Devan Morris
GEOG 342 Remote Sensing
Jennings
5-14-10

Executive Summary

This project utilizes the Feature Analyst extension of ArcGIS to identify large surface parking lots within a quarter-mile radius of Sacramento Regional Transit District (RT) light rail stations within the City of Sacramento.

A buffer of a quarter mile was utilized around each rail stop in order to define a study area. A quarter mile was chosen because it is the distance and individual could walk in 5 minutes. All features were clipped by this quarter mile buffer. A number of features were created to be used as masks during the remote sensing process. These include: parks, roads (derived from erasing parcel lines from a polygon feature), residential structures, rail lines and light rail lines.

High quality 6 inch resolution aerial orthophotographs from 2009 of the City of Sacramento were used as the base image. Each quarter mile buffer study area was extracted from the image then mosaiced together to create on image. During this process the imagery was converted to the TIF format and resampled to 3 foot pixels in order to allow the Feature Analyst extension run iterations at a faster rate. It was found through trials that the 3 foot resolution provided a classification with Feature Analyst that was comparable to the higher quality 6 inch resolution.

Three classifications were chosen to be defined by Feature Analyst: buildings, parking lots and vacant grassy lots. Through trial it was found that these three classifications were best able to classify the image with parking lots being marked correctly. Test sites for these three classifications were chosen throughout each study area to give a good representation of the types of land cover in each class. Through trial it was discovered that the square classification was best able to identify each feature. This is probably because most features were paralleled by straight streets, creating sharp, straight edges in most cases. A high pixel aggregate value was used to eliminate misclassified in-holdings such as trees in parking lots.

Using hierarchical learning, correctly classified features were marked as being correct and misclassified features as being incorrect for each separate class. The clean up iteration was run using a square sensor area and clutter removal approach. The result of this clutter removal for each feature were then combined and run again in a wall to wall classification to improve classification results. The clutter removal process was repeated twice. On the last wall to wall classification parking lot and building features were squared and grass features smoothed to further aid in correct classification.

The final results of the classifications using Feature Analyst were then manually inspected by the analyst to ensure their accuracy. Features found to be misclassified had their polygons split and the incorrect classification deleted. This process was repeated in each study, and especially needed in the downtown area where dark buildings and parking garages were often confused as parking lots.

Finally, the area of all parking lot polygons in each specific study area were calculated to give a rough estimate of how much of the land within a quarter mile of the light rail station was dedicated to parking for automobiles. This information was included on a series of maps created for each study area that showed parking lot areas classified by Feature Analyst.