Enhancing the Analyst and Decision Maker Through Text Analytics

Presenters:

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Sandia National Laboratories
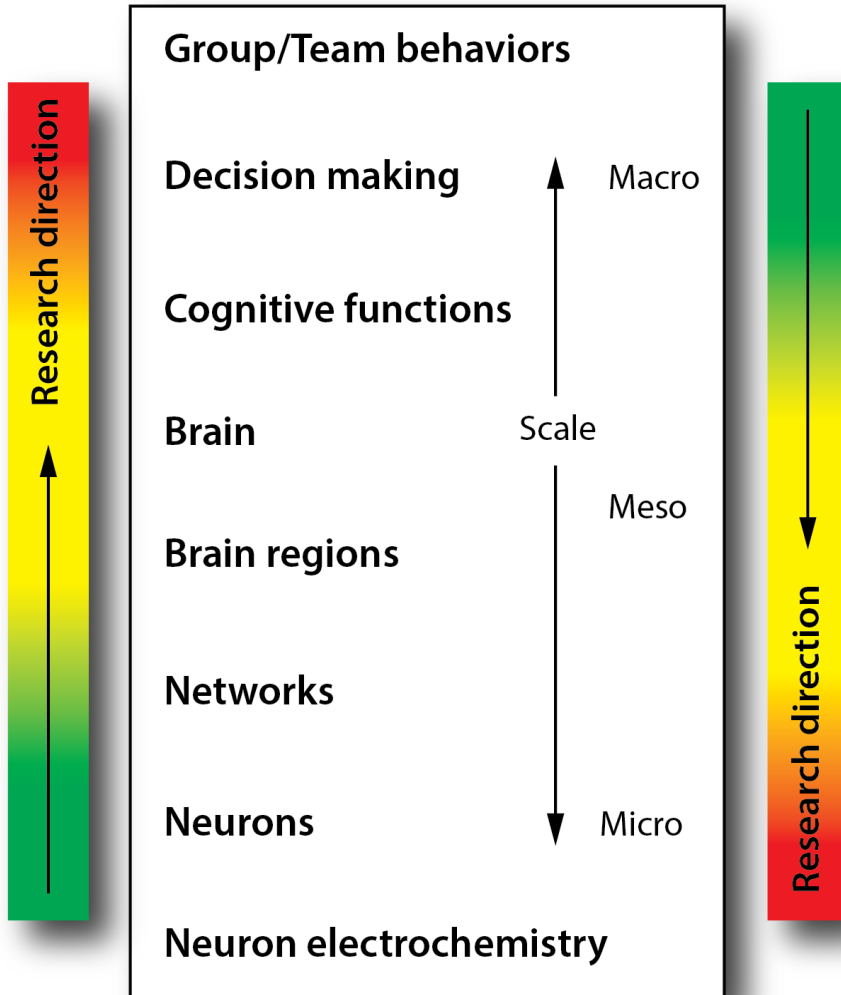
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Purpose of this Talk

1) Cognitive Science Work

2) The Analyst's Challenge

3) How Text Analytics Can Help

4) Huntsmen: Web crawling, text analytics capability

5) Application for National Security

Cognitive Science Program, Sandia National Laboratories
Scope and Purpose

Phenomena range by scale

Research direction (left arrow)

- Group/Team behaviors
- Decision making — Macro
- Cognitive functions
- Brain — Scale
- Brain regions — Meso
- Networks
- Neurons — Micro
- Neuron electrochemistry

