Spatial Multidimensional Association Rules Mining in Forest Fire Data

Hotspots (active fires) indicate spatial distribution of fires. A study on determining influence factors for hotspot occurrence is essential so that fire events can be predicted based on characteristics of a certain area. This study discovers the possible influence factors on the occurrence of fire events using the association rule algorithm namely Apriori in the study area of Rokan Hilir Riau Province Indonesia. The Apriori algorithm was applied on a forest fire dataset which contains data on physical environment (land cover, river, road and city center), socio-economic (income source, population, and number of school), weather (precipitation, wind speed, and screen temperature), and peatlands. The experiment results 324 multidimensional association rules indicating relationships between hotspots occurrence and other factors. The association among hotspots occurrence with other geographical objects were discovered for the minimum support of 10% and the minimum confidence of 80%. The results shows that strong relations between hotspots occurrence and influence factors were found for the support about 12.42%, the confidence of 1, and the lift of 2.26. These factors are precipitation greater than or equal to 3 mm/day, wind speed in [1m/s, 2m/s), non peatland area, screen temperature in [297K, 298K), the number of school in 1 km2 less than or equal to 0.1, and the distance of each hotspot to the nearest road less than or equal to 2.5 km.

Keywords: Data Mining; Spatial Association Rule; Hotspot Occurrence; Apriori Algorithm