

# Finding Knowledge Structure: A Sensemaking Oriented Search Mechanism

Yan Qu

[yanqu@umd.edu](mailto:yanqu@umd.edu)

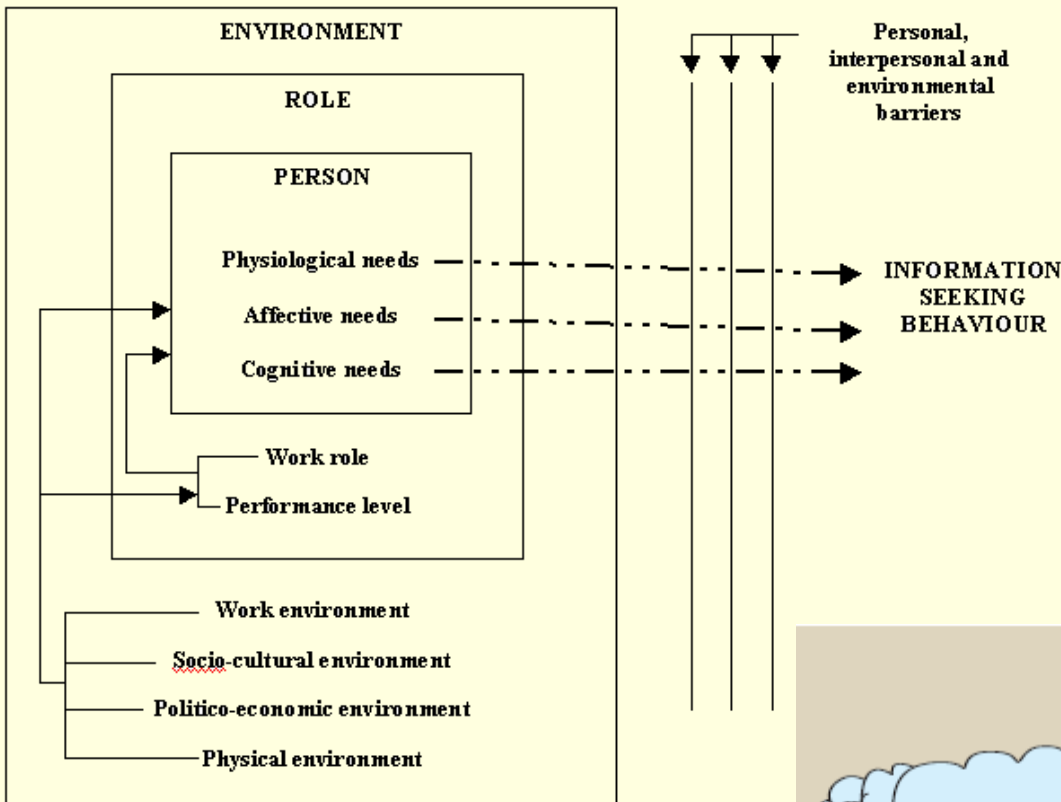
College of Information Studies  
University of Maryland



