A comparative study of multiband mamdani fuzzy classification methods for west of Iraq satellite image

In our paper, performance of four fuzzy membership function generation methods was studied. These methods were studied in the context of implementing Mamdani fuzzy classification on a set of satellite images for western Iraqi territory. The first method generate triangulate membership functions using mean, minimum (min) and maximum (max) of histogram attribute values (AV), while peak and standard deviation (STD) of these AV were used in the second. On the other hand, in the third and fourth methods, Gaussian membership functions are generated using same mentioned values in the first and second method respectively. The goal was to generate a Mamdani type fuzzy inference system the membership function (MF) of each fuzzy set and implementing the AV of western Iraqi territory training data sets. A pixel-by-pixel comparison of each method with traditional maximum likelihood method (ML) was made on data sets comprising six bands of satellite imagery of the western Iraqi region taken by the Landsat-5 satellite. Simulation results of these performance comparisons singled out that the method using Gaussian MFs together with peak and STD of the AV as the best achiever with a similarity of 83.16 percent for band (3) of the studied area.