

## Analyzing the Influence of Hydrometeorological Extremes, Geological Setting, and Social Demographic on Public Health

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**Abstract :** This main research objective is to accurately identify the possibility for a Leptospirosis outbreak severity of a certain area based on its input features into a multivariate regression model. The research question is the possibility of an outbreak in a specific area being influenced by this feature, such as social demographics and hydrometeorological extremes. If the occurrence of an outbreak is being subjected to these features, then the epidemic severity for an area will be different depending on its environmental setting because the features will influence the possibility and severity of an outbreak. Specifically, this research objective was three-fold, namely: (a) to identify the relevant multivariate features and visualize the patterns data, (b) to develop a multivariate regression model based from the selected features and determine the possibility for Leptospirosis outbreak in an area, and (c) to compare the predictive ability of multivariate regression model and machine learning algorithms. Several secondary data features were collected locations in the state of Negeri Sembilan, Malaysia, based on the possibility it would be relevant to determine the outbreak severity in the area. The relevant features then will become an input in a multivariate regression model; a linear regression model is a simple and quick solution for creating prognostic capabilities. A multivariate regression model has proven more precise prognostic capabilities than univariate models. The expected outcome from this research is to establish a correlation between the features of social demographic and hydrometeorological with Leptospirosis bacteria; it will also become a contributor for understanding the underlying relationship between the pathogen and the ecosystem. The relationship established can be beneficial for the health department or urban planner to inspect and prepare for future outcomes in event detection and system health monitoring.

**Keywords :** geographical information system, hydrometeorological, leptospirosis, multivariate regression

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