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The Premier Software and Product Delivery Event



Preparing *Watson* for the Jeopardy! Challenge

David Shepler
Jeopardy! Challenge Program Manager

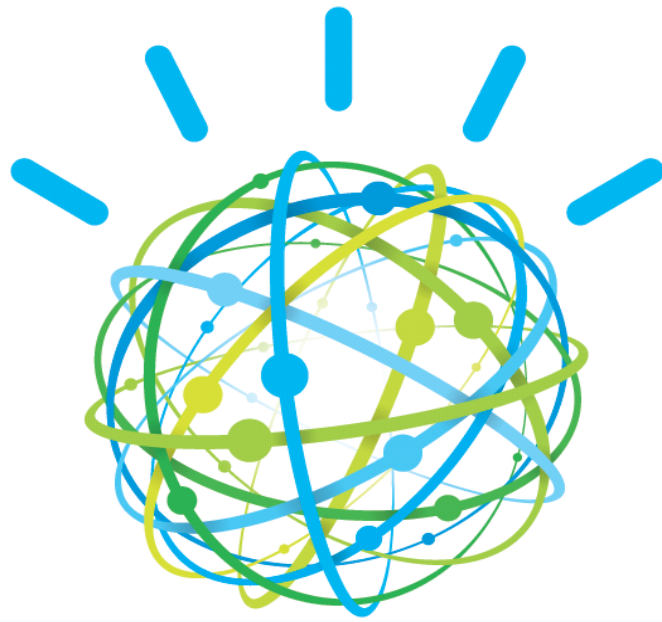


The Jeopardy! Exhibition marked a milestone in the long-standing AI challenge of automatic open-domain question-answering



Final Score:	\$ 24,000	\$ 77,147	\$ 21,600
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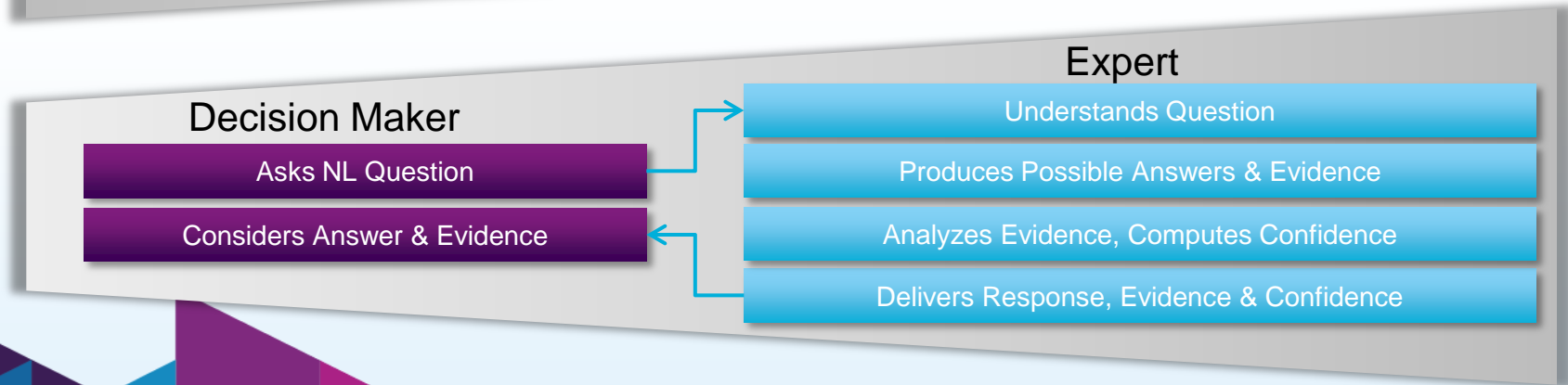
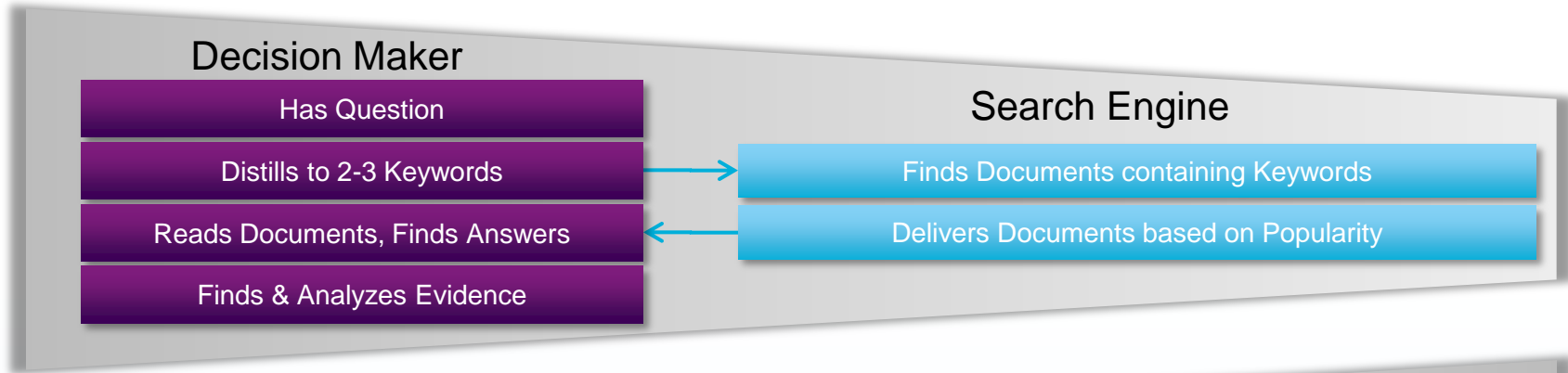


