A Collaborative Approach to Building Personal Knowledge Networks

or

How to Build a Knowledge Advantage Machine?

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Importance of Knowledge in Post-Modern Society

An investment in **Knowledge** returns the best interest of all.

Benjamin Franklin

Nature of Knowledge

- Knowledge is *power*
- Knowledge is *scattered*
- Knowledge is growing *exponentially*
- Knowledge is mingled with *trivia*

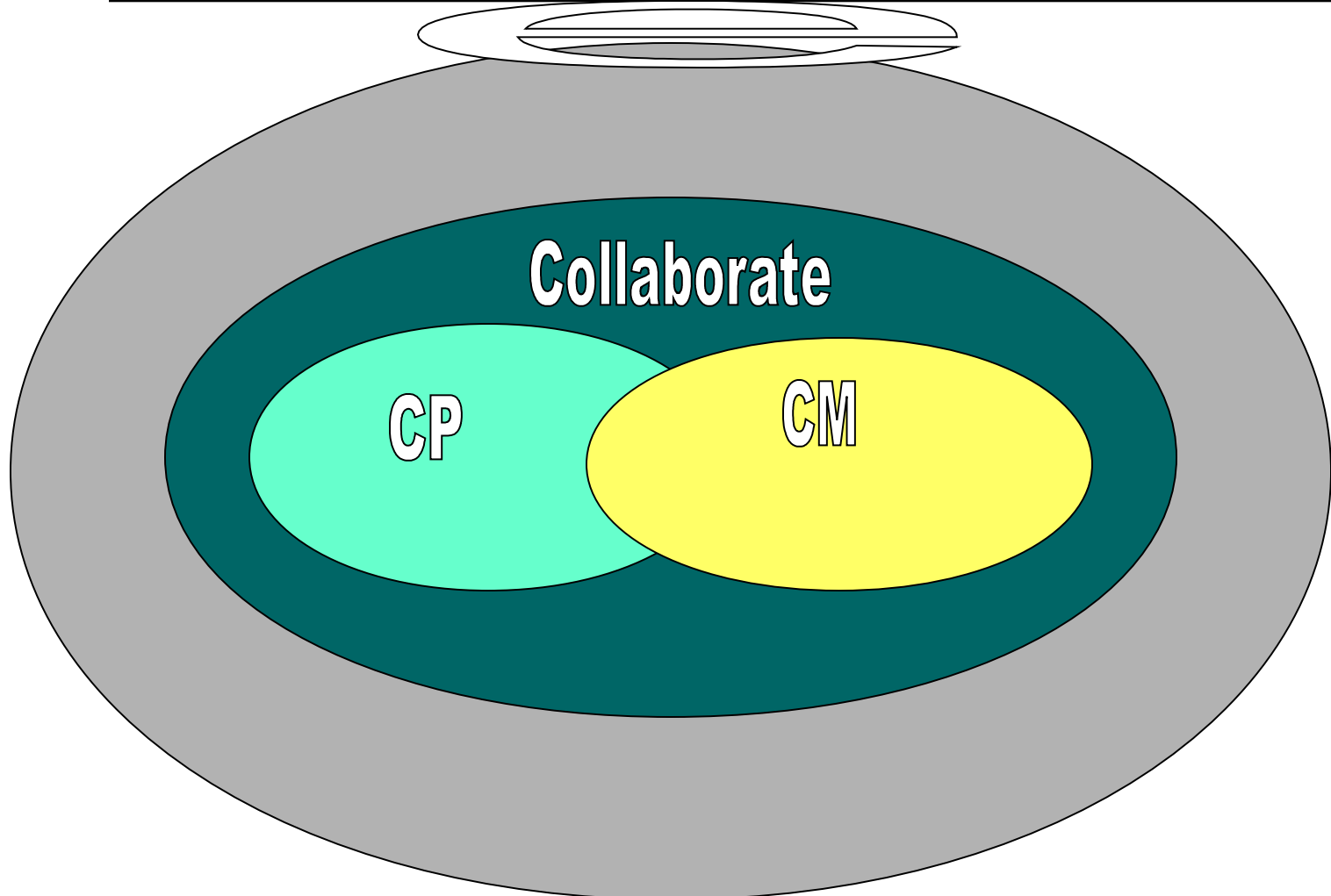# To be useful….

