

Study on sharing and reusing geographic simulation models in web environment

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Abstract: Modelling is an effective method to simulate geographic phenomena and processes and solve geographic problems. To date, many experts and scholars have constructed massive geographic simulation models to meet the requirement for simulation of different geographical scenarios. Meanwhile, collaborative modelling and integration are becoming more important for complex geographic problem solving. In order to make existing models better serve various geographic studies, model sharing and reuse have become hot topics nowadays. Due to their heterogeneous nature, diverse models have varying methods of description, different structures and access arrangements. It's hard to locate, share and reuse models in a common way. To alleviate these difficulties, research has been undertaken to improve model sharing and reuse for different levels and kinds of requirements, such as model knowledge acquiring, model building and model use. For example, Maxwell and Costanza designed a modular modeling language (MML) (Maxwell and Costanza, 1997) to describe the cognitive problems of models. The CSDMS platform uses standardized names to describe the input and output of the model (Overeem et al., 2013). For the sharing of models, Gehlot et al. (2006) proposed the sharing of a geographical processing chain based on the network. HydroShare platform is based on Open Archive Initiative's Object Reuse and Exchange (ORI-ORE) standards to share model resources (Lagoze et al., 2007; Horsburgh et al., 2016). This paper summarizes the knowledge from the model construction and using processes and divides them into four knowledge entries: model item, conceptual model, logical model and computable model. These items can serve various users' needs for model recognizing, model constructing, and model invoking by providing a structural description of the fundamental data, mechanisms, structures, and operating processes of models. Finally, we provide a web system that demonstrates how various levels of model knowledge entry would be beneficial for model sharing and reuse, allowing users to recognize and use models as web services.

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