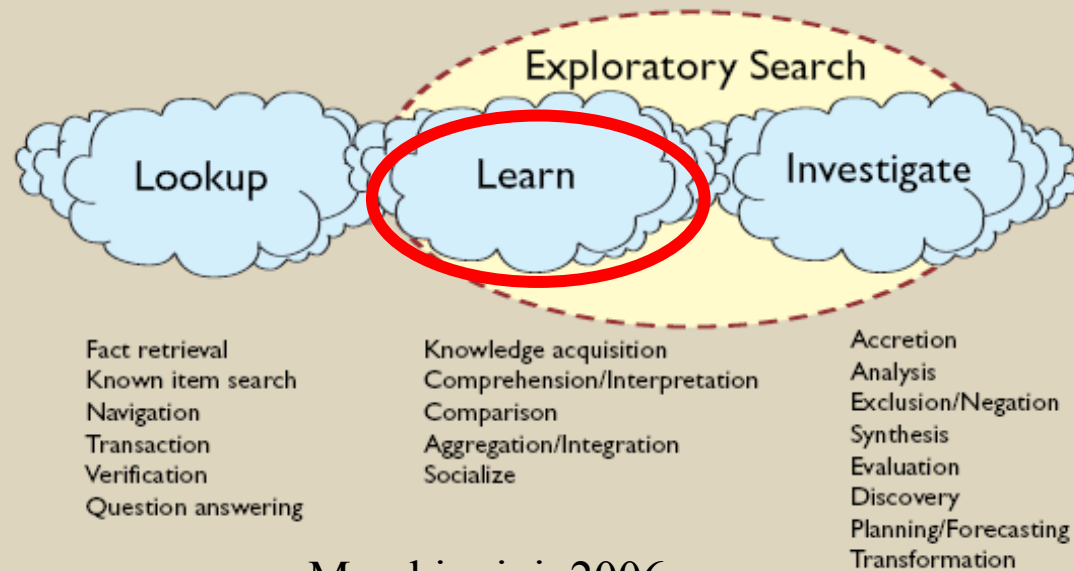
# Outline

- Information Seeking in Sensemaking
  - Seeking structuring ideas
  - Query initiated navigation
- A new search mechanism
  - Query Initiated Structure Exploration
  - A toolset