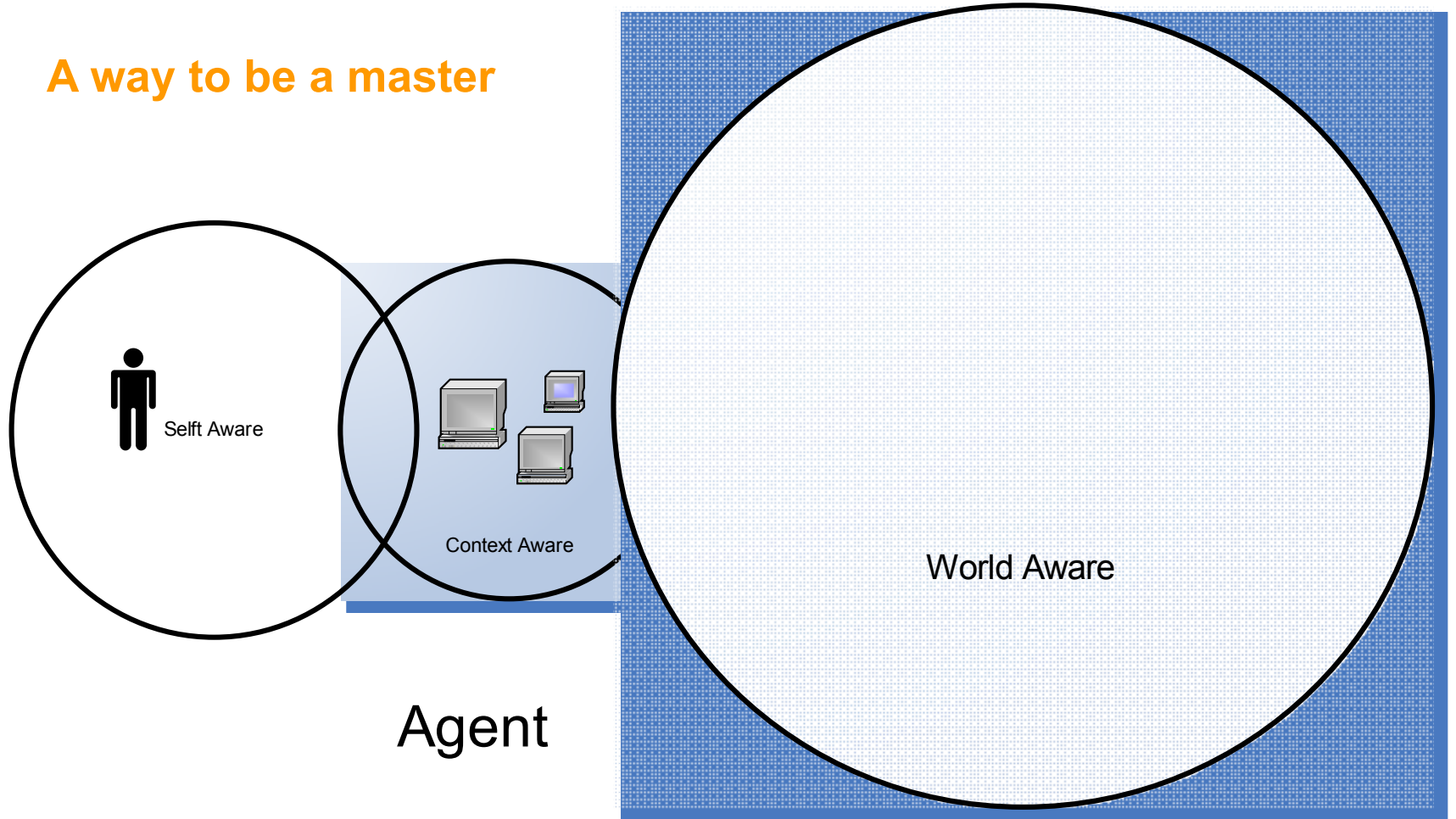Knowledge must be synthesized, presented on-demand, be visualizable and adaptable to the present context.
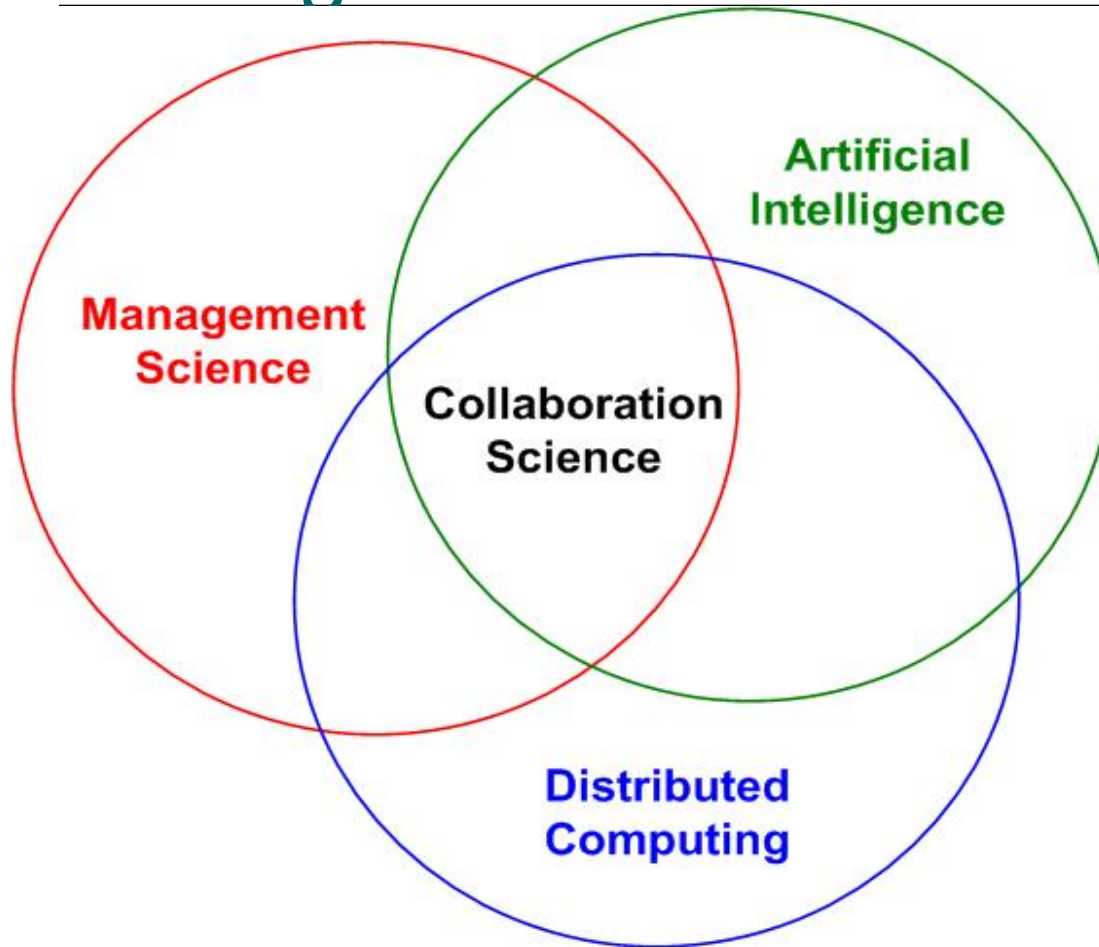
Knowledge Advantage

