EIAH Data Model

Semantic Interoperability between Distributed Digital Repositories

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Introduction to EIAH

**EIAH**
- Founded at 2007
- Nonprofit Organization
- Head director of the project: Mohammad Beheshti, the Former head of Iranian Cultural Heritage Organization

**Sponsors**
- The Iranian Academy of Art
- Iran Cultural Heritage, Handicrafts & Tourism Organization
- The Iranian Ministry of Housing and Urban Development

**Partners**
- National Library & Archive of Iran
- Polytechnic University of Iran
- Shahid Beheshti University of Iran
Goals and objectives

**EIAH Goals**

- Increasing the quantity and improve the quality of information on Iranian culture
- Facilitating the recovery of vernacular identity
- Presenting the joint heritage of the countries in the region for further interaction and focusing on cultural unity

**Objectives**

- Providing varied types of resources
- Providing eligible and accurate resources
- Providing accessible resources
Entry and Document

- Two Core Concepts in EIAH Information Architecture
  - **Entry**
    - Every topic or concept in domain which information accumulates around it (Terms, Monuments,...)
  - **Document**
    - Any kind of resources which provides information regarding history of Iranian architecture (Text, Photo,...)
EIAH Information Architecture Objectives

- **Three Main Objectives**
  - Facilitate the access to the resources and documents
  - The ability to represent the conceptual relations between topics of Iranian architecture domain
  - The ability to represent and develop relations between topics and resources
EIAH Information Architecture

• Three-layer architecture
  - Information pool
  - Ontology – knowledge representation level
  - The mediator level

• Foundation layer
  - Standards and policies
EIAH Cake

Semantic Interoperability between Distributed Digital Repositories
Three Layer Architecture

- Service-oriented architecture
- Distinct components and services
- Semantic enabled.
- Modularity
Standards and Policies

• A Foundation Layer

All processes and work-flows in this project must follow open and international standards and guidelines, so all the products in different phases of the project could be homogenized and optimized. These guidelines are known as EIAH's standards and policies.
Standards and Policies

- Software Standard Policies
- Hardware and Network Standard Policies
- Technical Tracking Standard Policies
- Information Storage and Exchange Standard Policies
- Content Legal and licensing Standard Policies
- Security Standard Policies
- Resource Description and metadata Standard Policies
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Ontology Knowledge Representation Level

Mediator Level Agents

Control Vocabulary

Information Pool

Aratta Agent

Distributed Repositories

OAI Agent

Aratta Note Taking tool

Other Knowledge Base & Information Services

Foundation Level

Standards & Policies

Other Pools of Information

Response

@ Mediator Level Query

Semantic Portal

Search

Data Visualization

User Contribution

Data Export
A network of digital repositories, containing various types of resources related to Iranian architecture

To establish the grid of digital repositories a powerful Open source solution was necessary.
DSpace

- DSpace institutional repository platform was chosen after evaluating and reviewing twenty other solutions.
- EIAH customized and localized DSpace for the institution's needs. These modifications include Persian Calendar, Persian user interface and right to left text rendering.
- Introduction to EIAH
- Goals and objectives
- Entry and Document
- EIAH Information Architecture Objectives
- EIAH Information Architecture
- EIAH Cake
- EIAH Information Architecture
- Standards and Policies
- Information Pool
- DSpace
- Aratta
- Ontology
- EIAH Ontology
- The Mediator Level
- Controlled Vocabulary
- Metadata Model
- Application Profile
- Semantic Portal
- Distributed Repositories
- UNIPHO
- The Current Implementation
- Future Works

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EIAH Data Model

Semantic Interoperability between Distributed Digital Repositories

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**DSpace**

- Open Source Software
- The community around DSpace
- Using crosswalk plug-ins
- Can customize UI for end user
- Uses Java, JSP, servlet JSTL
- Uses Oracle and Postgresql
- Uses Apache Lucene
Aratta

- A collaborative research tool (semantic note taking tool)
- developed as a web-based research tool
- Semantic relations between notes
- Reference management services
- Deploys the conceptual model of the EIAH and defines its relational tags based on this model
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Ontology

- A specification of a conceptualization and a formal representation of a set of concepts within a domain and the relationships between those concepts (Tom Gruber, 1992).
- In Iranian architecture domain, the ontology gives us an overall picture of Iranian architectural history with all its concepts and all their relations.
EIAH Ontology

- EIAH ontology
  - Temporal
  - Spatial
  - Human (actors and actions)

- Subclass
  - Persons (as subclass of human entities),
  - Works (monuments and sites) and Geographical Names (as subclass of spatial entities),
  - Historical Periods and Events (as subclass of temporal entities),
  - (Architectural) Terms (which is the abstract level of all classes).
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Foundation Level

Standards & Policies
The Mediator Level
The Mediator Level

• Detects relations between two layers (ontology and repository)
• Collects and links resources to concepts (entries)
• Integrates data from other services (e.g. Aratta)
• Applies controlled vocabulary to improve search quality
Controlled Vocabulary

- Required for accurate search results (recall and precession)
- Needed for efficient resource description
- Expansion of users by multilingual controlled vocabularies.
- Promoting a broader global overview respecting translation /Culture
- Three main fields are in our focus: architectural terms, geographical names and united list of peoples name
Metadata Model

- Customized and based on the Dublin Core (simple & qualified)
- Uses relational elements as refinements of subject
- Compliance with EIAH ontology
- Enables high semantic interoperability among different services

<table>
<thead>
<tr>
<th>Term Name: Is related to Geographical Name</th>
<th>Term Name: Is related to Historical Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label:</td>
<td>Is related to Geographical Name</td>
</tr>
<tr>
<td>Definition:</td>
<td>An entity responsible for correlating a geographical name to the resource</td>
</tr>
<tr>
<td>Types term: of Property</td>
<td>Types term: of Property</td>
</tr>
</tbody>
</table>
**Application Profile**

The diagram illustrates the relationships between various components of the EIAH Data Model, focusing on Semantic Interoperability between Distributed Digital Repositories. The main elements include:

- **EIAH Functional Requirements**
- **EIAH Data Domain**
- **EIAH Description Set Profile**
- **EIAH Syntax Guidelines & Data Format**
- **Domain Model**
- **Metadata Vocabularies**
- **DOMI Abstract Model**
- **DOMI Syntax Guidelines**
- **RDF/S**
- **RDF**

The diagram shows how these components are interconnected, with arrows indicating dependencies and relationships.
Distributed Repositories

- Widespread cultural heritage centers
- Huge amount of resources
- Promoting digital preservation
**OAI-PMH**

- Open Protocol for Metadata Harvesting
- HTTP and XML
- Built-in for DSpace
- Dublin Core friendly
The Current Implementation

- **Repository Level**: DSpace
- **EIAH Metadata and Application Profile**
- **Ontology Level**: Semantic Mediawiki tools
- **Mediator Level**: Semantic Mediawiki extensions
Future Works

- Launch of more digital repositories in other cultural heritage centers;
- Development of EIAH ontology;
- Development of EIAH controlled vocabulary;
- Implementing of DSpace XML UI framework (Manakin) to increase adaptability;
- Enhancement of EIAH application profile based on DCAP Singapore framework;
- Development of more data visualization tools.