# The context of Information Seeking



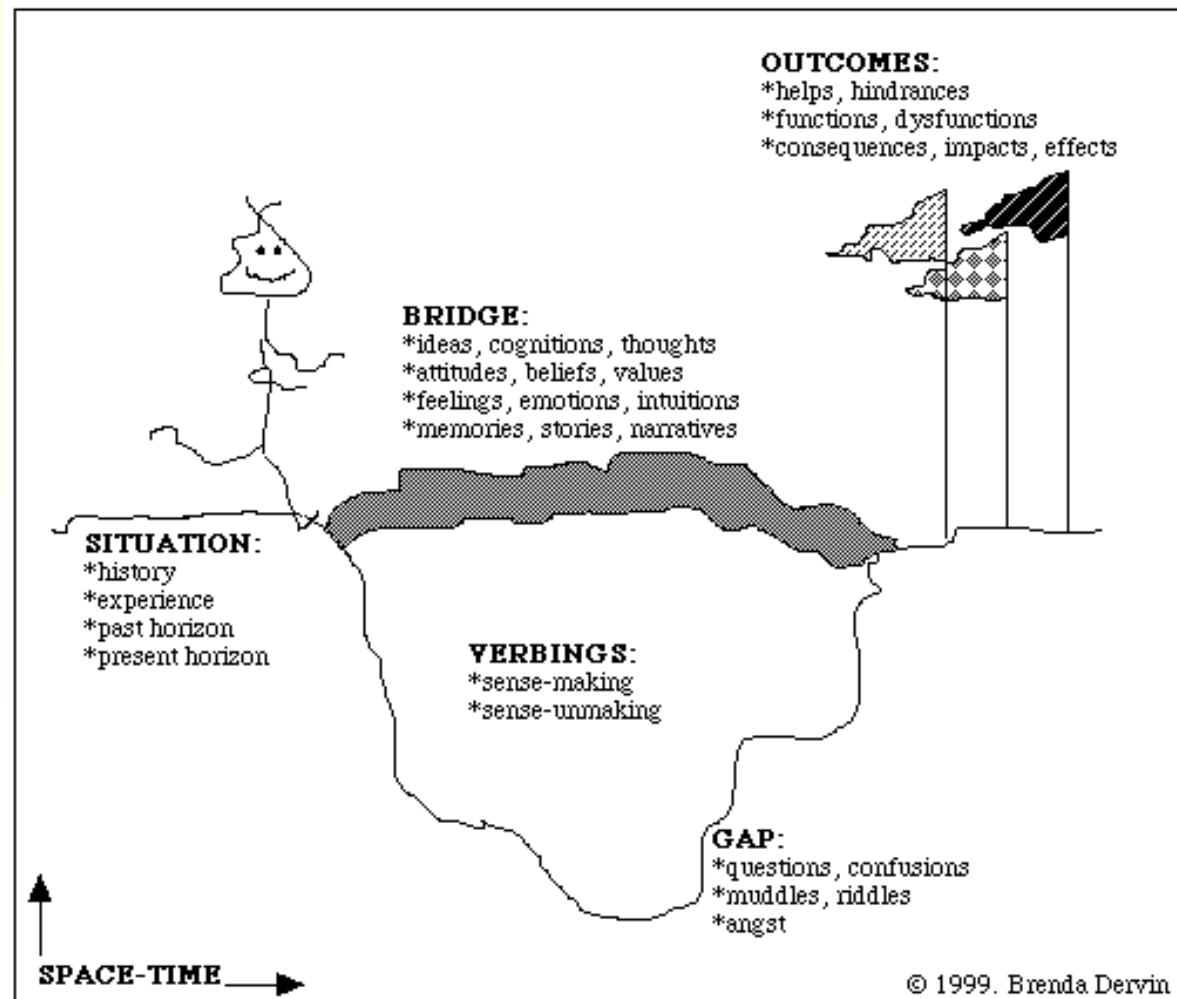
Wilson, 1981



Marchionini, 2006

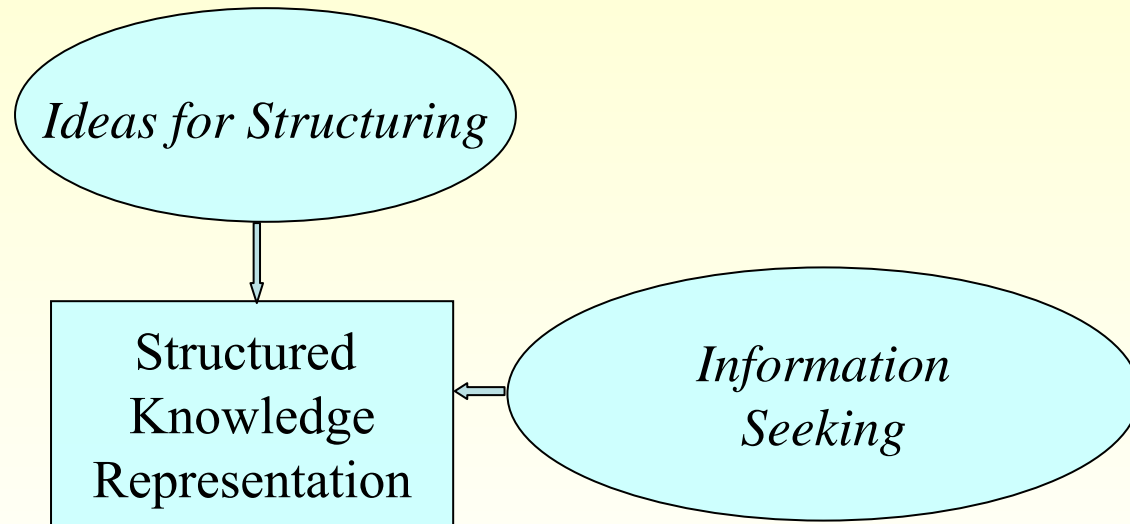
# Sensemaking (Dervin 1999)

Seeking information to bridge knowledge gap.



## Sensemaking (Russell et al, 1993)

Developing successively more sophisticated representations and using them to organize information in service of a task.



# Information Seeking and Sensemaking

- Where do ideas for structures come from?
- What is the role played by information seeking in representation construction?
- How can a computer system help in representation construction?

# A topic comprehension task

- Prepare a talk on an unfamiliar topic
- Search for relevant information
- Sketch an outline of the talk

Cosen System

TreeGraphOutline

others

news articles

user test

newdata

tea talk

history

History of Tea

Stash Tea: The History of Tea

types

culture

talk outline

SSQ tree

Query History

search results

history of tea

Stash Tea: The History of Tea

Korean tea pages

History of Tea

Tea Glorious Tea - Tea History

Important Events in the History of Tea +246teachronolo

History of Tea in Britain

History of tea

History of Tea

Tea and Sri Lanka

The Bramah Museum of Tea & Coffee - Tea Histor

The History of Tea - Tea Bags and Makers

A History of Tea from Mark T. Wendell Tea Company

Twinings - History and Tradition - History of Tea

Stash Tea: The History and Design of Teapots

Victorian Tea Parties - the History of the Tea Tradition!