Collaborate

CP

CM

Context Awareness

A way to be a master

Selft Aware

Context Aware

Agent

World Aware

Collaboration and Knowledge Advantage

Welcome to the *SIVA* Paradigm

- Sieve
- Interlink
- Visualize
- Apply

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SIVA Paradigm ----*Sieve, Interlink, Visualize*, and *Apply*
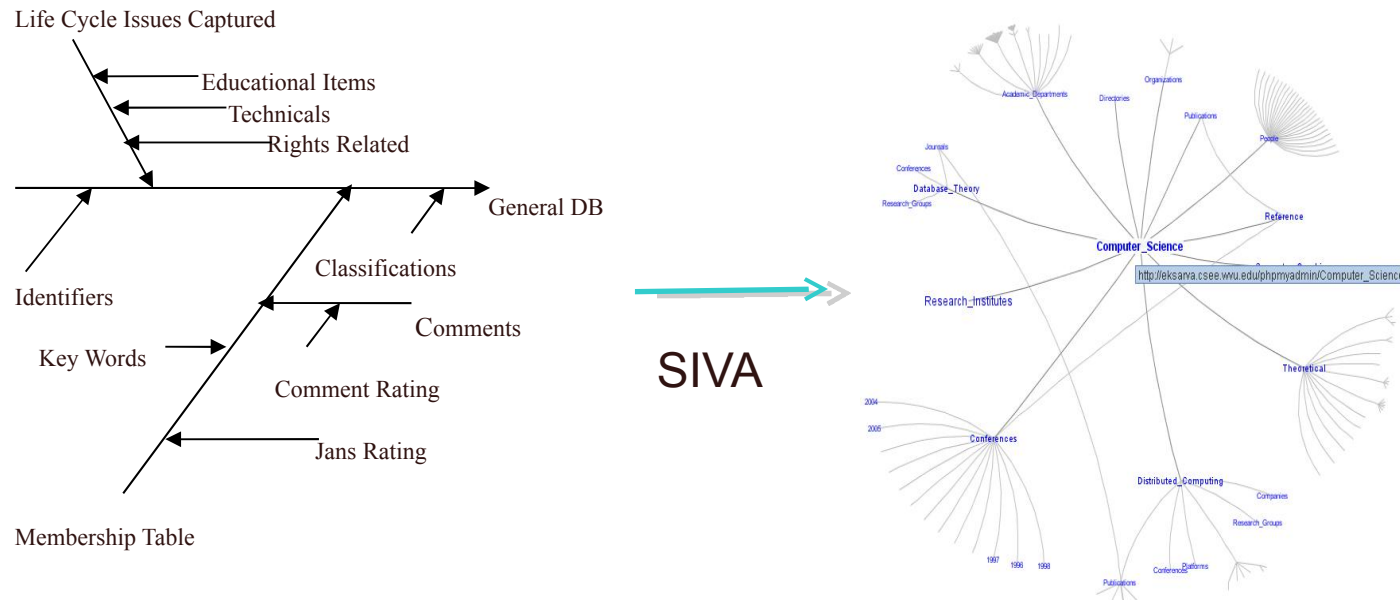
SIVA

Vijjana – A Model based on the SIVA Paradigm

An instance of Vijjana Model Application

Semantic network consists of units with enriched metadata , which can be searched, achieved, and accessed from everywhere by everybody.

