CHIP Project  
@ Rijksmuseum Amsterdam  

Cultural Heritage Information Personalization  

Eindhoven University of Technology, the Netherlands  
Lora Aroyo, Paul De Bra, Natalia Stash & Yiwen Wang  

Telematica Instituut, the Netherlands  
Rogier Brussee, Lloyd Rutledge  

Rijksmuseum Amsterdam, the Netherlands  
Peter Gorgels
Contents

- CHIP goal
- Approach to providing personalized access
- CHIP Architecture
- CHIP demonstrators
- Future Work and Links
Cultural partner: Rijksmuseum Amsterdam

Inside museum

Online

http://www.rijksmuseum.nl

7758 artworks

131934 artworks
Personalized Art Experience

Personalized Web Site
- Interactive user modeling
- Personalization of navigation & presentation

Personalized Museum Tour
- Printed tour maps through the Rijksmuseum

Personalized Tour on a Mobile Device
- Interactive user modeling
- Route adaptation inside the Rijksmuseum
Artwork Description

The Company of Frans Banning Cocq and Willem van Ruytenburch, known as the 'Night Watch'

Creator: Rembrandt van Rijn
Creation site: Amsterdam
Year of creation: 1642
Material Medium: Oil paint
Material Support: Unprimed canvas
Style: Baroque
Dimensions: 353 x 437 cm
Exposition place: PH-012
Themes: Group, Group portraits, Militia paintings, Artists and Society, Power, Impact of Time, Annomone Veld Hagen, The Glory of the Golden Age, Rijksmuseum collection, Composition

Description:
The Night Watch, the most famous painting in the Rijksmuseum, actually has another title: the 'Company of Frans Banning Cocq and Willem van Ruytenburch'. The picture is a militia painting: a group portrait of a division of the civic guard. Rembrandt depicted the group of militia men in an original way. He did not paint them in neat rows or sitting at their annual banquet, rather, he recorded a moment: a group of militia men have just moved into action and are about to march off.

View related artworks
Show namespace prefix
Approach

- Making museum metadata available in RDF/OWL
- Making relevant vocabularies available in RDF/OWL
- Aligning & enriching vocabularies/metadata
- Using resulting RDF/OWL graph for building a combined (virtual and physical) user model
- Using the above results for (semi)automatic generation of virtual and physical museum tours
The Semantic Web = Web with a meaning

"If HTML and the Web made all the online documents look like one huge book, RDF, schema, and inference languages will make all the data in the world look like one huge database"

*Tim Berners-Lee, Weaving the Web, 1999*
Semantic Web: describing relationships

- Rembrandt is the creator of the The Night Watch.
- Rembrandt is the student of Peter Lastman.
- The Night Watch was created on unprimed canvas.
- Peter Lastman is the creator of Orestes and Pylades Disputing at the Altar.
Semantic Web: describing relationships

Triples: {Subject, Predicate, Object}

http://www.getty.edu/vocabularies/ulan#500011051

http://www.getty.edu/vocabularies/ulan#500032894

http://www.chip-project.org/Rijksmuseum#artefactSK-C-5

http://www.chip-project.org/Rijksmuseum#artefactSK-C-5

http://www.getty.edu/vocabularies/aat#300238097

vra:creator

vra:creator

ulan:student_of

vra:material.support
Converting Museum Metadata in RDF/OWL

- Rijksmuseum data:
  - ARIA database (Website-targeted)
    - 729 artworks
  - Adlib database (Curator-targeted)
    - 460204
Converting Vocabularies in RDF/OWL

- provided by E-Culture project
  (http://e-culture.multimedian.nl)
  - TGN (#425,517)
  - ULAN (#1,896,936)
  - AAT (#1,249,162)
- provided by STITCH project
  (http://www.cs.vu.nl/STITCH)
  - IconClass (# 24349)
Style: Baroque

Baroque (<Renaissance-Baroque styles and periods>, <European styles and periods>, ... Styles and Periods)

Notes: Refers to the style and period of architecture, visual art, decorative art, music, and literature of western Europe and the Americas from about 1590 to 1750. The style is characterized by balance and wholeness, often with an emphasis on spectacle and emotional content, and a tendency toward contrasts of light against dark, mass against void, and the use of strong diagonals and curves.