How many software engineers does
it take to change a light bulb?

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Informed Decision Making: Search vs. Expert Q&A



Want to Play Chess or Just Chat?

Chess

- A finite, mathematically well-defined search space
- Limited number of moves and states
- All the symbols are completely grounded in the mathematical rules of the game

Human Language

- Highly ambiguous, contextual, implicit
- Words navigate, align and communicate an infinite space of intended meaning
- Computers can **not** ground words to human experiences to derive meaning



Easy Questions?

$$\ln((12,546,798 * \pi)) ^ 2 / 34,567.46 = \mathbf{0.00885}$$

Select *Payment* where *Owner*="David Jones" and *Type(Product)*="Laptop",

Owner	Serial Number
David Jones	45322190-AK

Serial Number	Type	Invoice #
45322190-AK	LapTop	INV10895

Invoice #	Vendor	Payment
INV10895	MyBuy	\$104.56

David Jones
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
David Jones

=

Dave Jones
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
David Jones

≠

Hard Questions?

Computer programs are natively **explicit, fast** and exacting in their calculation over numbers and symbols....But **Natural Language** is implicit, highly contextual, ambiguous and often imprecise.

Person	Birth Place
A. Einstein	ULM

Structured

Unstructured

- Where was X born?

One day, from among his city views of Ulm, Otto chose a water color to send to Albert Einstein as a remembrance of Einstein's birthplace.

Person	Organization
J. Welch	GE

- X ran this?

If leadership is an art then surely Jack Welch has proved himself a master painter during his tenure at GE.

The Jeopardy! Challenge:

A compelling and notable way to **drive** and **measure** the technology of **automatic Question Answering** along 5 Key Dimensions

Broad/Open Domain

Complex Language

High Precision

Accurate Confidence

High Speed

\$200

If you're standing, it's the direction you should look to check out the wainscoting.

What is down?

\$2000

Of the 4 countries in the world that the U.S. does not have diplomatic relations with, the one that's farthest north

What is North Korea?