Remote Server

Wireless Connection

Laptop , Smart Phone , PDA

GPS Device

| The Photo Alblum |
| Basic Informaton and |
| Properties |

Digital Camera

Semantic Photo Album Software

Location

Social Network

Nation

Oragization
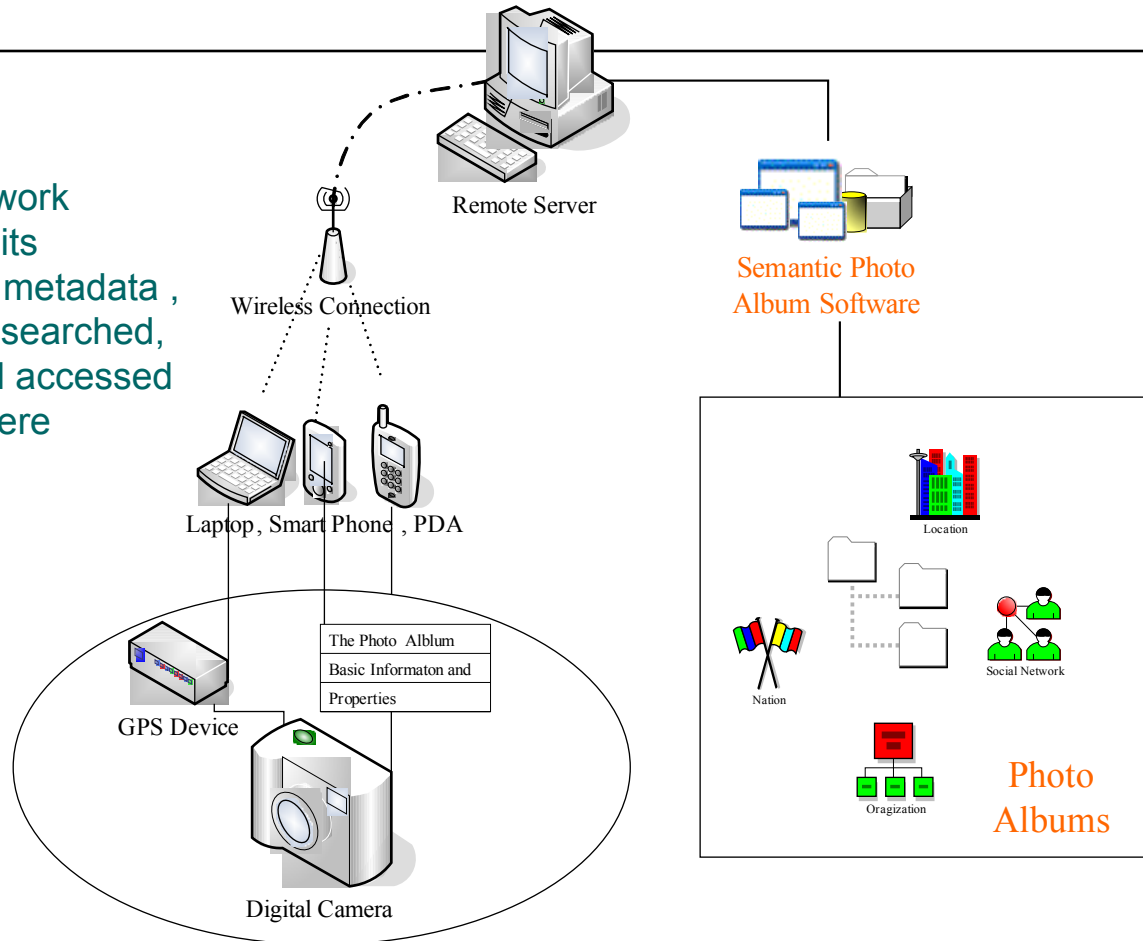
Photo Albums

A Vijjana based Photo Album

- Organizes itself
- Retrieves photos based on context
- Accessible to Personal Apps

The Vijjana Model

○ Vijjana-X = {J, T, R, dA, oA, cA, vA, sA, rA}

X = the domain name
J= the collection of JAN's in the Vijjana-X
T = the Taxonomy used for classification of JAN's
R= the domain specific relations
dA = the discovery agent which finds relevant JAN's
oA = the organizing agent which interlinks the JAN's
   based on R
cA = the consistency/completeness agent
vA = the visualization agent
sA = the search agent
rA = the rating agent

Framework Infrastructure
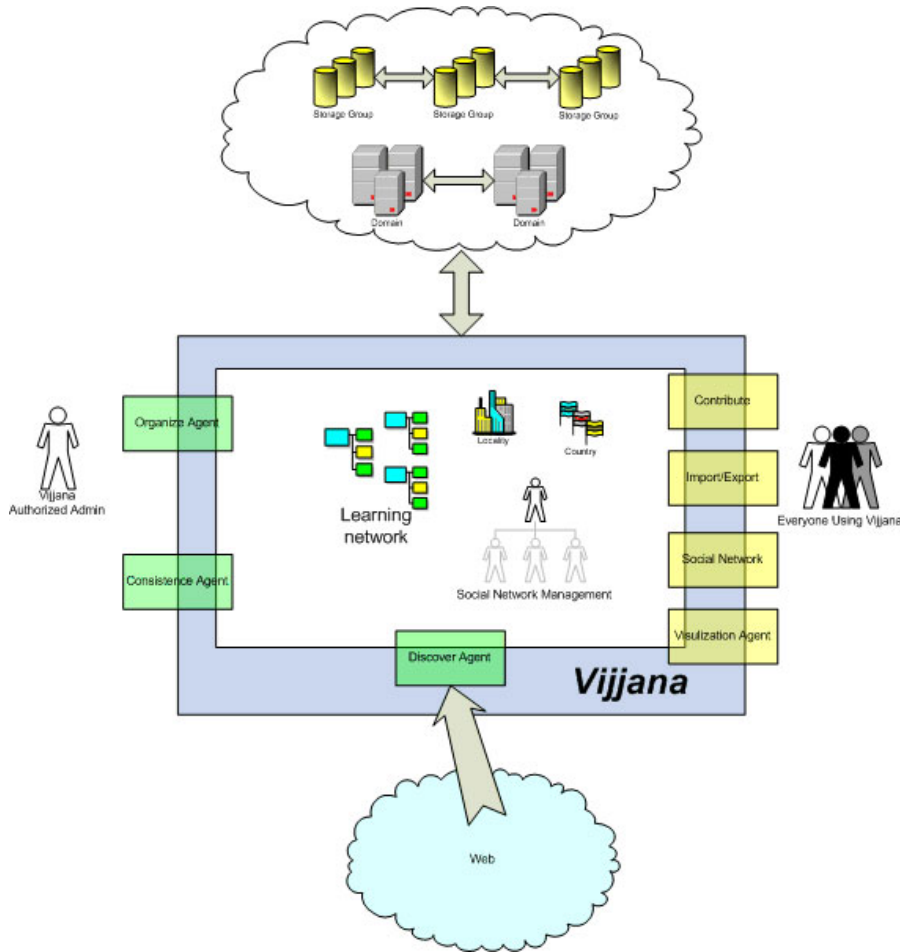
- Knowledge is contributed by trusted user and administrated by their supervisor

- Semantic service is running on recognizing, organizing, and clustering knowledge.

