Application of probabilistic reasoning to environmental risk analysis

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ABSTRACT

Environmental risk assessment (ERA) is the evaluation of the extent and probability of the negative effects on environment and ecology due to human activities. ERA can be roughly divided into health and ecological risk assessments. Because the concept of risk implies probability the use of probability reasoning technique to implement the risk assessment is a promising direction. Therefore, this study utilizes the Bayesian belief network (BBN), a notable probability reasoning tool, to perform ERA. Compared to the traditional non-carcinogenic health risk assessment, the BBN method is more informative such as the provision of possible diseases and their associated risks which makes it easier to manage these risks. The health risk assessment for a road construction project is used as a case study and the goal of risk management is to reduce the disease risks through the BBN calculation. On the other hand, BBN is also employed to predict the future status for specific population due to the construction projects. The Taiwan High-Speed Rail System is used to demonstrate how to manage the ecological risk on Hydrophasianus chirurgus through the BBN method.

Keywords : environmental risk assessment ; health risk assessment ; ecological risk assessment ; bayesian belief network

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