USC IMSC
A NATIONAL SCIENCE FOUNDATION
ENGINEERING RESEARCH CENTER

information management

Information Management for Multimedia Earthquake Science Data

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Research Goal

• Support effective information retrieval and web-based search for data of interest to specific scientists

• Break the barriers and access the tremendous amount of heterogeneous geoscience data

  • Different data sources

  • Various data interpretations

• Provide interoperability for heterogeneous data, different applications and database systems, and user-defined packages

Research Approach

• Portal Integration and Semantic Interoperation

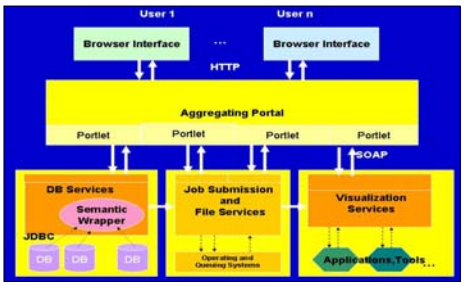

Figure 1. System Architecture

Uniqueness & Related Work

• Metadata services – dynamic and intelligence-based-updating ontologies

• Federated database system – ontology-based management of data for interoperability

• Data assimilation – assimilation of remotely sensed data from ground stations, satellites, GPS, etc.

• Data mining – ontology integration and data interpretation based on semantics

• Web services - information exchange among different platforms and applications and invocation of the remote application

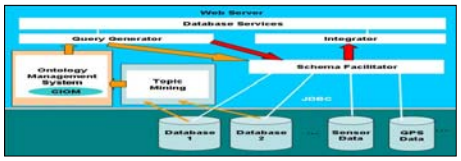

Figure 2. Database Services and the host

Role in IMSC

• Provide applications and technologies to other research at IMSC (e.g., communications vision project)

  • Dynamic Ontology Management – IMSC Ontology Manager

  • Topic/event detection from data streams

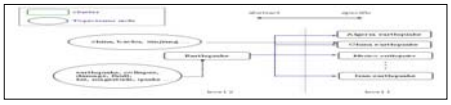

Figure 3. Example of Topic Mining

Figure 4. Metadata Management

Accomplishments

• Technology and application implementations

  • Portal and web services

  • Fault Databases

  • User centered middleware and user interface designs

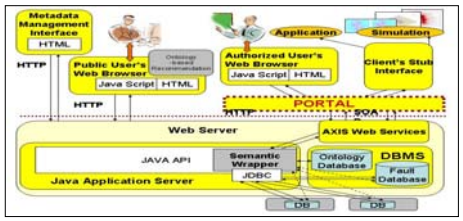

Figure 5. Accomplishments in the current system (marked in yellow)

Figure 6. Example of UI for Portal

Figure 7. Example of UI for Fault Database

• Publications

  • S. Chung, and D. McLeod. Dynamic Topic Mining from News Stream Data.*ODBASE*, 2003.

  • A.Y. Chen, A. Donnellan, D. McLeod, G. Fox, J. Parker, J. Rundle, L. Grant, M., Pierce, M. Gould, S. Chung, and S. Gao. Interoperability and Semantics for Heterogeneous Earthquake Science Data. *International Workshop on Semantic Web Technologies for Searching and Retrieving Scientific Data*, 2003.

5-Year Plan

• Development of dynamic ontology management systems (Year 2-3)

• Provision of interoperability for heterogeneous data (Year 3-4)