- Access can be everywhere

Vijjana Client

V$_{ijSpace}$ Client (Developer) Architecture
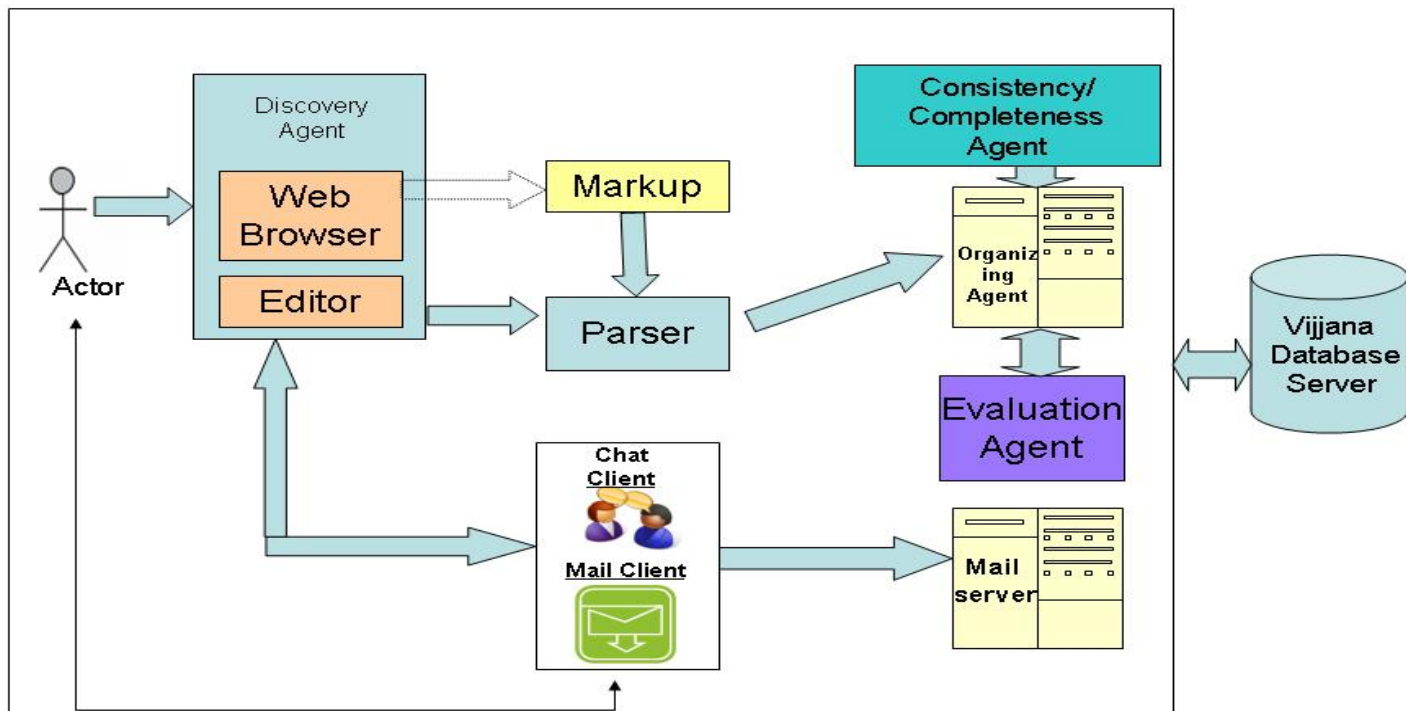
Work Flow for knowledge accumulation

Has access to Global Space, Personal Space, Validate his Jans etc.

User

Add a Jan to the Library

Web Browser / file (Markup)

Collaboration Agent

Client Interface (Vijjana Website)

Metadata of a Jan.

Organizing Agent

The Collaboration Agent is embed in the Vijjana Website.

Displays different Views

Establishing the relationship and placing them in the taxonomy hierarchy.

Visualization Agent

Providing Dataset

Database (Digital Library)

The Vijjana Work Process

○ Indentify the domain

○ Create a Taxonomy and semantic links

○ Discover URLs

○ Markup

○ Organize

○ Archive

The Vijjana Work Process

- Check consistency and completeness
- Visualize
- Search
- Retrieve on demand contextually

Web Interface Prototype

○ Browse JAN's with in the user interest.

○ Comment on the JAN, for discussion .

○ Rate the JAN, to get best & useful content.

○ Visualization of Taxonomy, for addition of JAN's manually.

○ Visualization of Knowledge Domains for easy navigation and User friendly search.

Web Interface of Singed User

Vijjana Add-on

- We have also a browser interface for accessing Vijjana.

