

Abstract

Weather is very important for human activities, such as washing cloths, travelling, farming, plane schedules, etc. Weather forecast useful to inform us about weather for tomorrow or the next day. BMKG use statistic calculation and satellite observation to predict weather. In this TA, Fuzzy Hidden Markov Models(FHMM) with Fuzzy Split and Merge Cluster ing(FSMC) is used in weather forecast system to predict weather. FSMC is improvement of Improve Split and Merge Clustering(ISMC) and in the end of its process is combined with FCM. FCM is one of ISODATA algorithm. ISMC is proven to make more faster convergen cluster then ISODATA algorithm[1]. Because of that reason, in this TA, FCM in FHMM is replaced with FSMC. This TA use weather data from BMKG. Data in year 2000 with 305 records(January to October). The data contain many weather parameters, such as temperature, barometric pressure, rainfall, solar radiation time, wind speed, air humidity, and without weather label in that day. Weather label is taken from freemeteo.com, but must compare weather parameters from BMKG and freemeteo parameters first. 274 records of weather data is used to train system, and 31 records(data in October) is used for testing system performance. After implementation and testing, result that FHMM with FSMC produce average accuracy 66,12% and average recall 30%, and ever produce maximum accuracy 90,32% and maximum recall 100%. FHMM with FCM produce average accuracy 60,32% and average recall 63,33%, and ever produce maximum accuracy 90,32% and maximum recall 100%. FHMM with FSMC is affected from threshold (split, and merge) value, state number, power(w), series number, and data characteristic. FHMM with FCM is affected from cluster number, state number, power(w), series number, and inisialitation of matriks(U) for calculate codebook. Beside that, FHMM with FSMC can make codebook faster, average accuracy better, and average recall less than FHMM with FCM.

Key words: weather, forecast, FHMM, FCM, FSMC.