Using Artificial Intelligence to Enhance Research

Ray Shan, October 2017
The Problem

Transform information into knowledge
The Solution - AI as Ontology

- Add order to huge amount of data
- Encode structure we can mutually agree upon
- Define how a set of entities relate to each other
- Coalesce dispersed knowledge into a singular answer
“AI is the new electricity.”

–Andrew Ng, AI at Stanford, Google and Baidu
The Solution

Transforming information to knowledge using Yewno AI technology

- Machine Learning
- Computational Linguistics
- Graph Analytics
The Yewno Story

Applied mathematics and econophysics research focusing on complex systems, multi-scaling modeling and graph theory.

Moleculer repurposing via analyzing 23 million scientific journal articles.

Built an inference and discovery engine aimed at creating a new way of finding data for its research community. Extracted knowledge graph against Stanford’s centuries of unstructured and multidisciplinary data.

Silicon Valley based startup focusing on knowledge discovery and analytics.

Provides an innovative platform based on computational linguistics and deep learning algorithms.

Able to quantify semantics, i.e. convert large corpus of text into structured data.
Discoverable Content
Concept / Topic Extraction

Quickly understand huge volume of dense, scholarly content.

120M scholarly documents

{ machine learning and computational linguistics models }

{ Chronic condition
  Ontology
  Overdiagnosis
  Pulmonary hypertension
  National Institutes of Health }
Concept / Topic Extraction

Concepts are uniform across domain, time and language

Unit of knowledge for apple

苹果
apple
apfel
Concept / Topic Extraction

Can be used to answer these questions:

• What percentage of a publisher's content discusses chemistry, and how has this changed over time?

• Which authors discuss robot-assisted surgery, even outside of biomedical field?

• What is Chapter 4 of a book about?
Knowledge Graph

The Yewno knowledge graph consists of tens of millions of entities as extracted concepts. We perform graph analytics to enable search, exploration and anomaly detection.
Knowledge Graph - Uses
Inference / Summarization

By identifying relationships and analyzing concepts' surrounding context, we can extract known connections and draw inferences.

We use these techniques to summarize longer content into digestible chunks and help users quickly understand relationships.

“chocolate may help prevent heart disease”

Chocolate  Cardiovascular Disease

A  B  C
Search Quality - Input Disambiguation
Search Quality - Challenging Keywords
Demo & Q&A
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DEFINITIONS

Artificial intelligence (AI), the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellec...

Theory and development of COMPUTER SYSTEMS which perform tasks that normally require human intelligence. Such tasks may include speech recognition, LEARNING, VISUAL PERCEPTION, MATHEMATICAL COMPUTING,
Strategic Alliance with Competitors in the Electric Vehicle Market: Tesla Motor’s Case

Published in 2015

What is the Right R&D Strategy for Overcoming the Difficulties of the South Korean IT Industry?

Published in 2018
Gloriana (novel)

Gloriana, or The Unfulfill'd Queen is an award-winning work of literary fantasy by British novelist Michael Moorcock. It was first published in 1978 (London: Allison & Busby) and has...

Seven Seas to Calais

Seven Seas to Calais (Italian: Il dominatore dei sette mari) is a 1962 Italian adventure film by Eastmancolor in CinemaScope, directed by Rudolph Mate (his final film) and Primo Zenlio. It...

Shakespeare's influence

Shakespeare's influence extends from theatre and literature to present-day movies, Western philosophy, and the English language itself. William...

RELEVANT SNIPPET

While optimization has a long-standing research foundation in control theory, decision theory, risk analysis, and many other fields, it has specific meanings in terms of machine intelligence research: learning to make better choices to maximize some kind of utility function over time to achieve goals. Extensive research efforts have suggested that ADP is the core methodology, or “the only general-purpose way to learn to approximate the optimal strategy of action in the general case” (Werbos, 2004, 2009). Of course, I would also like to note that many of the aforementioned fields THE MACHINE INTELLIGENCE RESEARCH 3 are strongly connected with each other. For instance, ADP/Rl approaches can be “embodied” (e.g., coupled with sensory-motor coordination with active interaction with the external environment) or built in a hierarchical way for effective goal-oriented multistage learning, prediction, and optimization (Werbos, 2009).