Haystack

A Platform for Creating, Visualizing, and Organizing Information Using RDF

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http://haystack.lcs.mit.edu/
Outline

- Motivation
- Demo
- System Architecture
- Language for Manipulating RDF
- User Interface Paradigm
Motivation

- Use Semantic Web technologies in personal information management domain?
- See all important things on one screen
- Send e-mail to ourselves
- Overflowing inbox
Folders?

- Out of sight, out of mind
- Which folder?
- Search
Root Problem

- People and computers think about information in different ways

Solution

- Add semantics to bridge the gap
- Model all data in RDF
System Architecture

User Interface

Scheduling service
Mail agent
Learning agents
Collaboration agents
...

Federation service

RDF store
Outlook store
File system store
LDAP store

Outlook CDO
File system
LDAP server
System Architecture

User Interface

Scheduling service
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Federation service

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System Architecture

User Interface

- Scheduling service
- Mail agent
- Learning agents
- Collaboration agents
- ...

Federation service

- RDF store
- Outlook store
- File system store
- LDAP store

- Outlook CDO
- File system
- LDAP server

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RDF Container Abstraction

- Information stores are RDF containers
- IRDFContainer: adding, removing, querying
- Federation Service is also an RDF container
RDF Container Abstraction

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Automation

- Services and agents
- Callable entities with SOAP-like interfaces
- WSDL-like ontology describes service interfaces
- All interface information stored in RDF store
- Written in Java, Python
Adenine

- `rdfContainer.add ( new Statement (  
    new Resource ("<urn:mySchema:John>"),  
    new Resource ("<urn:mySchema:likes>"),  
    new Resource ("<urn:mySchema:Mary>") ) );`

- `add { :John :likes :Mary }`

- `= friendsOfMary (query {  
    ?x :friendOf :Mary  
    ?x dc:title ?y  
}  
  ( List ?y )  
)`
Code is Data

- Adenine compiles into RDF

First instruction \(\rightarrow\) Next instruction \(\rightarrow\) ... 

Type \(\rightarrow\) Function 

Type \(\rightarrow\) For Loop
Code is Data

- Adenine compiles into RDF

First instruction → Next instruction → ...

Type

Function

Function type

Statistical Analysis function

For Loop
UI is Data

- Data for displaying data
UI is Data

- Data for displaying data
UI is Data

- Data for displaying data

UI data

Data to be displayed
UI is Data

- Data for displaying data
UI is Data

- Data for displaying data

```
Underlying resource

Data to be displayed

Mapping

UI data
```
UI is Data

- Data for displaying data

View

UI data

Mapping

Data to be displayed

Underlying resource
UI is Data

- Data for displaying data

View

| UI data |

Mapping

Data to be displayed

View 2

| UI data |

Mapping 2

Underlying resource

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Semantic UI

- Presentation ontology
- Rendering engine
Semantic UI

- Presentation ontology
- Rendering engine
**Semantic UI**

- Presentation ontology
- Rendering engine

```
Data to be displayed
Mapping
UI data
Presentation Ontology
Rendering engine
Screen
View
Underlying resource
```
Composing Views

View for Favorites collection

View for cnn.com

View for yahoo.com

View for ~/documents/thesis.pdf
Event Firing

- Event firing from RDF store

- View for Favorites collection
  - View for a web page
  - View for an e-mail
  - View for a document

- RDF store

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Event Firing

- Event firing from RDF store

View for Favorites collection
- View for a web page
- View for an e-mail
- View for a document

{ <favorites> <hasMember> ?x }

RDF store
Event Firing

- Event firing from RDF store

- View for Favorites collection
  - View for a web page
  - View for an e-mail
  - View for a document

add

{ <favorites> <hasMember> <a> }

{ <favorites> <hasMember> ?x }

RDF store
Event Firing

- Event firing from RDF store

```
{ <favorites> <hasMember> <a> }
```

```
{ <favorites> <hasMember> ?x }
```

- View for Favorites collection
  - View for a web page
  - View for an e-mail
  - View for a document

```
add
{ <favorites> <hasMember> <a> }
```
Benefits

- Information processing decoupled from presentation
- Lower barrier of entry for development
- Uniform support for features like context menus
- Internationalization? Accessibility?
  - “Open on Monday, Tuesday and Thursday”
  - “_ _ _”
Summary

- Using Semantic Web technology to improve end user experience
- Unified storage format; RDF used like a file system
- Adenine: manipulates RDF natively
- Semantic UI
Thank You For Your Attention

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Paper
http://www.ai.mit.edu/people/dquan/overview.pdf