What is Supervised and Unsupervised classification?

Remotely sensed data are often used in classification analyses, whereby individual pixel values are classified into meaningful categories. The classification are based on spectral, spatial (texture, proximity, etc.), or temporal (changes through time) information in an image or images. The two most commonly used automated classification methods are supervised and unsupervised classifications. These two methods are inherently different. Supervised and unsupervised methods have been used for decades for classifying remote_sensing images. They are pixel-based classification methods solely based on spectral_information (i.e., digital number values), which often result in "salt and pepper" effect in the classification result.

Unsupervised classification is where the outcomes (groupings of pixels with common characteristics) are based on the software analysis of an image without the user providing sample classes. The computer uses techniques to determine which pixels are related and groups them into classes. The user can specify which algorism the software will use and the desired number of output classes but otherwise does not aid in the classification process. However, the user must have knowledge of the area being classified when the groupings of pixels with common characteristics produced by the computer have to be related to actual features on the ground (such as wetlands, developed areas, coniferous forests, etc.).

Supervised classification is based on the idea that a user can select sample pixels in an image that are representative of specific classes and then direct the image processing software to use these training sites as references for the classification of all other pixels in the image. The training sites (also known as testing sets or input classes) are selected based on the knowledge of the user. The user also sets the bounds for how similar other pixels must be to group them together. These bounds are often set based on the spectral characteristics of the training area, plus or minus a certain increment (often based on "brightness" or strength of reflection in specific spectral bands). The user also designates the number of classes that the image is classified into. Many analysts use a combination of supervised and unsupervised classification processes to develop final output analysis and classified maps.