



Onto-DIAS: Ontology-based Data Integration and Analytics System for Landslide hazard Early Warning

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Modern Early Warning System (EWS) requires strong technical principles and sophisticated knowledge of natural hazards, the urban context and risk management to enable dynamic and timely decision making against serious hazards. Relying on scientific methods, EWS analyses a variety of earth observation (EO) and urban data that are produced by a number of sensors deployed in the hazard-prone areas. Based on this, a comprehensive data integration system has played a significant role in order to discover and access potential data sources, and become a challenge due to the complexity and high variety of the data sources. Onto-DIAS is a data integration and analytic system for multi-hazard early warning applications. Essentially, the system provides knowledge about multi-hazard interactions, warning sign of hazardous events, and data sources to facilitate data integration and analysis. This knowledge base can be used to discover and acquire EO and urban data from registered data sources which relevant to the hazardous event in the area of interest and use such data for hazard verification and prediction in EWS. Moreover, Onto-DIAS provides an interactive agent that allows social media users to report hazard-related incidents they observed. The agent then indicate possible hazardous events from the users' input message and executes additional process using data sources suggested by provided knowledge base to verify the observed events. In this work, we develop an ontology, namely Landslip ontology, to provide the knowledge base and relation between landslide hazard and EO and urban data sources. The purpose of Landslip ontology is to facilitate data source discovery for landslide hazard verification and analysis in EWS. The ontology is evaluated based on scenarios and competency questions to verify the correctness and consistency. Moreover, the ontology can be use to identify possible landslide events reported by social media users and support landslide decision making.