

**APPLICATION OF THE SEMIVARIOGRAM TEXTURAL CLASSIFIER (STC) FOR TERRANE RECOGNITION USING MAGELLAN DATA: PRELIMINARY RESULTS;**  
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The Magellan Mission will provide an enormous amount of image data that will require extensive analysis and interpretation. As a result of the single banded nature of this data set, multivariate statistical analysis techniques are not an option. Along with visual interpretation, we propose that texturally based classification procedures be used. To that end we have applied the Semivariogram Textural Classifier (STC) (1) to a sample of Magellan data.

The STC is a supervised parallelepiped type classifier that uses the semivariogram function as a means for capturing image textural information. As it is a strictly deterministic process there is the option to include DN values in the classification procedure.

The data set used in this study consists of a full resolution mosaic (F-MIDR) image of the Lavinia region of Venus (Figure 1). The data was acquired by digitizing a public relations photograph provided by JPL to an 8-bit grey scale image. The image consists of three informally defined terrane categories: fractured plains, impact crater ejecta and unfractured plains. Training statistics for each terrane class are derived from 15 by 15 pixel areas.

The resulting classification image (Figure 2) consists of the three terrane classes: fractured plains (dark grey), impact crater ejecta (light grey) and unfractured plains (white). Black patches in the image represent clusters of non classified pixels. It is the authors' opinion that this image represents an easily interpretable product that emulates a thematic map that would be generated by a visual interpretation of Figure 1. The approximate relative quantities of the various classes are shown in Table 1.

Table 1		
Non classified	:	9%
fractured plains	:	24%
impact crater ejecta	:	8%
unfractured plains	:	59%

The results of this study indicate that the STC may provide an efficient tool for reducing large amounts of this type of data into interpretable products.

## REFERENCES

- (1) MacDonald, J.A., Miranda, F.P. and Carr, J.R. 1990. Textural image classification using variograms. In Proceedings of SPIE (The International Society for Optical Engineering) 1990 Technical Symposium on Optical Engineering and Photonics in Aerospace Sensing, Orlando, U.S.A, April 1990, SPIE Vol 1301, pp 25-39.



**Figure 1.** *Magellan F-MIDR radar image of the Lavinia region of Venus.*



**Figure 2.** *Resulting STC classification image.*