Mapping Areas Prone to Traffic Accidents in Lumajang Regency Using the Fuzzy Mamdani Method

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ABSTRACT

The population in Indonesia continues to increase every year, including in Lumajang Regency. Population growth can have an impact on traffic conditions. Lumajang Regency is crossed by national roads with heavy traffic characteristics. This traffic density can cause a high number of traffic accidents in Lumajang Regency. In 2018, a total of 506 traffic accidents were recorded in Lumajang Regency. In 2019 there was an increase with a total of 601 accidents recorded by the Lumajang Police Traffic Unit. Therefore, this research aims to build a geographic information system for mapping accident-prone areas in Lumajang Regency. Mapping was carried out using the fuzzy mamdani method with input variables, namely time of incident, accident conditions, light conditions, and geometric shape which produces an output variable, namely the level of vulnerability consisting of safe, vulnerable and very vulnerable. Comparison of manual calculation results is carried out by entering the values of the time of the incident, accident conditions, light conditions, and the same geometric shape to determine the results of the fuzzy mamdani calculation. Comparison of the calculation results in Excel with the system produces an average accuracy value of 100%. Meanwhile, a comparison of the system with Matlab resulted in an average value of 2.2% difference in error value and an accuracy of 97.8%. System testing using the User Acceptance Test (UAT) method obtained very good results and met user needs.

Keywords: Mapping, Traffic Accidents, Fuzzy Mamdani, Geographic Information Systems