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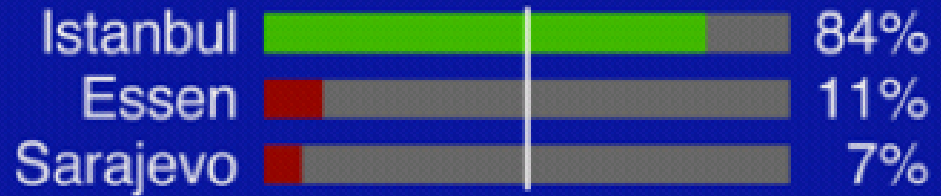
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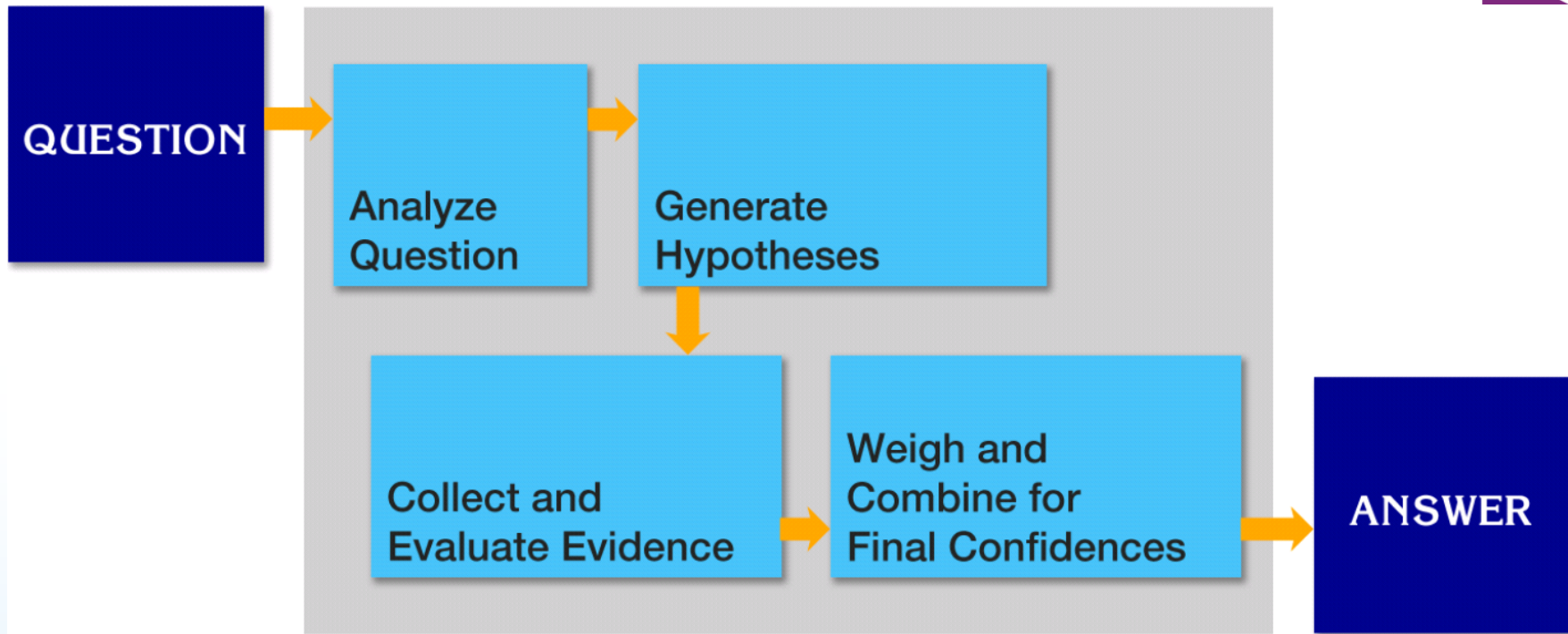


0 GODS	WINE, WHITE WINE	EU, THE EUROPEAN UNION	CLASSIC LITERATURE	MEDICINE	WORLD POTPOURRI
\$200	\$200	\$200	\$200	\$200	\$200
\$400	\$400	\$400	\$400	\$400	\$400
\$600	\$600	\$600	\$600	\$600	\$600
\$800	\$800	\$800	\$800	\$800	\$800
\$1000	\$1000	\$1000	\$1000	\$1000	\$1000

EACH YEAR THE EU
SELECTS CAPITALS OF
CULTURE; ONE OF THE 2010
CITIES WAS THIS TURKISH
"MEETING PLACE OF
CULTURES"

WHAT IS ISTANBUL? ✓





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OF CULTURES"