Afternoon Tea

about

history-1

Google Search

history of tea

search

result 1-20

result 21-40

BrowserMapOutline

Save as BookmarkURL: http://www.stashtea.com/facts.htm

S T A S H

HOME | SHOP | REQUEST A CATALOG | VIEW CATALOG | DISCOUNTS & CLOSEOUTS

SITE INDEX | ABOUT TEA | ABOUT US | RECIPES | BED & BREAKFAST PROMOTION

The History of Tea


SEARCH

stash store

enter keywords

Go

The Legendary Origins of Tea



The story of tea began in ancient China over 5,000 years ago. According to legend, Shen Nung, an early emperor was a skilled ruler, creative scientist and patron of the arts. His far-sighted edicts required, among other things, that all drinking water be boiled as a hygienic precaution. One summer day while visiting a distant region of his realm, he and the court

The Chinese Influence

The Japanese Influence

Europe Learns of Tea

Tea comes to Europe

Tea Comes to America

Tea Arrives in England

The John Company

Afternoon Tea in Engl

Note Editor - talk outline

Save and Close

Title talk outline

This note is for the following doc: choose

Monospaced12BIZU

I. History

- \* Importance in European exploration (to new New World)
- \* Boston Tea Party

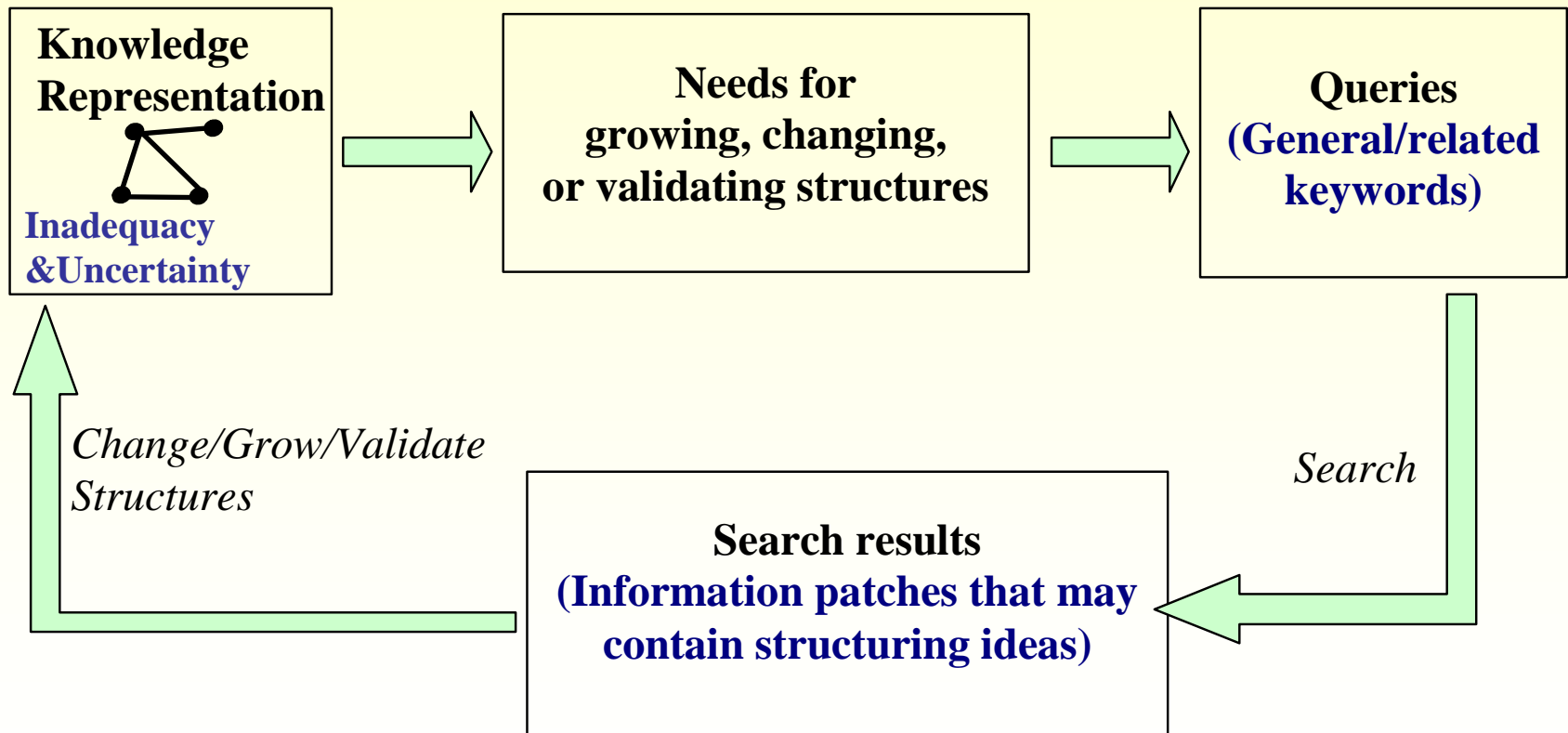
II. Types of Tea

- \* Traditional
- \* Herbal
- \* Medicinal
- \* W/out caffeine

III. Tea Industry



# Seeking Structure by Query Initiated Navigation



# Prevalence and Success of Query Initiated Navigation

	Sessions not followed by navigation	Sessions followed by navigation (QIN)	Totals	Percent from QIN
Number of Sessions that resulted in NO Bookmarks	636	42	678	6.2
Number of Sessions that resulted in at least one Bookmark	227	107	334	32.0
<i>Totals</i>	863	149	1012	14.7
Percent resulting in Bookmarks	26.3	71.8	33.0	
Number of Bookmarks Created	281	216	497	43.5

73% of the navigation sessions are within one website.

# Design Implication

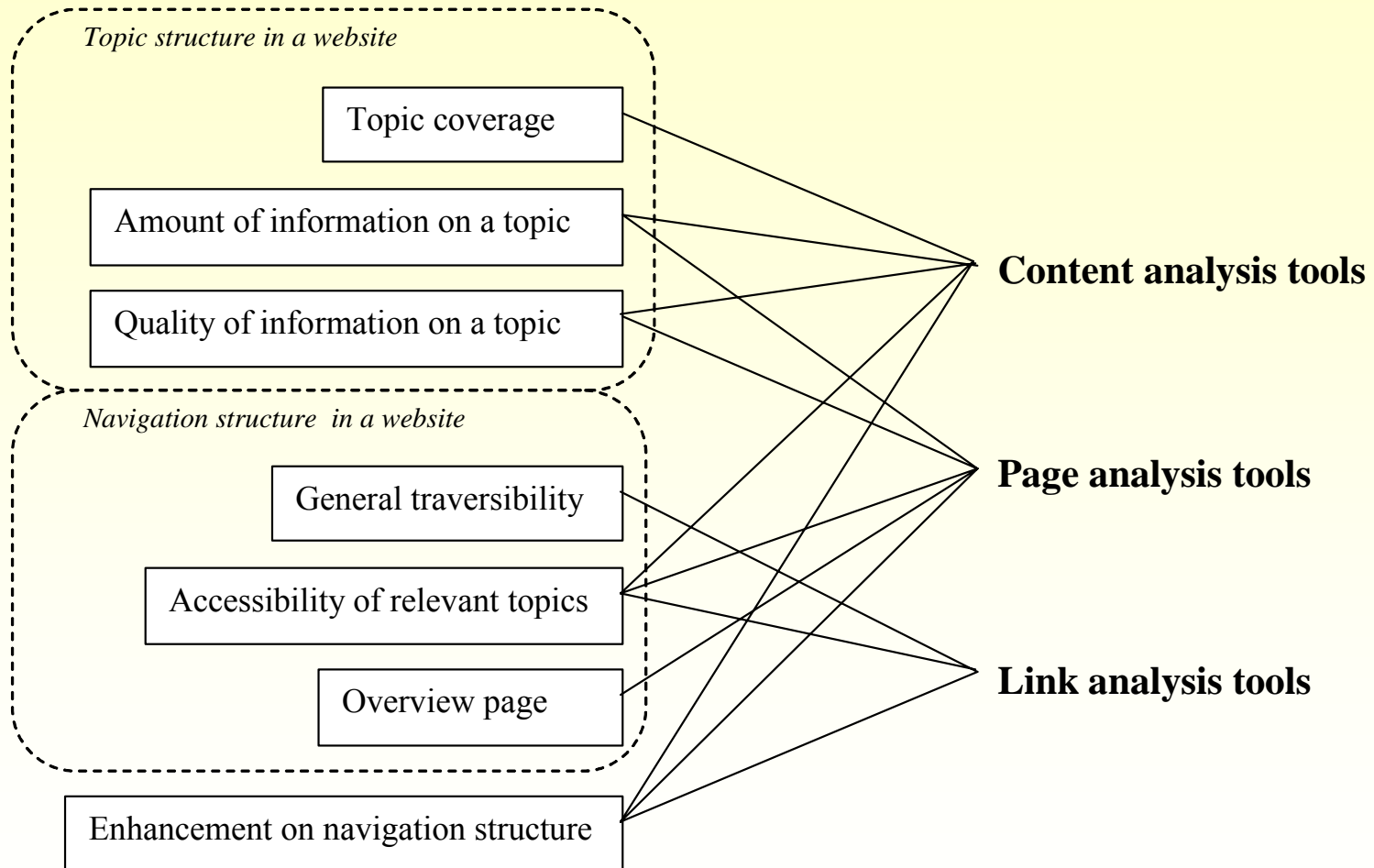
- Seek information → Seek knowledge structure
- Enhance structure exploration in the Query Initiated Navigation
  - Find rich information patches (websites) with good navigation structure
  - Help users navigate through a website

