Semantic Computing in Real-World: Vertical and Horizontal Application within Enterprise and on the Web

Amit P. Sheth

Wright State University - Main Campus, amit.sheth@wright.edu

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Semantic Computing in Real-World: Vertical and Horizontal application, within Enterprise and on the Web

Panel at Intl Conf on Semantic Computing, Palo Alto, CA, Sept 20m 2011

Amit P. Sheth
LexisNexis Ohio Eminent Scholar
Ohio Center of Excellence in Knowledge-enabled Computing (Kno.e.sis)
Wright State University, Dayton, OH
amit@knoesis.org
Semantics as core enabler, enhancer @ Kno.e.sis

Ohio Center of Excellence in Knowledge-enabled Computing

one of the two largest academic groups in Semantic Web; multidisciplinary;

15 Faculty
~50 PhD Students

knoesis.org
Semantics & Semantic Web in 1999-2002

(12) United States Patent
    Sheth et al. 2001

(54) SYSTEM AND METHOD FOR CREATING A SEMANTIC WEB AND ITS APPLICATIONS IN BROWSING, SEARCHING, PROFILING, PERSONALIZATION AND ADVERTISING

(75) Inventors: Amit Sheth; David Avant, both of Bogart; Clemens Bertram, Athens, all of GA (US)

Significant Presence In...

- MediaAnywhere/Taalee
- BBC Sound Index
- Twitris
- Twarql
- ASEM
- GIS
- Scooner

Pharmaceutical
Defense
Health Care
Finance
Life Science

App Specific
Search
Social
Sensor
Semantic Web In Action

Create Domain Model and Knowledge bases

Semantic Annotations

Reasoning and Analysis

- Bio2RDF
- Linked Open Data
- Scooner
- BBC Sound Index
- Global Investment Bank
- Semagix
- ASEMIR
- Taalee - MediaAnywhere
- BestBuy
- Schema.org
- Twarql

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Semantic Search 1999 - 2001
uniform view of worldwide distributed assets of similar type

**Details**

<table>
<thead>
<tr>
<th>Title</th>
<th>Alien:Resurrection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>Sigourney Weaver, Winona Ryder</td>
</tr>
<tr>
<td>Actors</td>
<td>Sigourney Weaver, Winona Ryder</td>
</tr>
</tbody>
</table>

The experiments begin. An unholy combination of human and alien genetics, made possible by an uneasy alliance between a renegade band of smugglers and a jealous cadre of scientists and officials. One subject is familiar -- a woman horrifically linked to the alien species that now elicits so much scrutiny. Ripley is back and all is not what it seems... Alien:Resurrection stars Sigourney Weaver as Ripley, the role she originated in Ridley Scott's 1979 classic, Alien, and reprised in James Cameron's Aliens (for which she received an Academy Award nomination).
Taalee Semantic/Faceted Search & Browsing (1999-2001)

**BLENDED BROWSING & QUERYING**

**ATTRIBUTE & KEYWORD QUERYING**

**SEMANTIC BROWSING**

Uniform view of worldwide distributed assets of similar type

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**Targeted e-shopping/e-commerce**

You have searched for "Alien Resurrection". Below are results for the keywords you entered. If you prefer, you may try another search.

Top matches for this search:
- Alien Resurrection (1997) -- Sigourney Weaver, Winona Ryder; VHS
- Alien Resurrection (1997) -- Sigourney Weaver, Winona Ryder; DVD
- Alien Resurrection (1997) -- Sigourney Weaver, Winona Ryder; VHS widescreen

Full Results: 5 items are shown below.

Alien Resurrection -- VHS
Sigourney Weaver, Winona Ryder / Subtitled in Spanish
Our Price: $12.99 ~ You Save: $1.99 (13%)

Read more about this title...
Fast Forward to 2010 - 2011
Schema.org

Amazing things can happen
Enterprise Applications
Semagix Freedom for building ontology-driven information system

Managing Semantic Content on the Web
In Use Today at Athens Heart Center For Clinical Decision Support since January 2006

Fraud Prevention application used in financial services – Related KYC application is deployed at Majority of Global Banks
Using large data sets for Structured Data on the web
Linked Open Data

Publish Open Data Sets in RDF
By 2010, 203 data data sets
25 billion Triples

Image: http://richard.cyganiak.de/2007/10/lod/
You publish the raw data...