Analyze
Question

Generate
Hypotheses

Collect and
Evaluate Evidence

Weigh and
Combine for
Final Confidences

ANSWER



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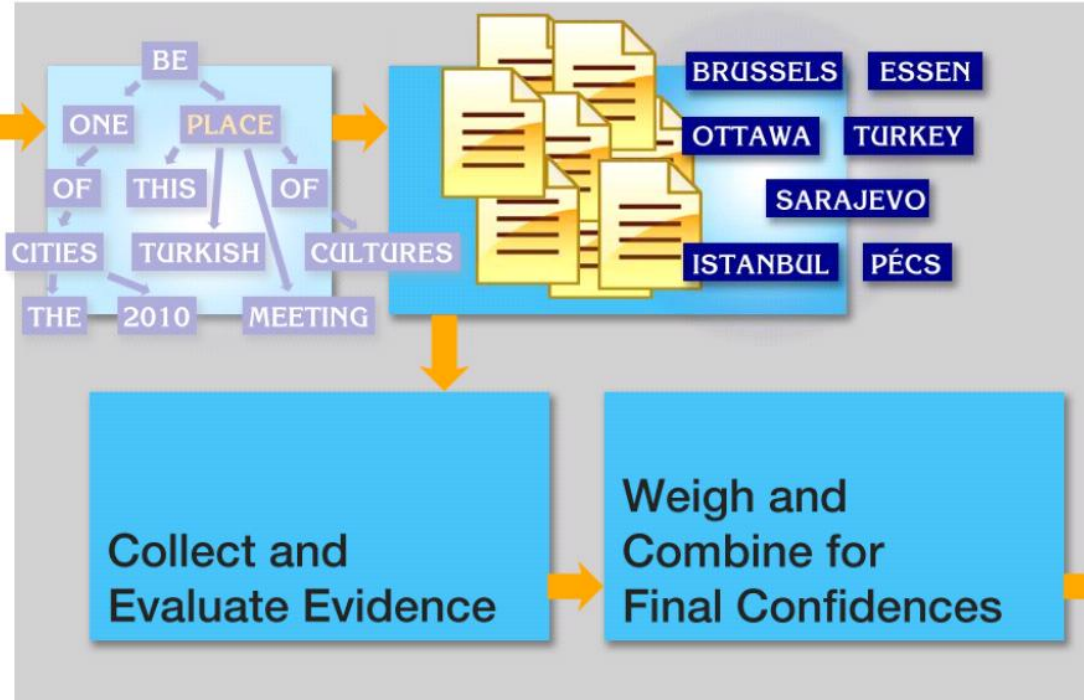
ANSWER