Terms:

Baroque (preferred, C,U,D,American English-P)

Facet/Hierarchy Code: F,FL

Hierarchical Position:

- Styles and Periods Facet
  - ... Styles and Periods
    - ....... <styles and periods by region>
      - ........... European
        - ............ <European styles and periods>
          - ................ <Renaissance-Baroque styles and periods>
            - .................... Baroque

Related concepts:

related to .... Rococo

- ......... (<Renaissance-Baroque styles and periods>, <European styles and periods>, ... Styles and Periods) [300021155]

- <Eastern European Renaissance-Baroque styles>
  (<Renaissance-Baroque regional styles>, <Renaissance-Baroque styles>, ... Styles and Periods) [300107026]
Rembrandt van Rijn

Rembrandt van Rijn (preferred)

artist (preferred)
draftsman
printmaker
etcher
teacher

Gender: male

Birth and Death Places:

Born: Leyden (South Holland, Netherlands) (inhabited place)
Died: Amsterdam (North Holland, Netherlands) (inhabited place)

Events:

active: 1631-1669 Amsterdam (North Holland, Netherlands) (inhabited place)

Related People or Corporate Bodies:

influenced: Koninck, Salomon

parent of: Rijn, Rumbertus van

patron was: Uyleburgh, Hendrick

spouse of: Stoffels, Hendrickje

spouse of: Uyleburgh, Saskia van

student of: Lastman, Pieter

teacher of: Backer, Jacob Adriaensz

teacher of: Bol, Ferdinand

teacher of: Dou, Gerrit

teacher of: Drost, Willem

teacher of: Dullaert, Heyman

teacher of: Eeckhout, Gerbrand van den
Amsterdam (inhabited place)

Coordinates:
Lat: 52° 21' 00" N  degrees minutes  Lat: 52.3500  decimal degrees
Long: 004° 54' 00" E  degrees minutes  Long: 4.9000  decimal degrees

Note: Located on over 90 islands in the IJ arm of the IJsselmeer. Early inhabitants built dikes on both sides of the Amstel River to prevent flooding, and a dam was built between the dikes in 1270. Chartered in 1305. Became affluent in the 15th century due to trade with Baltic seaports, and was the financial center of the world by 17th century. United Dutch East India Company was founded in 1602, followed by the West India Company in 1621. Capital of the Batavian Republic under Napoleon, later of the kingdom of Holland, and became part of the French Empire in 1810. Under German occupation from 1940-1945. Center of the world’s diamond trade.

Names:
Amsterdam
(preferred, C,V,N,English-P, Dutch-P)
Amstel-dam (H,V,N)
............... documented in 13th cen., meaning “dam on the Amstel [river]”
Amsteldam (H,V,N)
Amstel-damme (H,V,N)
Amsteldamum (H,O,N)
Amsteddamum (H,O,N)
Amsterdambam (H,O,N)
Amstelredamum (H,O,N)
Amsteldamense oppidum (H,O,N)

Hierarchical Position:
- World (level)
  - ... Europe (continent)
  - ........ Netherlands (nation)
  - ........... North Holland (province)
  - ............... Amsterdam (inhabited place)

Place Types:
inhabited place (preferred, C) ........... there possibly was a Roman settlement in the area; modern town probably originated as a fishing village in 13th century

city (C)
capital (C) ........... nominal capital of The Netherlands, though government is located in s’-Gravenhage

Amsterdam ........... (inhabited place)
(World, North and Central America, United States, Montana, Gallatin county) [2061000]
Keyword: guard

List of Keywords:
- guard
- guard-room
- Guardia

Context of: 45B31
- 4 Society, Civilization, Culture
- 45 warfare; military affairs
- 45B the soldier; the soldier's life
- 45B3 military service
- 45B31 guard duty, keeping sentry

Children
- 45B31(+) KEY
- 45B311 changing the guard
- 45B312 in the guard-room; 'kortegaard'
- 45B313 challenged by the guard
- 45B314 attacking the sentry
- 45B315 sentry box

Systematic References
71037(Iis. 52:6) the watchmen on the walls of Jerusalem

Keywords - Click icons for illustrations
- society
- civilization
- culture
- occupations
- military affairs
Aligning Vocabularies