- Browser required: Mozilla Firefox 2.0.1 or later

- Vijjana toolbar is provided as add-on for Firefox

- when the Add-On installed, will install the Vijjana buttons

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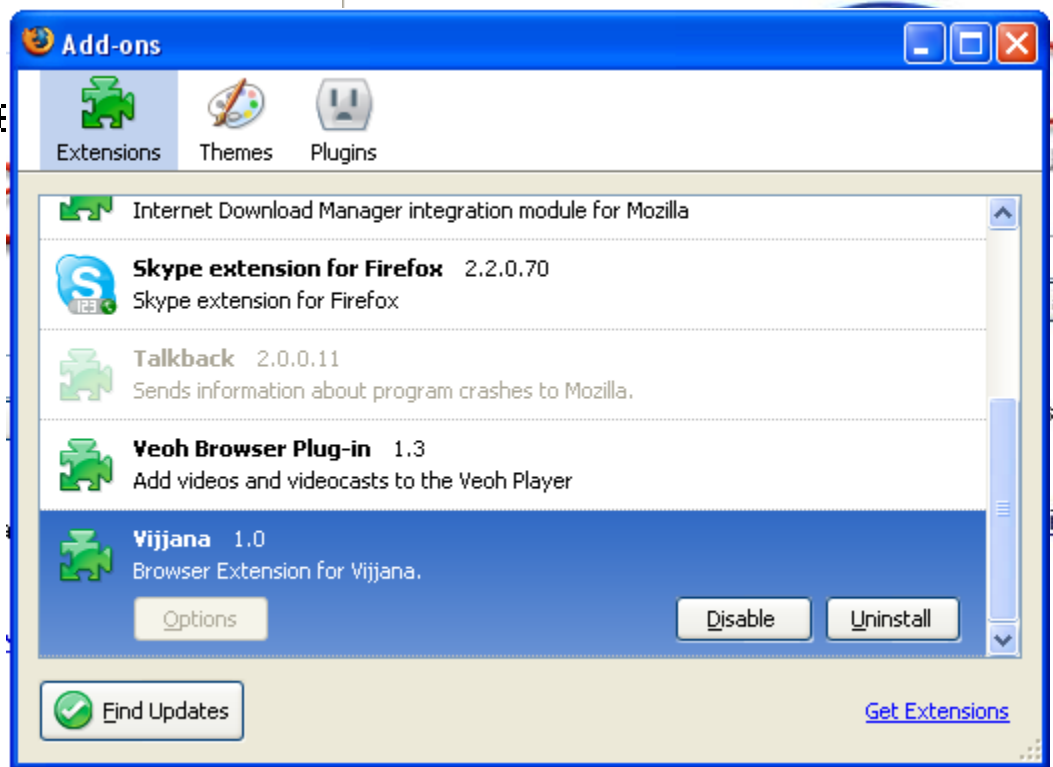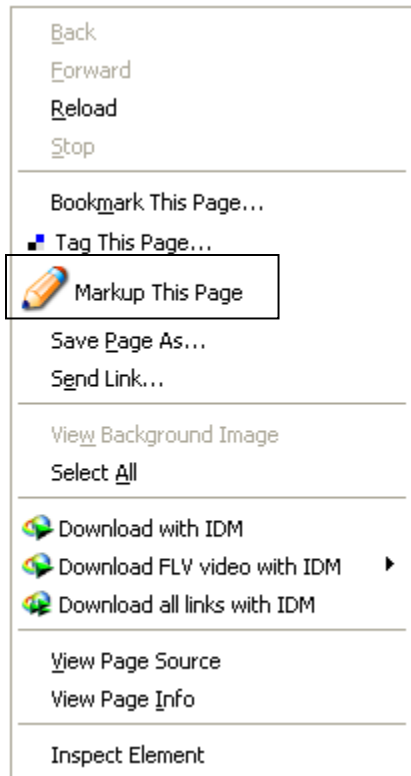
SIVA Model (1)-- Context

○ Context Awareness
- Grammatical analysis—VKE algorithm

○ Manually define
- Semantic network
- Search criteria— Knowledge Sieving

○ Machine Learning

Context Awareness Prototype

SIVA Model(2) -- Channel

- Expert System
  - Context detection
  - Resource utilization
- Data Mining
  - Data warehouse
  - Mobile information

SIVA Model(3) – Sieving

○ Plenty of knowledge can be filtered
- Under context
  - ○ Where
  - ○ Who
- Under manual definition
  - ○ Search Criteria
  - ○ User preference

Visual knowledge Sieve of Vijjana

SIVA Model(4) – InterLink

○ Relevant knowledge should be clustered together

○ Similar topics can be grouped to be discussed

○ People with same interest should be provided with communication channels.