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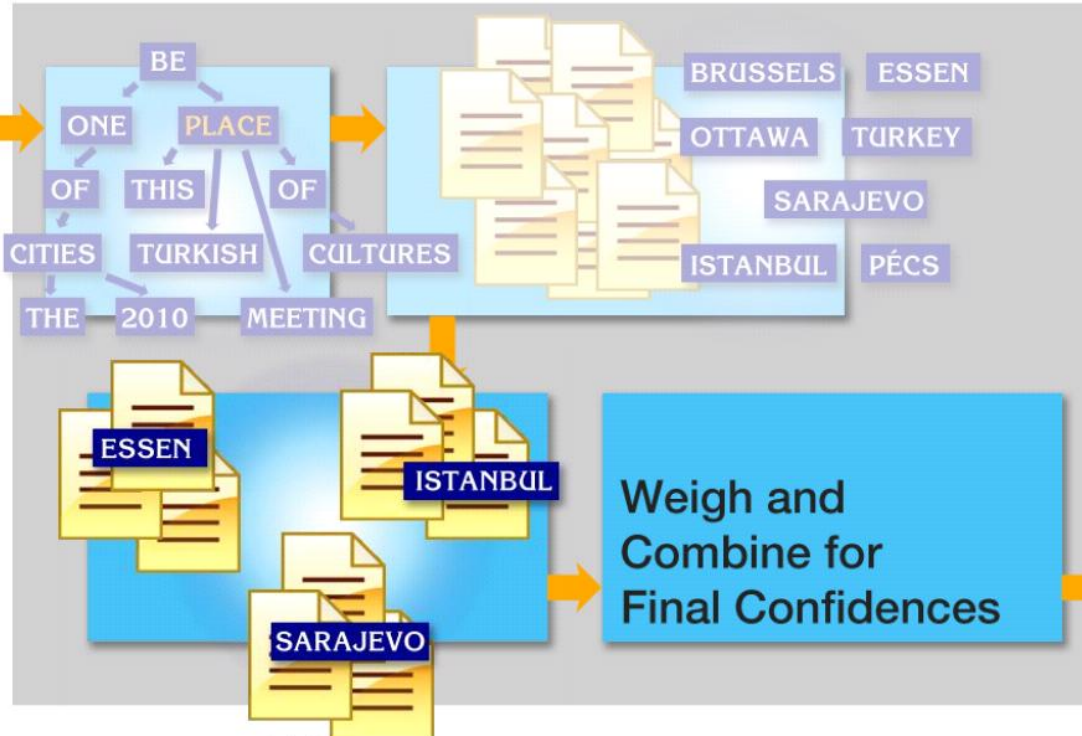
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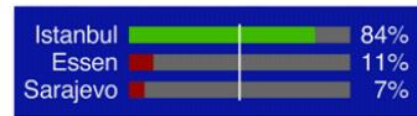
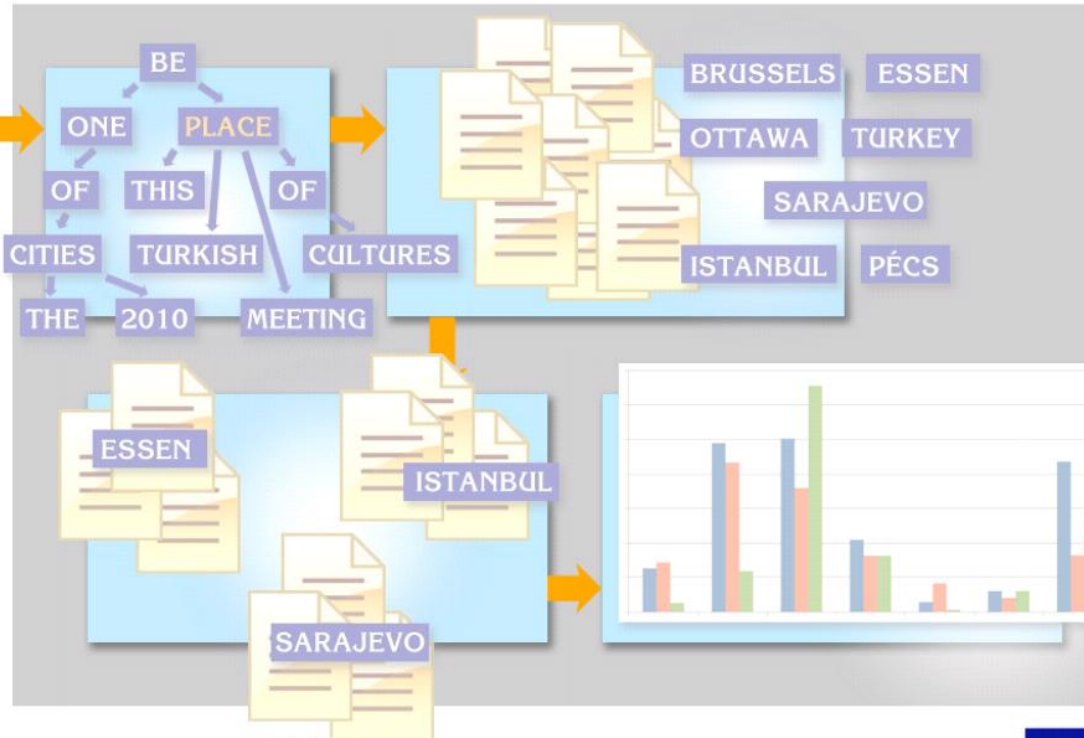
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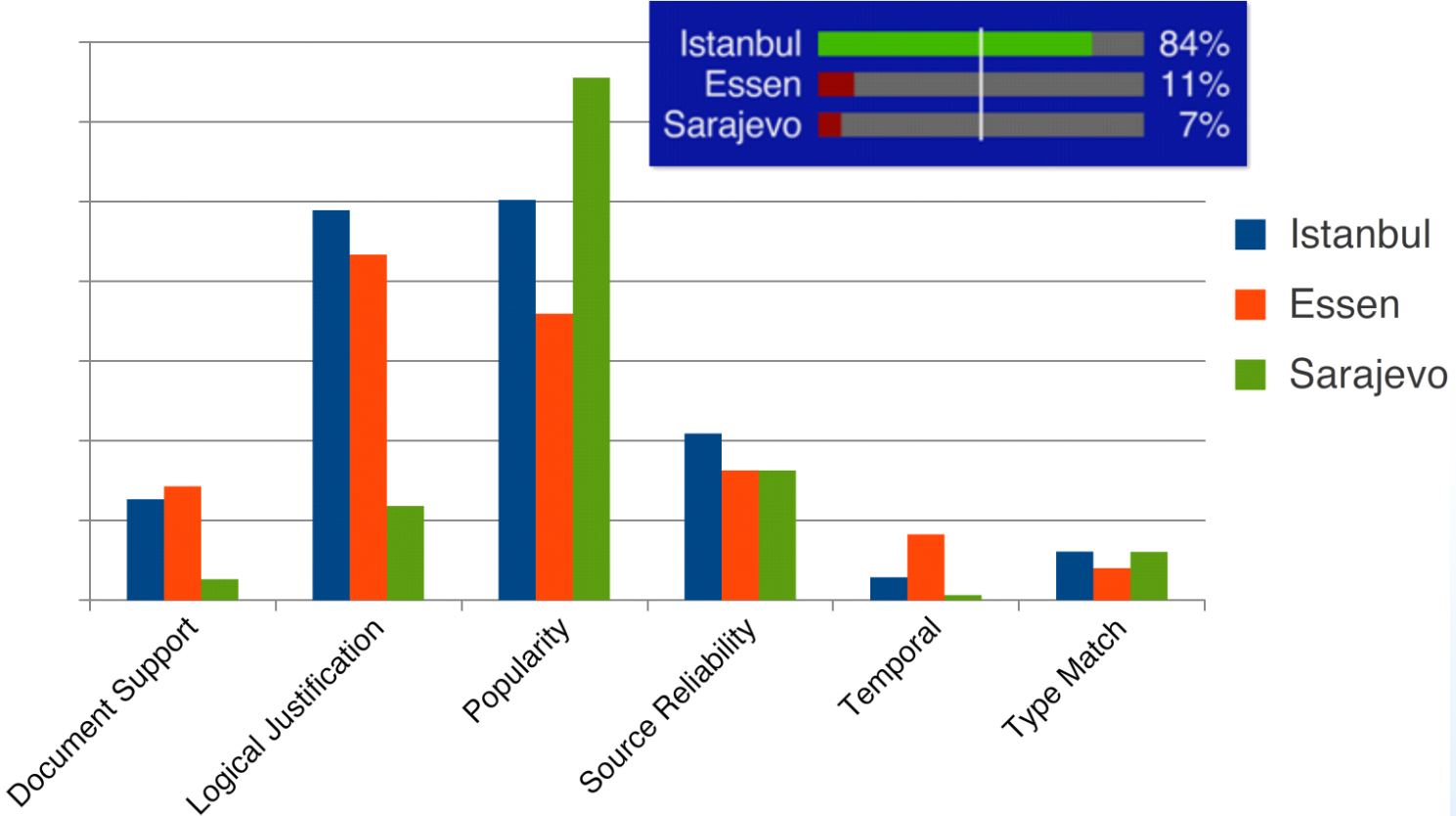