# Finding rich information patches (websites)

- *Structure Exploration Algorithm:*
  - *Step 1. Find websites that hold information about the topic.*
  - *Step 2. For each of such website:*
    - *Step 2.1. Content Analysis*
    - *Step 2.2. Linkage Analysis*
    - *Step 2.3. Page Analysis*
    - *Step 2.4. Calculate a quality score of the website using a utility function based on the topic coverage, network topology and quality of individual pages.*
  - *Step 3. Rank the websites based on the quality score and return the websites with high scores.*

**The challenge: Find an appropriate utility function in a vast function space.**

# Seeking Utility Function – A Toolset



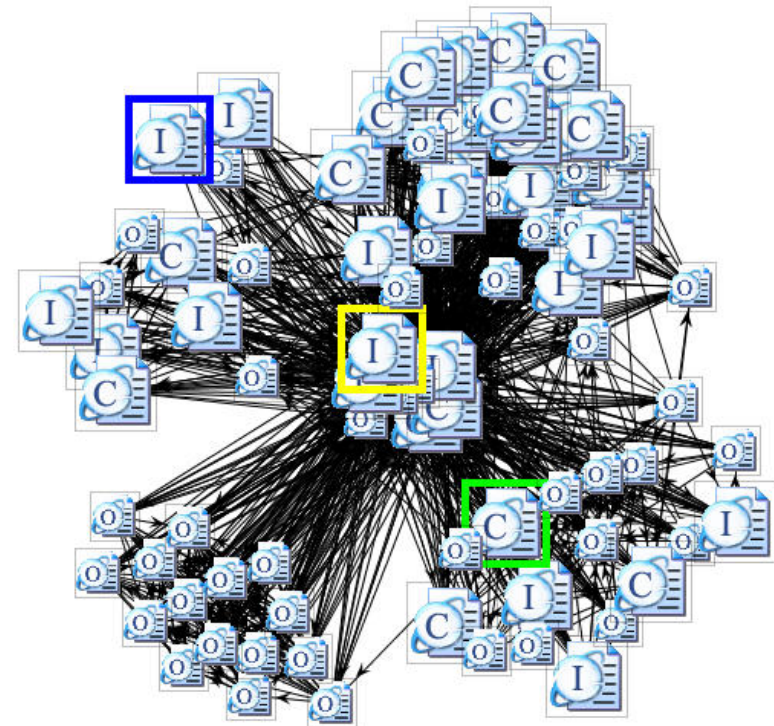
## Content analysis tools

stashtea-agglomerative

ClusteringResult-C:\Program Files\ eclipse-3.1\workspace\CosenV1\topic\_analysis\sw  
ww.stashtea.com-selected\siteinfo