○ Links should be updated as time goes on

○ Dynamically transform based on lower-level semantics changes

SIVA Model(4) – InterLink
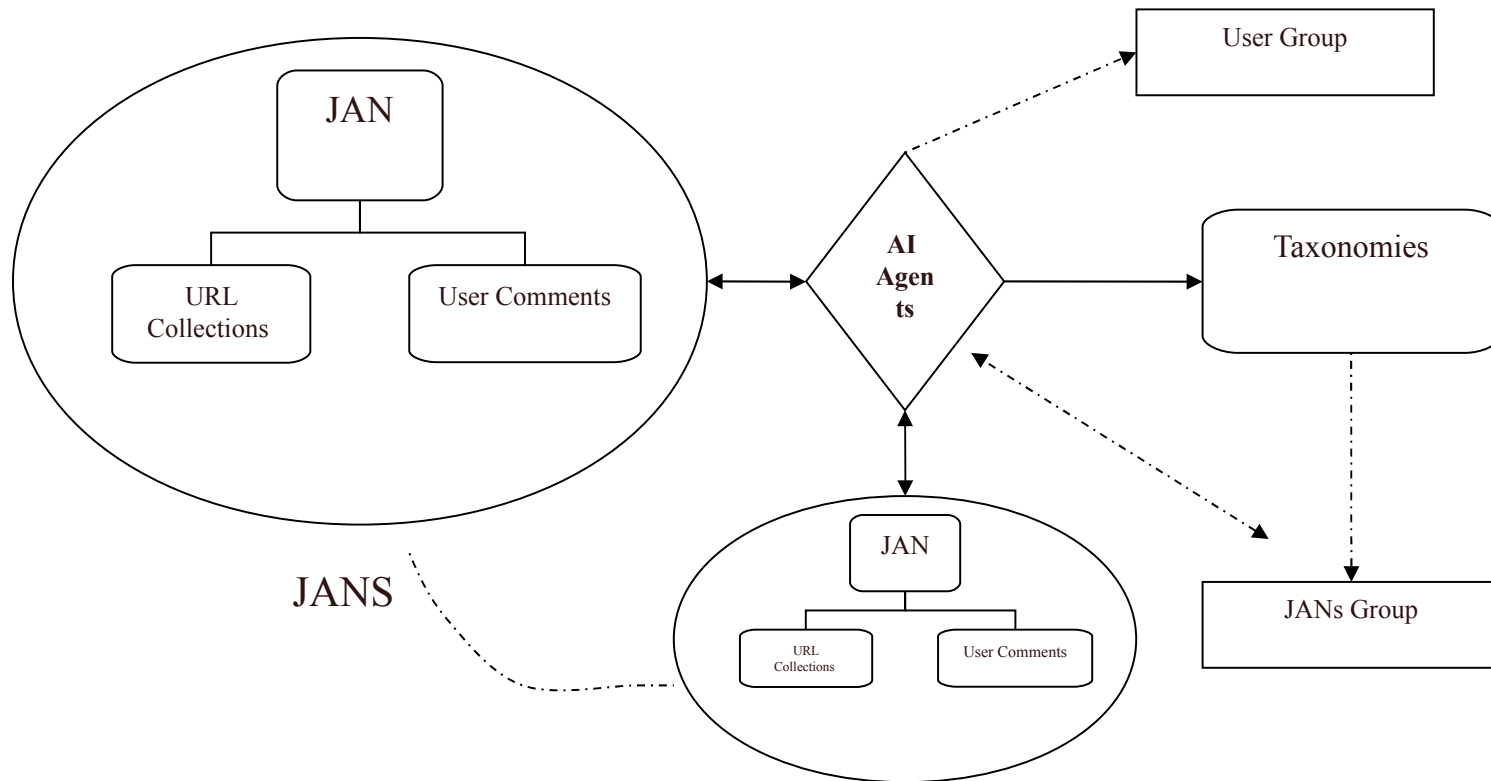
SIVA Model(5) - Visualization

- Visualization is more than a method of computing!
- a visual form enabling the viewer to observe, browse, make sense, and understand the information.
- interactive graphics, imaging, and visual design.
- It relies on the visual system to perceive and process the information.

What is Information Visualization ?

❑   "The use of computer-supported, interactive, visual representation of abstract data to amplify cognition."

       Card, Mackinlay, and Shneiderman

- Interactive
- Visual representation
- Amplify cognition

Vijjana Views

- ❑ HyperGraph
  - ○ Hypergraph View

- ❑ Prefuse Toolkit
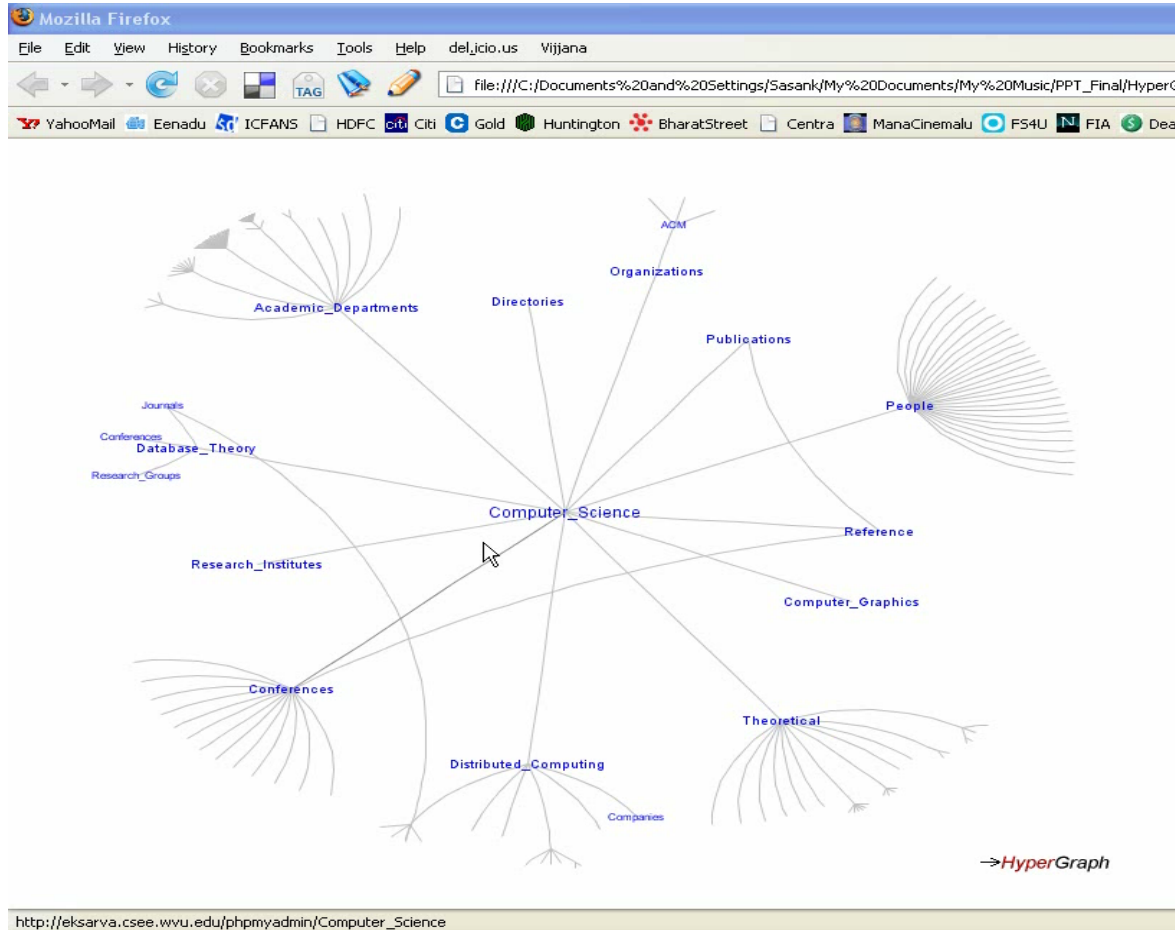 - ○ Tree View
  - ○ RadialGraph View

