The study describes a proposed technique to predict rainfall using observations from the Indian National Satellite System (INSAT-3D) Imager. For the prediction, we use brightness temperature (TB) obtained from the thermal infrared, middle infrared and water vapor channels of INSAT-3D. A Multi-Layer Perceptron Neural Network (MLPNN) model is used to predict rainfall. Rainfall prediction from the brightness temperatures and INSAT-3D Hydro-Estimator (HE) product is used as the training reference. The model is trained and evaluated using data from one month (Oct 1, 2018 – Oct 31, 2018); 70 percent of data is used for training and the remaining 30 percent of data is used to evaluate the technique. The MLPNN model is configured using 6 inputs: TB of Thermal Infrared-1(TIR-1), Mid-Wave Infrared (MIR), Thermal Infrared-2(TIR-2) Water Vapor (WV) channels and the mean and the standard deviation (SD) of the TIR-1 TB over a 40 km x 40 km grid. The MLPNN is configured to estimate the rainfall values for each INSAT-3D pixel. We find that this technique predicts rainfall with the accuracy of 71%. Further verification metrics are provided in the manuscript. This study demonstrates the potential use of INSAT-3D observations for prediction of rainfall. The Predicted rainfall is compared and validated using the TRMM data available in GIOVANNI website. The rainfall is predicted during the Cyclone GAJA period (November 10, 2018 – November 21, 2018). The predicted half-hourly rainfall values are averaged into daily rainfall and then mapped. The spatial pattern and the movement of the Cyclone GAJA tracked with the help of the predicted rainfall map. In the first phase of the work, we ordered the data from MOSDAC website required for this work. We started to download the half-hourly data from INSAT- 3D Imager in the H5 format. The data contains brightness temperature of all the bands of INSAT-3D and Hydro-Estimator Method rain (HEM rain). Downloaded sample data from MOSDAC is 3DIMG\_15NOV2018\_0030\_L1B\_STD & 3DIMG\_15NOV2018\_0030\_L2B\_HEM in which it consists of date (15), month (NOV), year(2018), time of observation (00.30), data level (L1- level 1, L2-level 2). The data is imported in Spyder (Python) with help of h5py module. The parameters from that file are extracted. These parameters are structured, Inorder to train the neural network. In Spyder, the Artificial Neural Network model is constructed using the Scikit learn module. The structured data is divided into two as 70 percent for training and 30 percent for training. The Multi-layer Perceptron model is trained with training data and evaluated with test data. The model predicts the test data which is compared with remaining data for determining its model accuracy. The model performs with 71% accuracy. In the second phase of the work, we download the L1B data from MOSDAC website to which L2B data is predicted using the Multi-layer perceptron neural network. The predicted rainfall values from the model are mapped using the basemap module in python for easy understanding. Similarly, we predict and map the other downloaded data. The Layout is generated for the predicted rainfall values.Predicted rainfall plays vital contribution in the field of agriculture, water reserve management, flood prediction and management with an intention to ease the people by keeping them updated with the weather and rainfall prediction. Accurate prediction for heavy monsoon rains during the cyclone will keep the authorities alert and focused for an upcoming event that of which the destruction could be minimized by taking precautionary measures.

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