- Manual alignment of internal ARIA Rijksmuseum vocabulary to external (Getty and IconClass):
  - 2825 mappings to 283 different AAT concepts
  - 485 mappings to 263 different ULAN concepts
  - 507 mappings to 69 different TGN concepts
  - 503 mappings to 178 different IconClass concepts

- Splitting Rijksmuseum "Location/Period" metadata and mapping them to TGN Locations and AAT Periods:
  - Amsterdam, 1625-1650 RM: #Atlas157849
  - Amsterdam TGN: #1092823
  - Second quarter of the 17th century AAT: stylePeriod

- Examples:
  - **Oil paint** ARIA: artefactMaterial
    - AAT: #300015050
  - **Rembrandt** ARIA: #artists/00016943
    - ULAN: #500011051
  - **Amsterdam** ARIA: #Place88668
    - IconClass: #7
  - **Altarpieces** ARIA: #encyclopedia/00048862
    - **Altar with altar-piece** IconClass: #11Q714113
Aligning Vocabularies

- Manual alignment of internal AdLib Rijksmuseum vocabulary to external (Getty):
  - 534 different AAT concepts
  - 3846 different ULAN concepts
Enriching Rijksmuseum Vocabulary

- Adding and mapping AAT Style metadata to artists Rijksmuseum collection

**Van Gogh** ULAN: #500115588

*hasStyle*

- **Realist** AAT: #300172861
- **Impressionist** AAT: #300021503
- **Expressionist** AAT: #300021502
Semantically Enriched Data
militia

self-portrait

style: Baroque

place:
Amsterdam, 1625 to 1650
Asking users to rate any Rijksmuseum artwork:
- first 20 pre-selected by museum curators
- rest random

Possibility to rate semantic properties of artworks
You Rate - We Recommend

North Holland

part of Amsterdam

creationSite

1642

creationDate

material

Oil paint

The Night Watch

specific term

subject

Portraiture

subject

Militia

Creator

Rembrandt

style

Baroque

studentOf

Pieter Lastman

teacherOf

Ferdinand Bol
CHIP User Model - Core classes and properties

External classes and properties from FOAF

foaf:Person
  foaf:holdsAccount
  foaf:OnlineAccount

Internal classes and properties in CHIP

subclass of

chip:User
  chip:has_Rated
  chip:has_Created

N-ary relation for Rate

chip:Rate_Value
  chip:rated_Value

chip:Rate_Relation
  chip:rated_Object
  chip:added_Object
  chip:excluded_Object

chip:Create_Tour

Objects from the enriched museum collection, refers to Fig.1 Metadata vocabularies

vra:Work
ulan:Person
tgn:Place
aat:Style
ic:Concept
Approaches to Solving Cold Start Problem

- **Input From**
  - FOAF profile
  - External tagging or recommendation systems profiles, e.g.
    - flickr.com
    - del.icio.us
    - amazon.com
    - iCity (http://icity.di.unito.it/dsa)
Importing Tags from iCity

(a) Importer, Exporter

(b) CHIP, Rijks Museum Amsterdam

ICITY tags of the user fede

- photography
  - Exact match from CHIP: Photographs, Photography
  - Related artwork/concepts from CHIP: Jerusalem, étude et reproduction photographique des monuments de la Ville Sainte
- Giovanni
  - Related artwork/concepts from CHIP: Tiepolo, Giovanni Battista, Piranesi, Giovanni Battista
- 1400
- repairing
Using RDF/OWL Museum Data & User Model for Generation of Museum Tours

- Automatically generated tours:
  - “Favorites” tour
    - Positively rated artworks
  - “Recommended artworks” tour
    - 20 top recommended artworks

- Creating tours manually:
  - Adding artworks and topics to tours
  - Searching for semantically related information (via E-Culture API)
    - related artists (students or teachers of an artist)
    - artworks created in the same style as artist’s style
    - etc.
Future Work

- Improving existing content-based recommendations algorithm
- Social aspects based on FOAF profile
- Adapting the tour sequence on the fly
- Mobile Guide on iPod Touch
Links

- www.chip-project.org
  - CHIP demonstration tutorial
  - PDA tour presentation

- www.chip-project.org/demo