Research direction (right arrow)
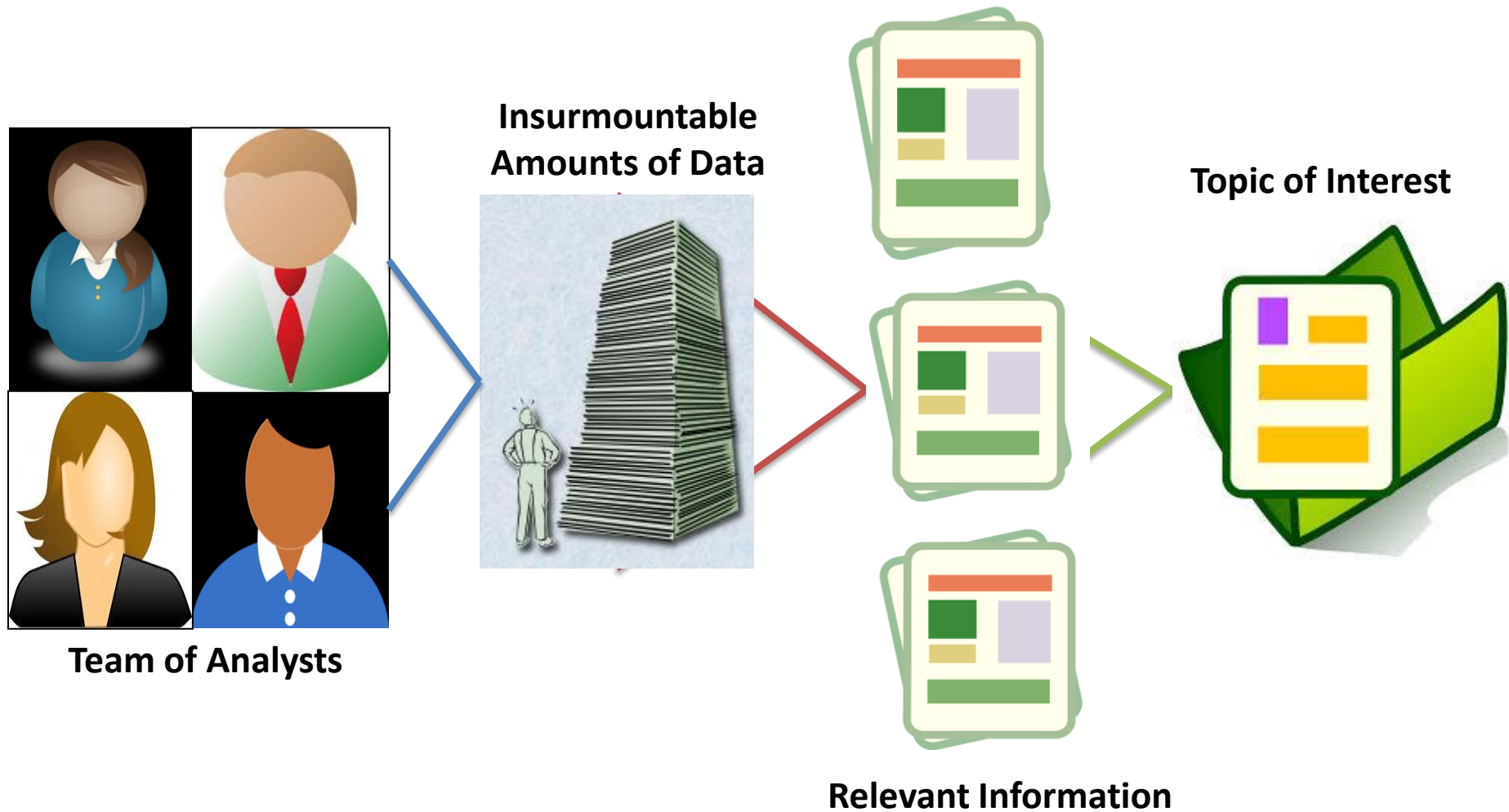
High consequence decision making

Objectives:

- Respond and anticipate national security concerns

- Examine, understand, and enhance human behavior through theory and experimentation

- Leverage psychology, cognitive science, computer science, and neuroscience

- Must predict how and why, using an empirical approach

Areas of Expertise:

- Experimental Psychology
- Software Engineering
- Systems Biology
- Neuroscience
- Statistics
- Human Factors
- Etc.

3

The Analyst's Challenge

Team of Analysts

Insurmountable Amounts of Data

Relevant Information

Topic of Interest

The Analyst's Challenge

Human as the Analyst

- Inconsistent
- Biased
- Large amounts of time
- Unable to sort all the data

With Multiple Analysts

- Various strategies for finding information
- High labor costs
- Different experiences and perspectives for what's important
- Overlap across material covered

We need to Enhance Human Analysts

The human in the loop is critical

- Intuitive

- Calculate options

- Connect data to solutions

- Decision-maker

Need to reduce amount of data and cognitive load to increase effectiveness, accuracy, and speed.