- cluster1 (49, .131, .134): teas tea page leaf print green order blend catalog white
- cluster2 (10, .145, .011): natural compost preparations cow role important starting pick green horn
- 52\_1
  - Bio-Dynamic Preparations
  - Compost Files
  - Cow Horn Preparations
  - Cow Horns and Compost
  - Natural Protection
  - Natural Spraying
  - Starting to Pick
  - Stash Tea: Green Tea - a natural elixir
  - The Important Role of Cows
- cluster3 (88, .139, .023): bed inns breakfast rms map pb mail list inn tea
- cluster4 (11, .204, .013): plants new hillsides rows young machine hills trees care planting
- cluster5 (46, .144, .074): reader time part collection tea stash organic take tour careful
- cluster6 (18, .140, .023): lemon blossom recipe jelly cheese peach cream garlic sour potatoes
- cluster7 (19, .165, .008): wild blackcurrant raspberry sauce recipe ready cream cake cheese dessert
- cluster8 (22, .181, .044): ambootia school tea schools temple shiva community family way view
- cluster9 (26, .121, .019): apple cinnamon recipe mango sparkler cake cheese turkey stuffing sauce
- cluster10 (10, .172, .110): white black yunnan tea special juices ingredients combo flush loose
- cluster11 (14, .178, .030): pops iced recipe chai smoothie fruit tea juice ice bags

## Network analysis tools



## Page analysis tools

# Structured Query and Search

Structured query

**Structured Search Step2**

Main Query:

Search Aspect 1:

Search Aspect 2:

Search Aspect 3:

Search Aspect 4:

Search Aspect 5:

Structured search results

**Cosen System**

Tree Graph Outline

- 0 user folder
- 0 user query
- Query History
- search results
  - tea
    - history - Women's Place in Tea History
    - ceremony - Zen and Leaves: Japanese Tea
    - plantation - Growing Up American Pride: C

**Browser** Map Outline

Save as Bookmark URL: <http://www.stashtea.com/ceremony.htm>

**STASH** HOME SHOP REQUEST A CATALOG VIEW CATALOG DISCOUNTS & CLOSEOUTS  
SITE INDEX ABOUT TEA ABOUT US RECIPES BED & BREAKFAST PROMOTION

## The Japanese Tea Ceremony

SEARCH

stash store

enter keywords

### The Japanese Tea Ceremony

Introduced by Zen Buddhist priests, the Japanese tea ceremony originates from the philosophy that only through Zen meditation can a person achieve enlightenment. Based on the four principles; purity, harmony, respect and tranquility, the tea ceremony, known as chanoyu, is used to teach discipline and instill respect for others. Tea schools in Japan, which are still in existence today, teach the etiquette and art of tea making.

Starting after a traditional Japanese meal, the ceremony can last from three to five hours. Each element in the tea room is carefully selected by the host and is significant in its meaning. In addition to tastefully selected scrolls and flower arrangements, as many as 24 utensils may be used for the tea ceremony.

A small black lacquer container (natsume), contains the Japanese Matcha, a powdered green tea, which is measured out with a special bamboo spoon (chashaku). The Matcha is then mixed with water that is heated to 85°C (185°F), then lightly whisked with a chasen (bamboo whisk) to make a rich, frothy liquor. The tea is served in a china bowl and presented to the guest. The guest turns the bowl three times before it is consumed in three sips. The bowl is then wiped three times with a silk cloth, refilled, and passes on to the next guest.

Questions, comments, and suggestions are always welcome.



# Helps on Website Navigation

## Site Index

### About Tea

**The History of Tea** - From 2737 B.C. through today

**Tea Types** - Black teas, green teas, oolong teas, white teas, herbal teas, and a tea tasting glossary

**Tea - Where it Comes From** - From tea gardens to your cup. A video & slide presentation

**Take an Online Tea Tour** - Visit the Ambootia™ Organic Tea Estate in Darjeeling, India

**Tea FAQ** - Frequently asked questions

**Tea and Health -- The Latest News**. Recently, the prestigious Mayo Clinic conducted a study and discovered that a component in green tea helps to kill leukemia cells.