Ivan Herman, "Semantic Web Adoption and Application", http://www.w3.org/People/Ivan/CorePresentations/Applications/
... and others can use it

Ivan Herman, "Semantic Web Adoption and Application",
http://www.w3.org/People/Ivan/CorePresentations/Applications/
Using the LOD to build Web site: BBC

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GoodRelations Ontology - RDFa

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GoodRelations Ontology - RDFa

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http://www.w3.org/People/Ivan/CorePresentations/Applications/
Using Community Engagement
BBC Sound Index

Using MusicBrainz to spot entities in the BBC Sound Index

- 60 songs with Merry Christmas
- 3600 songs with Yesterday
- 195 releases of American Pie
- 32 Artists American Pie
This new **Merry Christmas** tune.. SO GOOD!

Which ‘Merry Christmas’?; ‘So Good’ is also a song

**Scoped Relationship graphs**

- Using context cues from the content, webpage title, url...
  - e.g. **new** Merry Christmas tune
- Reduce potential entity spot size
  - e.g. **new** albums/songs

- Generate candidate entities
- Spot and Disambiguate
The Vision

- What is ‘really’ hot?
- BBC: Are online music communities good proxies for popular music listings?!
- BBC SoundIndex - “A pioneering project to tap into the online buzz surrounding artists and songs, by leveraging several popular online sources”

Netizens do not always buy their music, let alone buy in a CD store.

Traditional sales figures are a poor indicator of music popularity.

“U R $o Bad!”, “Thriller is my most fav MJ album”, “this is BAD news, miss u MJ”
Thriller/NNP is/VBZ my/PRP$ most/RBS fav/JJ MJ/NN album/NN

Structured Data
[Age, Artist, Gender, Location, Country]
- Rihanna
  - Def Jam artist b.1988
Good Girl Gone Bad
Released 2007-06-05
1. Umbrella (feat. Jay-Z)
2. Push Up on Me
3. Don’t Stop the Music
4. Breakin’ Dishes
5. Shut Up and Drive
6. Hate That I Love You (feat. Ne-Yo)
7. Say It
8. Sell Me Candy
9. Lemme Get That
10. Rehab
11. Question Existing
12. Good Girl Gone Bad

Unstructured Data
[Album, Tracks, Sentiments, Spam Mentions]

What are 18 year olds in London listening to?

Album/Track identification [ISWC09]

Sentiment Identification

Spam and off-topic comments

ETL
Structured Ingestor

Hypercube Generator
Source/Ranking Preference

List Projection

Group A
- Snoop Dogg
- Kanye West
- Timbaland
- Fergie
- J. Holiday
- 50 Cent
- Keyshia Cole
- Nicki Minaj
- Pink
- Colbie Caillat

Group B
- T.I.
- Soulja Boy
- Fall Out Boy
- Rihanna
- Keyshia Cole
- Avril Lavigne
- Timbaland
- Pink
- 50 Cent
- Alicia Keys

Annotators
[Artist, Spam, Sentiment]

Urban Dictionary
Music Branz

Crowd-sourced preferences

UIMA Analytics Environment
Social Data
Twitris: Semantic Social Web Mash-up

- Select topic
- Select date
- Topic tree
- N-gram summaries
- Spatial Marker
- Tweet traffic
- Sentiment Analysis
- Reference news
- Related tweets
- Images & Videos
- Wikipedia articles

More: TWITRIS

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• Semantically annotate tweets with entities, hashtags, URLs, sentiments, etc.

• Encode content in a structured format (RDF) using shared vocabularies (FOAT, SIOC, MOAT, etc.)

• Structured querying of tweets

• Subscribe to a stream of tweets that match a given query

• Real-time delivery of streaming data.

More: TWARQL
Twarql Architecture

More: TWARQL
User Controlled Content Dissemination

- Create Semantic Social Graphs (FOAF) of publishers (followee) and subscribers (followers).

- Dynamically create subset of subscribers (SPARQL Query on Semantic Social Graph), based on publishers privacy preference for the content generated.

- Distribute the content to only the subset of subscribers from the Social graph in (near) Real-Time

- Example –
  - SMOB (Semantic Microblogging Framework)  [http://smob.me](http://smob.me)
  - Semantic Hub (Publisher/Subscriber protocol)  [http://semantichub.appspot.com](http://semantichub.appspot.com)
Semantic Hub

1. POST #rdf tutorial by me, coming soon :)

2. Get my privacy settings for dbPedia:Resource_Description_Framework

3. Acess Space - #RDF
   SELECT ?user WHERE {
   ?topic dcterms:subject category:Semantic_Web .}

5. Get micropost + Access Space

4. There is a micropost

6. Subscribers of SMOB - A matching Acess Space

7. SMOB-B and D

8. Micropost from SMOB - A

SMOB – A
Interest: Linked Data

RDF
Privacy

SMOB – B
Interest: Knowledge Engg

SMOB – C
Interest: Comuter Networks

SMOB – D
Interest: Semantic Search

RDF Social Graph
Scenario ...

