

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Applications and Economic Benefits (5)

Author: Dr. Tan Li
Beijing Simulation Center, China

RESEARCH ON POLICE GEOGRAPHY INFORMATION FUSION AND APPLICATION
TECHNOLOGY BASED ON EARTH-OBSERVATION DATA

Abstract

As the core support platform of the Smart Public Security Environment (SPSE), the Police Geography Information System (PGIS) implements the Space Geography Information technology to present various public security (PS) information visually on the networked digital map, which effectively facilitates the search and analysis of the PS data. With the blossom of the earth-observation technology, the earth-observation systems now provide PGIS with high-resolution, high-usability, high-precision, rich and continuous geography information. Those massive distributed isomerous observation data raise new challenges to current data storage, management, search, analysis and comprehensive application technology. According to those features, this paper states a new Massive Data Storage and Management Framework (MDSMF) based on Cloud Storage technology, and puts forward the Ontology Meta-rules based PS information fusion and integration technology. The research fruits are verified in certain police information investigation of SPSE application. Earth-observation information is normally massive distributed remote sensing data, whose format differs with the frequency spectrum and observation platform. Based on the idea of cloud storage, this paper presents MDSMF, which includes data resource layer, resource integration layer, management middleware layer and application service layer. The layered architecture of MDSMF separates the observation data with the upper layer application, which realizes the unified storage and maintenance of the distributed isomerous data. Based on MDSMF, an Ontology Meta-rule based method is put forwards for the fusion and integration of earth-observation data and other police information such as identity and floating population information. This method abstracts the police information and geography information semantically to establish the ontology meta-rules for PGIS, and provides algorithms for information fusion and conflict resolution, to realize the PGIS information fusion and integration oriented to police application. This paper applies those research fruits mentioned above into certain fire investigation. The earth-observation data around the location and time of the fire, including the visual light spectrum and infrared spectrum, are stored and managed effectively based on MDSMF. The observation data, floating population and traffic information of the arsonist suspects are fused and mined based on ontology meta-rules to realize the object track analysis and clew association. The primary practice indicates that the new MDSMF and fusion algorithms facilitates the application of high-definition earth-observation data in PGIS and improves the intelligent investigation ability of public security.