**Approximating Discrete Closed Curves using Cubic Curves**

The need for automated reconstruction of broken fragments is ever increasing as detritus from earlier civilizations is uncovered. This is the motivation for the research done by the GRPX Group at Midwestern State University (MSU) Computer Science Department. The research herein described is a part of that endeavor carried out through the 2010 Undergraduate Research Opportunity and Workshop (UGROW) and funded by the MSU Honors Program.

The premise of this research is to condense the storage space needed by the discrete closed curves, improving the processing time. When these curves are scanned into the computer, they are discretized as hundreds of individual points. Our work is an attempt to use overlaid cubic curves that only require four points each, which will reduce the number of stored points to a few dozen. This is done by a process of locating the change of overall curvature and separating into sections with fewer than three of these regions. This procedure is streamlined by recognition of patterns within the curvature function for each figure.

During the upcoming academic term, this research will be continued in order to further optimize the parameters used in the implementation of the algorithm. After sufficient success is attained, a presentation and/or paper is expected.