How Text Analytics Can Help

Imitates & Enhances Human Analysts

- Uses text algorithms for consistent metrics

- Unbiased

- Rapid and parallel

- Returns the best matched information relative to all the data searched

- Allows for human analysts to validate findings

Why Don't Search Engines Work?

Single metric (result rank) to ascertain quality of a result
- Do you really think that's enough?
- How do you know that your multi-dimensional parameters are being satisfied by this metric?
- Reasoning for ranking completely hidden from the user
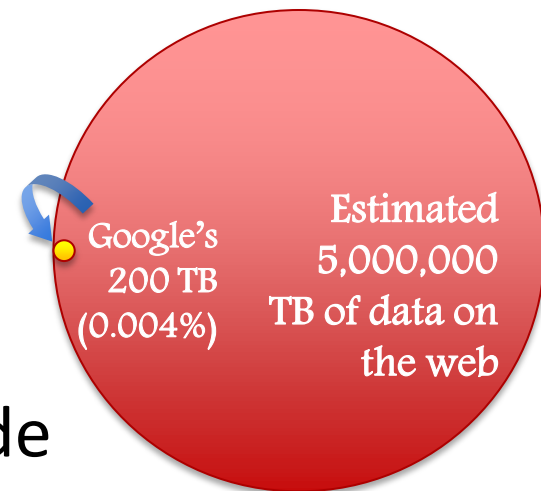
Why Don't Search Engines Work?

Search engines transform results according to:

– Your location

– Your personality

– Global or local trends

– SEO manipulation by 3rd parties

Results dependent on the parameterization of the search engines' crawlers

– Search engines make tradeoffs to crawl/index less to save money

Size of the internet already has made effective indexing infeasible

Google's 200 TB (0.004%)

Estimated 5,000,000 TB of data on the web

http://www.webanalyticsworld.net/2010/11/google-indexes-only-0004-of-all-data-on.html

Huntsman

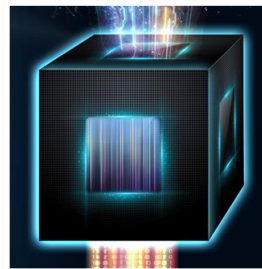*HUNTSMAN was designed to enhance the power of search engines with an INTELLIGENT AGENT capable of screening for relevant content and TARGETING YOUR SEARCH using a thoroughly parameterized topic space.*

