

Predicting the Human Impact of Natural Onset Disasters Using Pattern Recognition Techniques and Rule Based Clustering

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Abstract : This research focuses on natural sudden onset disasters characterised as 'occurring with little or no warning and often cause excessive injuries far surpassing the national response capacities'. Based on the panel analysis of the historic record of 4,252 natural onset disasters between 1980 to 2015, a predictive method was developed to predict the human impact of the disaster (fatality, injured, homeless) with less than 3% of errors. The geographical dispersion of the disasters includes every country where the data were available and cross-examined from various humanitarian sources. The records were then filtered into 4252 records of the disasters where the five predictive variables (disaster type, HDI, DRI, population, and population density) were clearly stated. The procedure was designed based on a combination of pattern recognition techniques and rule-based clustering for prediction and discrimination analysis to validate the results further. The result indicates that there is a relationship between the disaster human impact and the five socio-economic characteristics of the affected country mentioned above. As a result, a framework was put forward, which could predict the disaster's human impact based on their severity rank in the early hours of disaster strike. The predictions in this model were outlined in two worst and best-case scenarios, which respectively inform the lower range and higher range of the prediction. A necessity to develop the predictive framework can be highlighted by noticing that despite the existing research in literature, a framework for predicting the human impact and estimating the needs at the time of the disaster is yet to be developed. This can further be used to allocate the resources at the response phase of the disaster where the data is scarce.

Keywords : disaster management, natural disaster, pattern recognition, prediction

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