

A Multi-Source Recommender System for Intelligence Analysis

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Problem



- ***The analytical process relies on effective and efficient information retrieval, yet ...***
 - **Information searches outside of the analyst's primary work thread are often treated as "optional"**
 - **Searches within the analyst's primary work thread are time-consuming**
 - **Human bias may impact the type of information retrieved**
 - **Analysts may not immediately be aware of new sources**
 - **Information delivered too early may not be seen as relevant; information delivered too late may be ignored**

Intelligence analysts would reap substantial benefit from minimally intrusive tools that automatically inform them of relevant information

Background



Junior Analysts stay close to their “comfort zone” but would explore additional information sources if they were made aware of them



Journeyman Analysts use more sources, but would benefit from additional system-directed information search



Senior Analysts know most of the sources but would welcome more automation of common information search and review operations

Result is a gap between current and optimal use of information; our approach can help close some of that gap

Objective



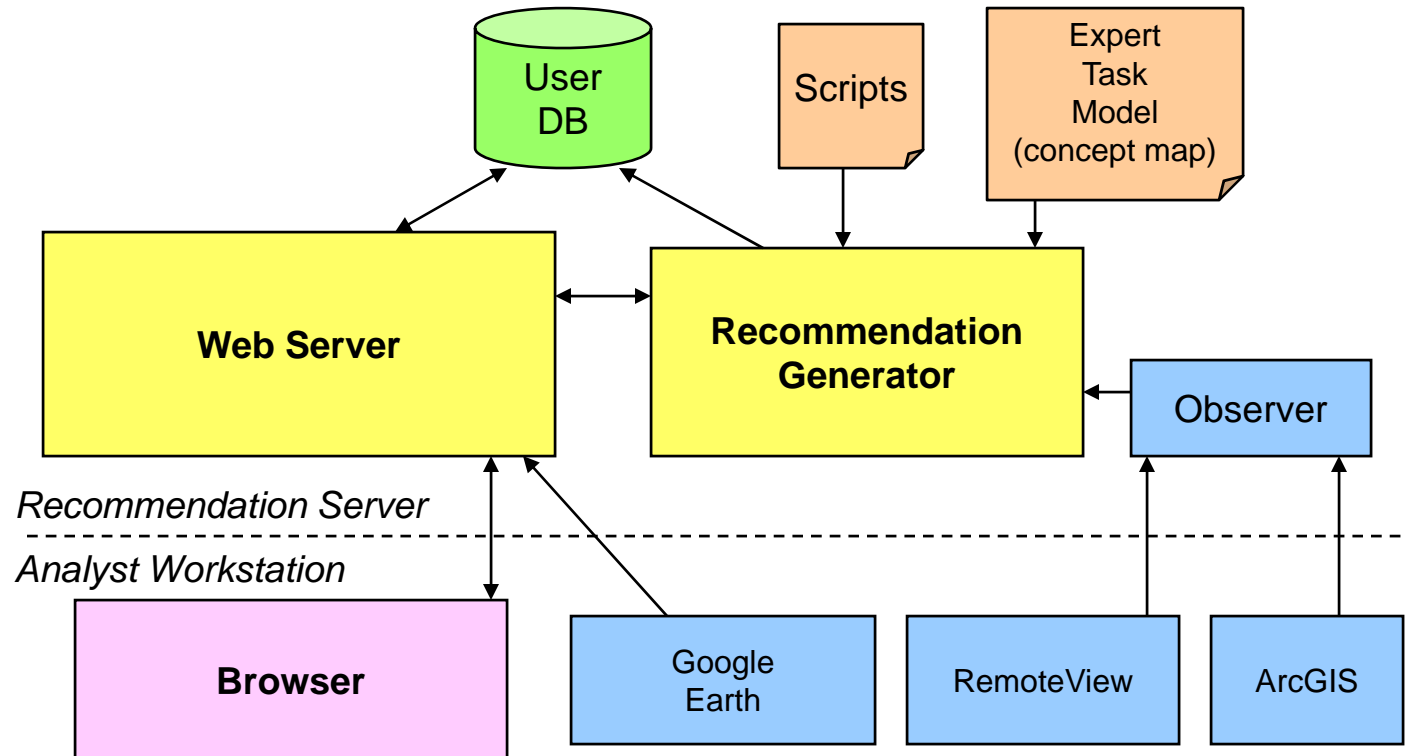
- **Design and Implement a *Task-Oriented, Multi-Source Recommender System* that:**
 - Provides the right information at the right time
 - Provides a more complete set of information
 - Minimizes individual bias
 - Saves the analyst valuable time