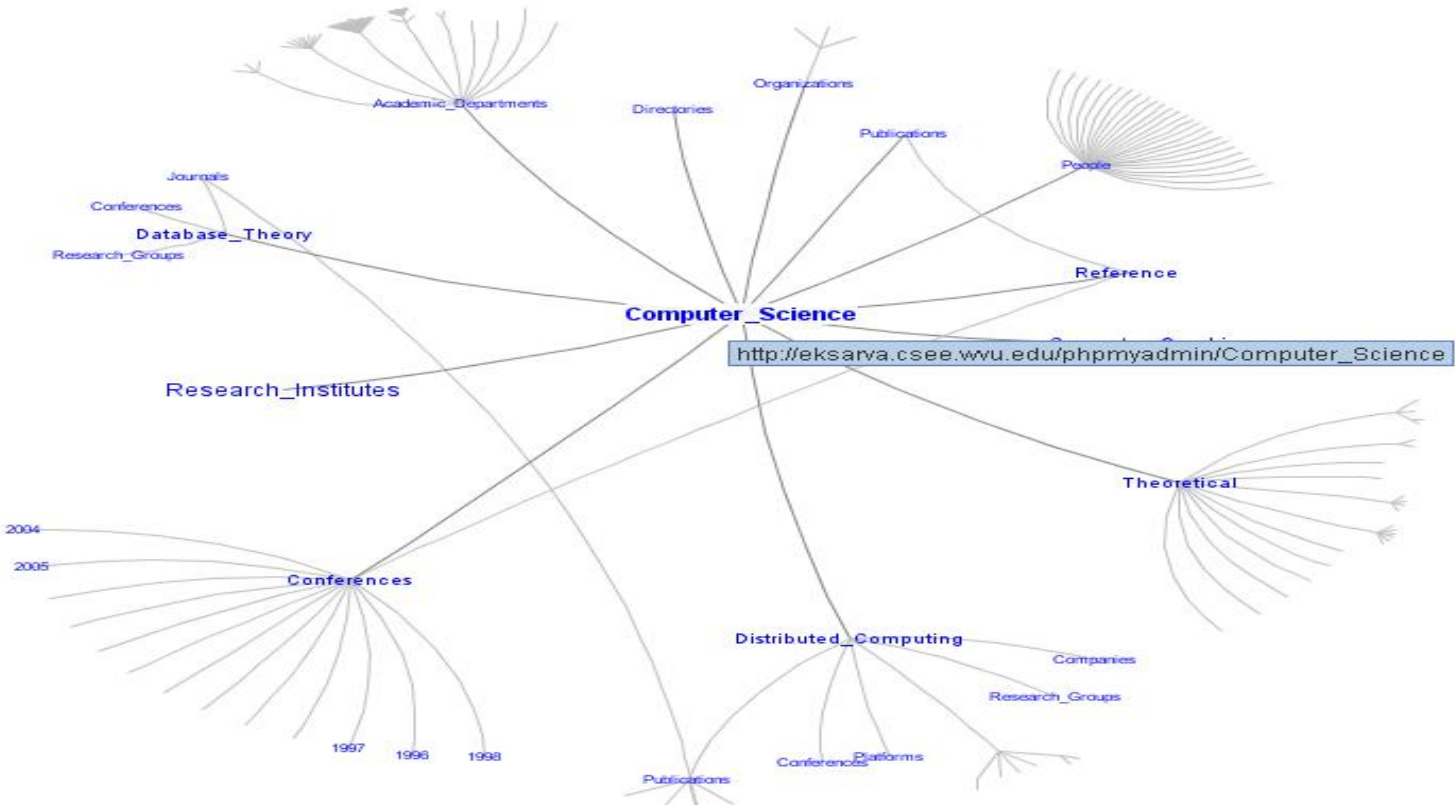# HyperGraph & Prefuse Toolkit

HyperGraph

- HyperGraph is an open source project which provides java code to work with hyperbolic geometry and especially with hyperbolic trees.

- Hyperbolic trees are very useful - they show more data than standard tree representations like your favorite explorer, and they have a great look and feel.

http://hypergraph.sourceforge.net/

HyperGraph

Knowledgebase of Computer Science Domain

JAN's from Computer Science Domain

Mobile --- iPhone View

Vijjana iphone app currently can detect user's basic information and provide information correspondingly.

Conclusion and Future Work

○ **To exploit the knowledge that is so pervasive and accessible, we need something like Vijjana ……**

Reference

- Vijjana – A Pragmatic model for Collaborative, Self-Organizing, Domain-Centric Knowledge Networks - Reddy, Dr. Ramana. Morgantown : IKE08, 2008.
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Questions ?