ABSTRACT

EPA ELFITRIADI. Rainfall Occurrence Modeling with Dynamic Bayesian Networks (Case Study: Rainfall Occurrence in Indramayu). Under direction of ERFIANI and AJI HAMIM WIGENA.

The objective of this research was to build Dynamic Bayesian Networks (DBN) model for modeling time series data and to predict occurrence of dry, normal and wet month in Indramayu, West Java.

DBN is the extension of Bayesian Networks (BN) considering a sequence of time slices corresponding to different snapshots in time of the same static BN, connected by temporal links. BN itself is a direct acyclic graph in which nodes represent random variables and edges indicate conditional dependencies among them. Thus, DBN can represent spatial and temporal dependences among variables. In this research, a discrete DBN model was constructed by learning network structures and parameters from the real data. Criteria for learning are introduced by a Bayesian networks viewpoint. In this case, K2/K3 algorithm and Adaptive Importance Sampling - Bayesian Network (AIS-BN) were used as learning algorithm. The research use rainfall data in 1997 to 2008 from 14 stations at Indramayu, West Java. It was categorized into 3 states: dry (0-100 mm), normal (100-200 mm), and wet (above 200 mm). The result shows DBN could model rainfall data from 14 stations which considered spatial and temporal dependences. The state probabilities of stations could be read from conditional probability of networks and it could be changed by instanted an evidence from other station. The state occurrences prediction of 12 months in 2008 by DBN model shows 12 of 14 stations have a value greater than 75% of accuracy. The accuracy measured by way of transformed Hellinger Distance.

Keywords: dynamic bayesian network, learning algorithm, rainfall, Hellinger distance.