Activities



- **Infrastructure demonstration thread**
 - **Demonstration of end-to-end search capability**
 - **Web browser based/AJAX front end**
 - **Script authoring tool for adding data sources**
- **Intelligence analysis threads**
 - **Applicable to real-world analyst tasks**
 - **Makes use of domain-specific concept maps elicited from subject matter experts**

Highlight

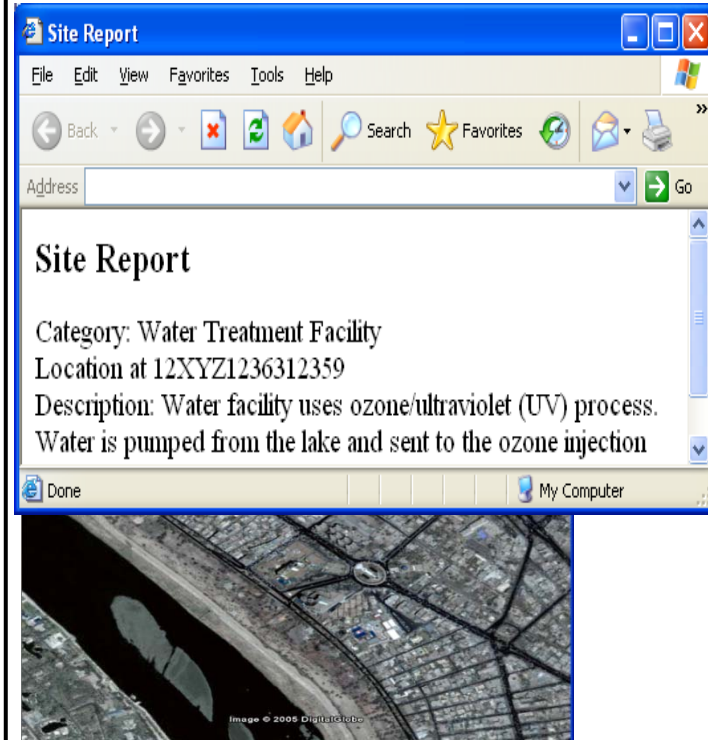


Recommender software architecture

Demonstration

Intelligence Analyst Support: Recommendation Browser

- Operating Task Model is: Intelligence Analyst [Change Task Model](#)
- ArcMap JumpTo operation to 12XYZ1234512345
- Imagery exists for this location: A123B [Add layer to ArcGIS](#)
- Recent Imagery found for this location:
 - 2005 14 June [View](#) [Download](#)
 - 2005 03 May [View](#) [Download](#)
 - 2005 04 Feb [View](#) [Download](#)
- Intelligence Message found referencing this location: EFMN-123456 [View Report](#)
- Reference to EFMN-123456 found: [View Report](#)
- Location Search: Location 12XYZ1236312359
- Search of site locations shows a water treatment facility within 10M of 12XYZ1236312359 [View Report](#) [Display Icon](#)



**User-friendly, non-intrusive
support to analysts**

Impacts



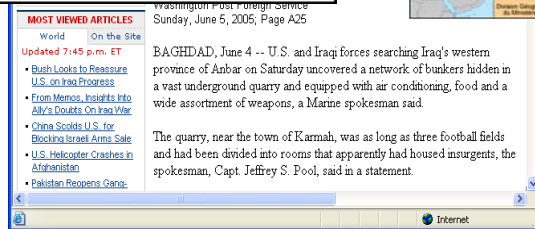
- Initial prototype will have an immediate impact in sponsor environments for high-priority tasks
- Concept of recommendation browser applies broadly to many areas of intelligence analysis
 - May assist in cross-community efforts

Our approach for a task-oriented recommender system is generic and will be applicable to many intelligence and non-intelligence domains

Future Plans

Intelligence Analyst Support: Recommendation Browser

- Operating Task Model is: Intelligence Analyst [Change Task Model](#)
- ArcMap JumpTo operation to 12XYZ1234512345
- Imagery exists for this location: NI38 [layer to ArcGIS](#)
- Recent Imagery found for this location
 - 2005 14 June [View Download](#)
 - 2005 03 May [View Download](#)
 - 2005 04 Feb [View Download](#)
- Intelligence Message found referencing this location: EFMN-123456 [View Report](#)
- Reference to EFMN-123456 found: [View Report](#)
- Location Search: Location 12XYZ1236312359
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Transition the Recommender prototype into customer spaces where it will help make analysts aware of relevant information