Intelligent

Targeted

Scalable

Huntsman's Solution
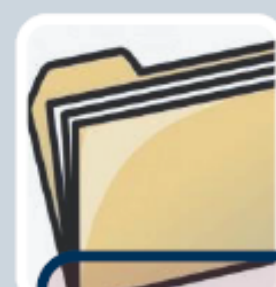

Huntsman's Solution

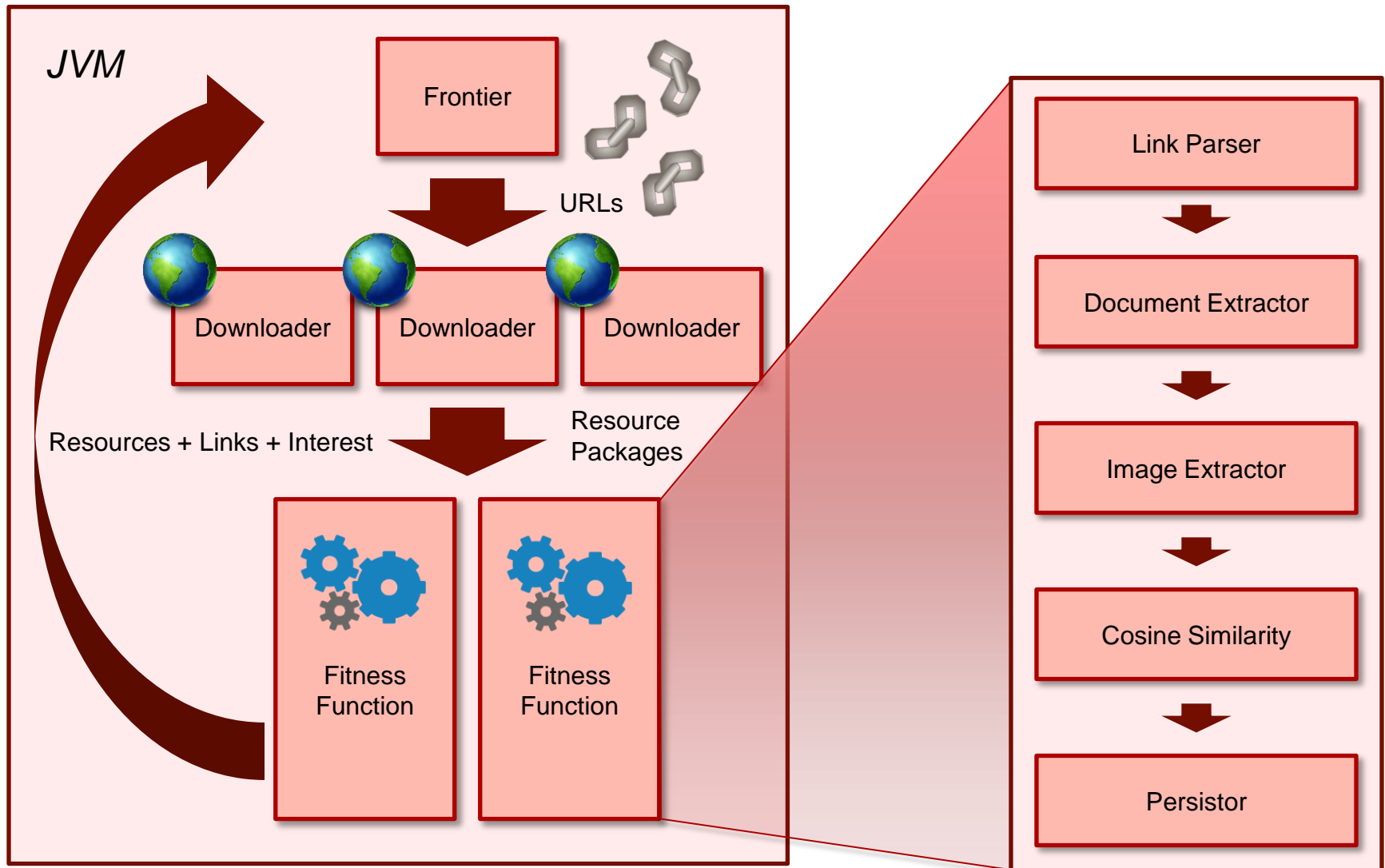**Submits queries to search engines and assesses relevance** → **Analyzes full-page content with text analytics** → **Submits additional queries based on results of analyses** → **Provides subsections of relevant data to analyst**

Huntsman saves the analyst time and reduces cognitive burden by focusing only on the most useful information at hand.

Huntsman: Under the Hood

Application to National Security

The use of Huntsman, and the Cognitive Science Program at large, applies to enabling informed decision-making
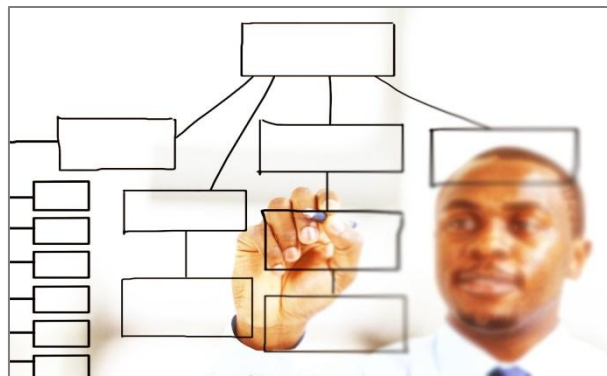
➢ **High-Consequence Decision-Making**

➢ **Field Operations**

➢ **Social Modeling**

➢ **Business Analysis**

➢ **Basic/Applied Research**

➢ **Cyber Security**

Many thanks
Questions & Comments

Contact Us

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