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Potential Business Applications

- **Healthcare / Life Sciences**
Diagnostic Assistance, Evidenced-Based, and Collaborative Medicine
- **Tech Support**
Help-desk, and Contact Centers
- **Enterprise Knowledge Management and Business Intelligence**
- **Government**
Improved Information Sharing and Security



DeepQA in Continuous Evidence-Based Diagnostic Analysis



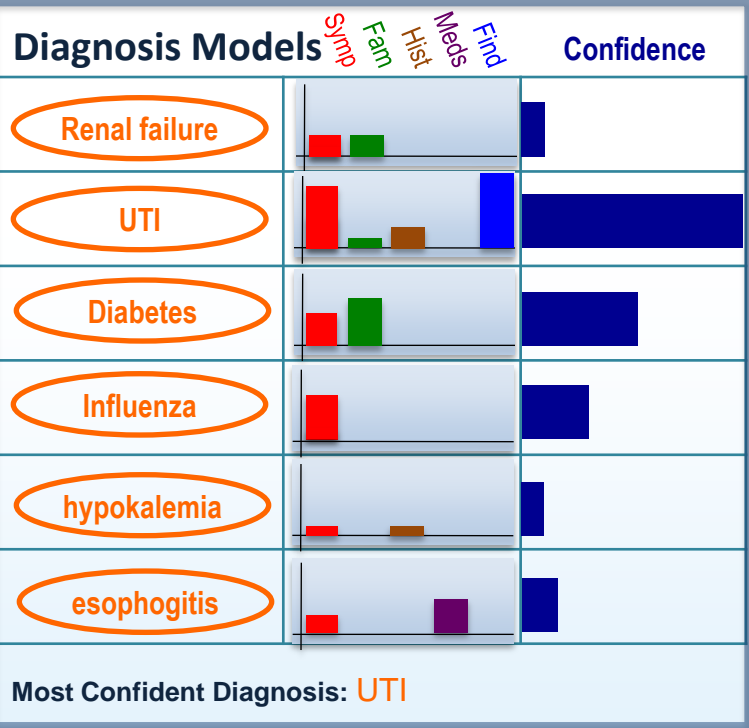
Symptoms

Family History
Patient History
Medications
Tests/Findings

Notes/Hypotheses

Huge Volumes of
Texts, Journals,
References, DBs etc.

Considers and synthesizes a broad range of evidence
improving quality, reducing cost



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