucci, A.L., Castro, R.** (1967) "Clustering of Landsat MSS Data: Certain Limitations," LARS Information Note 060679, Laboratory for Applications of Remote Sensing, Purdue University, West Lafayette, Indiana..
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- [5] **Bellow, M.E.** (1991) "Comparison of Sensors for Corn and Soybean Planted Area Estimation," U.S. Department of Agriculture, NASS/R&AD SRB Research Report Number SRB-91-02.
- [6] **Holko, M.L., Sigman, R.** (1984) "The Role of Landsat Data in Improving U.S. Crop Statistics," Proceedings of the Eighteenth International Symposium on Remote Sensing of the Environment, Paris, France, October 1984.
- [7] **Krieger, C.** (1997) "Spatial Classification Techniques Illustrated in a Remote Sensing Context", term paper presented to Spatial Statistics Course at George Mason University, Spring Semester 1997, Fairfax Virginia.
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- [9] **Ozga, M., Craig, M.E.** (1995) "PEDITOR - Statistical Image Analysis for Agriculture," presented at the Washington Statistical Society (WSS) Seminar, April, 1995, U.S. Department of Agriculture, NASS, Research Division, Washington, D.C.
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- [12] **Swain, P.H.** (1982) "Pattern Recognition Techniques for Remote Sensing Applications," Handbook of Statistics, Volume 2, North-Holland Publishing Company.
- [13] **Swain, P.H. , Davis, S.** (1978) "Remote Sensing: The Quantitative Approach," McGraw-Hill Publishing Company, New York.
- [14] **Swain, P.H., King, R. C.** (1973) "Two Effective Feature Selection Criteria for Multispectral Remote Sensing," LARS Information Note 042673, Laboratory for Applications of Remote Sensing, Purdue University, West Lafayette, Indiana.
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