

## **Data Mining Application to Estimate Canopy Cover Based on Landsat 8 and LiDAR Data for Digital Forests Classification using ANFIS Algorithm**

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**Abstract:** Canopy cover is defined as the percentage of an area occupied by the vertical projection of tree crowns. This study proposed the application of data mining technique namely Adaptive Neuro-Fuzzy inference system (ANFIS) on Landsat 8 satellite and LiDAR data to develop classification model to estimate forest canopy cover. ANFIS is a soft computing method in which a given input-output dataset is expressed in a fuzzy inference system (FIS). The FIS implements a nonlinear mapping from its input space to the output space. The method of this study classified First Return Canopy Index (FRCI) as target objects by correlating Landsat 8 bands data using ANFIS algorithm to obtain the best model. FRCI consider only LiDAR first returns and single returns, because it assumes that last and intermediate returns can provide little additional information on canopy cover estimation. The best result obtained provided low error for training (error = 0.07765) and also low error testing result (error = 0.090037). Thus, this model can be used as classification model to estimate FRCI value as indicator of forests canopy cover. Although, it tend to provide overestimate for sparse forest indicated by low FRCI, and provide underestimate for dense forests indicated by high FRCI.

**Keywords:** ANFIS, FRCI, LiDAR