
Abstract: There are many problems in fields like computer graphics, pattern recognition and computer vision to represent and store two and three dimensional objects efficiently. In my talk I present new methods to face such problems. On the one hand, we are looking for dominant point detection, in order to obtain the best polygonal approximation of a contour object. A method that we developed consists of encoding the contour with the code of the Angle Freeman chain code (AF8), which consists of strings of eight symbols, and we look for substring patterns that represent changes of curvature along the contour. For detecting dominant points, we take into account the ends of discrete straight lines through patterns of AF8 symbols. We found that these patterns can be produced by a context-free grammar. To obtain appropriate error criteria, we introduced a new parameter: lost pixels (LP), which are the pixels lost in a decoding process when obtaining the polygonal approximation. Adding this parameter to the known number of dominant points (N) and the integral square error (ISE), we also add LP in a new error criterion: lost ratio (LR). We discovered that our method produces the lowest ISE, LP and LR with respect to the state of the art. On the other hand, we are developing methods to encode surfaces of three-dimensional objects that are not isomorphic to the plane. Taking into account the different geometries presented, to solve the problem of finding the shortest path and that allows to optimally encode the transition from one slice to another in a 3D object, the F26 chain code is used, and then a helical path is obtained. A modification of the A star algorithm was carried out to achieve our purpose. Finally, our method was tested on three-dimensional objects obtained from real data.

Refreshments at 2:30pm in RT 1517