



#### Volume XL-1/W1

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-1/W1, 351-355, 2013  
 www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-1-W1/351/2013/  
 doi:10.5194/isprsarchives-XL-1-W1-351-2013  
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## HIGH RESOLUTION TEMPORAL NORMALIZED DIFFERENCE VEGETATION INDICES FOR SPECIFIC CROP IDENTIFICATION

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Keywords: WorldView-2; Possibilistic c-Means; Entropy; Temporal NDVI, Specific Crop

**Abstract.** In many applications of the remote sensing, an user is often interested in identifying specific land cover only while other classes may be of no interest. In the present study, high resolution WorldView-2 image having spatial resolution of 1.84 meter has been used for identifying wheat crop for a test site located in Roorkee, India. WorldView-2 data consists of a total of eight spectral bands out of which last four spectral bands i.e. Red (630– 690 nm), Red edge (705– 745 nm), NIR 1 (770– 895 nm) and NIR 2 (860– 1040 nm) are useful for the vegetation related studies. Since Normalized Difference Vegetation Index (NDVI) which is formulated by the Red and NIR band, is well known for vegetation related studies. Therefore, in the present research the above four bands has been used to generate all the four possible combinations of NDVI viz. Red – NIR1, Red edge – NIR 1, Red – NIR 2 and Red edge – NIR 2. Further to study the temporal behaviour of crops, two date WorldView-2 data was taken to make the temporal NDVI. These temporal NDVI were then classified using fuzzy based Possibilistic c-Means (PCM) soft classification. The weighting exponent (or fuzzifier)  $m$  was optimized to get the best PCM soft classification output. Wheat crop is represented as the fraction image output of the PCM soft classification corresponding to each temporal NDVI. To check the accuracy of these fraction images, the entropy method was used. The entropy values were calculated for a total of 150 known pixels in each output. It is found that the outputs corresponding to low entropy values have sufficiently high membership values for wheat class, hence these outputs are more accurate. Further, it is observed that the average entropy values found for the temporal NDVI corresponding to the Red – NIR 1, Red edge – NIR 1, Red – NIR 2 and Red edge – NIR 2 are 0.065, 0.089, 0.075 and 0.055 respectively. Thus, it can be concluded that temporal NDVI generated by using a combination of Red edge and NIR-2 bands yields higher accuracies in comparison to other. It was also observed from the study that the optimized values of weighting exponent  $m$  is varies for different spectral indices.

Conference Paper (PDF, 653 KB)

Citation: Upadhyay, P., Ghosh, S. K., and Kumar, A.: HIGH RESOLUTION TEMPORAL NORMALIZED DIFFERENCE VEGETATION INDICES FOR SPECIFIC CROP IDENTIFICATION, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-1/W1, 351-355, doi:10.5194/isprsarchives-XL-1-W1-351-2013, 2013.

