Software for Advanced Image Analysis

MultiSpec

MultiSpec is Windows and Macintosh software
originally developed for interactively analyzing Earth
observation multispectral data such as that produced by Landsat and
other Earth observing satellites. It has been used in other fields also, e.g.
multiband medical imagery, K-12 and university educational activities. It
was developed at Purdue University by David Landgrebe and Larry Biehl
from the School of Electrical and Computer Engineering.
The software capabilities include:

- Importing Data in a variety of formats, Binary or ASCII format with or without header.
- Displaying multispectral images in black and white, gray scale, or color,
  with default or user defined color schemes.
- Displaying histogram data.
- Reformatting data, e.g. adding headers, editing out spectral channels,
  combining files, adding or modifying channel descriptions, mosaicing data sets.
- Creating new channels of data from existing spectral channels.
- Clustering data for display as thematic maps or analyzing cluster statistics.
- Classifying subsets of data in a data file.
- Showing a graph of spectral values of a selected pixel.
- Showing scatter diagrams of data.
- Transferring intermediate of final results as images or as data for use by
  other application programs (word processors, spreadsheets, graphics).

Detailed capabilities as well as tutorial exercises can be found at
https://engineering.purdue.edu/~biehl/MultiSpec/

The DEW partner Forestwatch has a resource page with information about MultiSpec
http://www.forestwatch.sr.unh.edu/online/

Geographic Information System Software

Geographic information system (GIS) software is used for creating maps,
acquiring and displaying geographic data, analyzing mapped
information, and managing geographic information in a database.

Perhaps the earliest example of a geographic information system was in 1854, when John Snow depicted a cholera outbreak in London using points to represent the locations of individual cases. This helped identify the source of the disease, a contaminated water pump whose handle he disconnected, thus terminating the cholera outbreak.

In 1960 the Canadian Department of Forestry and Rural Development created the Canada Geographic Information System (CGIS) that was used to store, analyze, and manipulate data collected for the Canada Land Inventory (CLI) in an effort to determine the land capability for rural Canada by mapping information about soils, agriculture, recreation, wildlife, waterfowl, forestry and land use.

GIS has subsequently been used by US Fish and Wildlife Service, the US Army Corps of Engineers and an increasing number of government, public and private organizations and companies.

Any characteristic that can be located spatially and/or temporally can be used in a GIS, recorded as dates/times of occurrence, and x, y, and z coordinates representing, longitude, latitude, and elevation.

Data for GIS can be captured by

- Scanning and digitizing existing data printed on paper or film maps.
- Entering survey data directly into a GIS from digital data collection systems on survey instruments. This involves acquiring positions from a global navigation satellite system (GNSS) like Global Positioning System (GPS). Field computers can be used to edit live data using wireless connections.
- Importing remote sensing data from cameras, digital scanners mounted on aircraft and satellites. The majority of digital data comes from photo interpretation of aerial photographs. Analog aerial photos are scanned or high quality digital cameras used.
- Satellite remote sensing use different sensor packages to measure the reflectance from parts of the electromagnetic spectrum or radio waves that were sent out from an active sensor such as radar.

An excellent listing of GIS software may be found on Wikipedia.