**The History and Design of Teapots**

**Tea Market Report** - A weekly picture of the world tea market (June 12 to June 16, 2006)

**Stash Tea Recipes** - iced tea, hot tea, cooking with tea, frozen tea pops and more! Over 100 unique and delicious recipes

**Tea Beauty Remedies**

**Tea Quotes** - From Lu Tung to Jean Luc Picard

**You do WHAT with tea?!** Entertaining reading

**A Tea Time Reader** - Short works to read while enjoying your cup of tea

### Stash Tea Catalog Shopping

**Stash Tea Catalog Shopping**

Secure Online Shopping

Order by phone or fax - 24 hours a day, 7 days a week

Order line: 1-800-826-4211 or 1-503-624-1911

Fax: 1-503-684-4424

Browse the internet version of the Winter/Spring 2005 Stash Tea mailorder print catalog

Graphics Version (each catalog page is a web page)

**Text Version** (the whole catalog in one web page)

PDF Version (each catalog page is a pdf file)

PDF Version (the whole catalog in one pdf file - 10MB)

### About Us

**Company History** - from our start in 1972 to the present day

**The Stash Tea Difference** and profiles of our premium teas

**Stash Loose Teas** - in-depth descriptions of our premium full leaf loose teas from Assam Estate Golden-Tipped Black tea, to Zhufeng Green tea - more than 200 teas

**Stash Teas of India** From the high elevation estates of Darjeeling, to the tropical tea gardens of Nilgiri, to Assam - wonderful teas from this exotic land

**Stash Premium Organic Teas** popular tea flavors for consumers who want an organic choice

**Stash Exotica Teas** - An exciting line of rare and exotic teas, in foil wrapped tea bags

**Yamamotoyama 1690** - Nine classic teas of China and Japan. **The FAQ** provides further insight into the teas that have been more than three centuries in the making

**Yamamotoyama Nori Seaweed sheets & snacks** - To get you started we have some easy instructions that show you how to make sushi rolls, and answers to your **Frequently Asked Questions (FAQ)**

**List of Retail Stores** - In your area that carry Stash Tea

**Wholesale orders**

**The Stash Tea Catalog Retail Store**

### Special Offers

\$5.00 off your first order of \$25\* or more

\*Excludes shipping charges

Enter coupon code K6

Order \$50\* or more and receive a surprise gift!

\*Excludes shipping charges

Purchase 3 of the same 100g loose teas and the 4th is FREE (closeouts excluded)

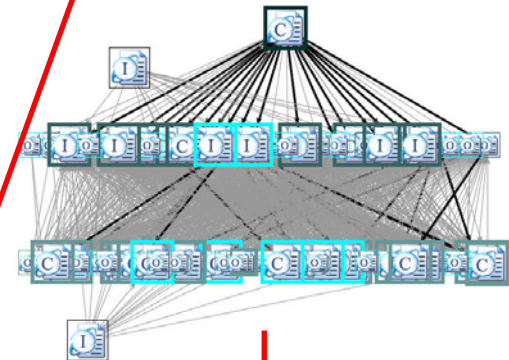
**Easy Gifts** - Include shipping and gift wrapping

**Online Exclusives** - Features many items not available in our print catalog

**Discounts & Closeouts** - Save up to 60% on many great overstock and closeout items!

**Internet Loose Tea Special of the Week** - Try something new and receive a free canister.

**Free night at a BED & BREAKFAST INN with purchase of Stash Tea**



Links with strong  
Information Scent  
are highlighted

Overview of the network  
of relevant pages

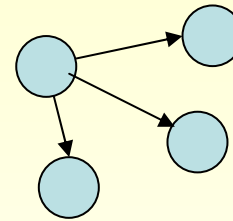
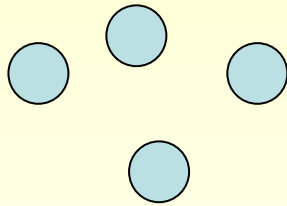


# Future Work

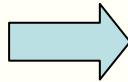
- Explore the website utility function
- User study on the efficiency and effectiveness of the new search mechanism.

# Important Points

Seek information → Seek knowledge structure



Enhance structure exploration in Query Initiated Navigation



Locate good websites

Help navigation

# Thanks!

Yan Qu

[yanqu@umd.edu](mailto:yanqu@umd.edu)