- Give me a stream of locations where Kinect is being mentioned now
- Give me all people that have said negative things about Kinect

```sql
SELECT ?location
WHERE {
  ?presence opo:currentLocation ?location .
}
```

```sql
SELECT ?user
WHERE {
  ?tweet sioc:has_creator ?user .
}
```

More: TWARQL
Creating Focus Specific Knowledge Bases for Knowledge Exploration
Intracerebroventricular (ivc) injection of neuromodulator (NPY), which is a widely distributed neurotransmitter, into the paraventricular nucleus area has been shown to increase secretion of insulin and glucagon from the pancreatic islets. Vasoaducton intestinal polypeptide (VIP) is a 28-amino-acid peptide that is associated with the mobilisation of energy during situations of energy depletion, such as fasting and exercise. VIP has also been reported to alter insulin and glucagon levels in a glucose-dependent manner. The aim of this study was to determine whether ivc infusion of NPY affected VIP secretion in dogs. Intracerebroventricular injections (6.5 ml) were administered through a stereotaxic apparatus to six healthy dogs. This protocol allowed the study of the effects of NPY on VIP secretion, following a more gradual and lengthy decrease in VIP levels. The secretion of insulin and glucagon increased significantly with all three doses of NPY. Intracerebroventricular infusion of NPY increased secretion of insulin and glucagon from the pancreas. The rapid change in the levels of VIP suggested the possibility of neural regulation by NPY.


The N-terminal part of VIP and agonist (PG97-299) physically interact with different regions of the human VPAC1 receptor.

Vasoaducton intestinal peptide (VIP) is a widespread neuropeptide, which exerts many biological functions through interactions with the VPAC1 receptor, a class B G protein-coupled receptor. Photoaffinity labeling studies combined with 3D molecular modeling demonstrated that the central and C-terminal parts of VIP (segment 6-26) have physical contacts with the N-terminal ectodomain (N-Ted) of VPAC1 receptor. However, the domain of the VIPAC1 receptor interacting with the N-terminus of VIP (1-5) is still unknown. We have synthesized a photoreactive probe, Bpa-VIP. After photoaffinity labeling and receptor cleavage, Nu-PAGE analysis revealed a 5-KDa labeled fragment corresponding to the 130-137 sequence of VPAC1 receptor, indicating that the N-terminus of VIP also interacts with the N-Ted. A photoreactive probe, Bpa-PG97-299, was also synthesized with the selective peptide antagonist. PG97-269 after photoaffinity labeling, it was found that the 15-KDa fragment is identified by cyanogen bromide (CNBr) cleavage and corresponds to the 43-56 sequence of the VPAC1 receptor N-ted. These results indicate that (1) the N-terminal part of VIP physically interacts with the N-Ted in the continuity of 6-26 VIP sequence, (2) the N-terminal part of VIP and the selective peptide antagonist (PG97-269) have different sites of interaction with the VPAC1 receptor N-ted.


Vasoaducton intestinal peptide (VIP) is an interesting example of a 28-amino-acid neuropeptide that is abundantly expressed in discrete brain regions/nuclei, and hence may contribute to brain function. This short review summarizes my personal view and encompasses 25 years of work and over 100 publications targeting the understanding of VIP production and biological activity. The review starts with our original cloning of the VIP gene and then continues to discoveries of regulation of VIP synthesis and the establishment of the first VIP transgenic mice. The review ends with the identification of novel VIP analogs that helped decipher VIP's important role in development, in regulation of the biological clock(s) and circadian rhythms, sexual activity, learning and memory as well as social behavior, and cancer. This review cites only articles that I have coauthored and gives my own perspective of this exciting ever-growing field.

Exploring Relationships

Scooner

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Interested in more?

- “Citizen Sensor Data Mining, Social Media Analytics and Development Centric Web Applications” (WWW2011)

- Jorge Cardoso, Martin Hepp and Miltiadis Lytras “The Semantic Web : Real World Applications from Industry”

- Ivan Herman, “Semantic Web Adoption and Application”

- Michael Hausenblas, “Open Data Ireland : From Research to Practice”

- Amit Sheth: “Semantics Scales Up: Beyond Search in Web 3.0”

- See showcase of several applications at: http://knoesis.org/showcase