MAKOCI: a GIS Cloud-based Web Application for Open GeoData

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Open Geospatial Data (Open GeoData) is one of hottest issues in the geospatial domain which aims to publicly and freely access, revise, and disseminate geospatial raw data. However, the GeoData may be deployed in various formats (e.g., keyhole markup language, KML, and Web feature service, WFS) and contained heterogeneous semantics which increase the challenges of managing and discovering appropriate GeoData in the Web environment. This paper addresses on developing a framework, named multi-agents knowledge oriented cyberinfrastructure (MAKOCI), to deal with semantic discovering of heterogeneous distributed Open GeoData (especially in Web service formats, such as KML, WFS, and Web mapping service, WMS) and to develop a cloud-based web application to use the GeoData without installing professional GIS software in local computers. For the purposes, MAKOCI integrates ontologies and multi-agent technologies in three components: (1) an ontological catalogue, called ONTOCAT, to register the metadata of GeoData into ontologies, which are semantic dictionaries defining formal semantics and classifications of knowledge; (2) an ontology editor to manage the definition and relationships of ontologies; (3) a cloud-based application, called intelligent spatial decision support system (iSDSS), to assist users to discover and use the registered GeoData. Multi-agent is in charge of communicating semantics to find appropriate GeoData in ontologies during these three components. MAKOCI can not only act as a web portal which manages and disseminate large volume of Open GeoData but also provide a cloud-based application for users to understand and facilitate the GeoData for supporting spatial decisions.