



Deep Sea Con 9/7/2021

SEMANTIC SEARCH

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Bill Slawski  @bill_slawski · Feb 10, 2019



In web crawling, a node is a page, and an edge is a link between pages; in data crawling, a node is an entity, and an edge is a relationship between entities. It's an evolution in thinking about the web.

 11

 107

 276



Sergey Brin Filed Google's 2nd Patent after PageRank on Semantic SEO

Information extraction from a database

Abstract

Techniques for extracting information from a database are provided. A database such as the Web is searched for occurrences of tuples of information. The occurrences of the tuples of information that were found in the database are analyzed to identify a pattern in which the tuples of information were stored. Additional tuples of information can then be extracted from the database utilizing the pattern. This process can be repeated with the additional tuples of information, if desired.

DUAL ITERATIVE PATTERN RELATION EXPANSION (DIPRE)

Isaac Asimov The Robots of Dawn

David Brin Startide Rising

James Gleick Chaos: Making a New Science

Charles Dickens Great Expectations

William Shakespeare The Comedy of Errors

Rich Results at Google Started Out with Rich Book Results

[RICH RESULTS RELEVANT TO USER SEARCH QUERIES](#)

Methods, systems, and apparatus, including computer programs encoded on computer storage media, for triggering rich results in response to queries. In one aspect, a method includes receiving a query. One or more search results are obtained from a first corpus. A rich result is triggered based on a score of the first-ranked search result if it meets a threshold relative to other search results. The rich result is populated with additional metadata about the first-ranked search result obtained from a second corpus. The rich result is provided in response to the query.

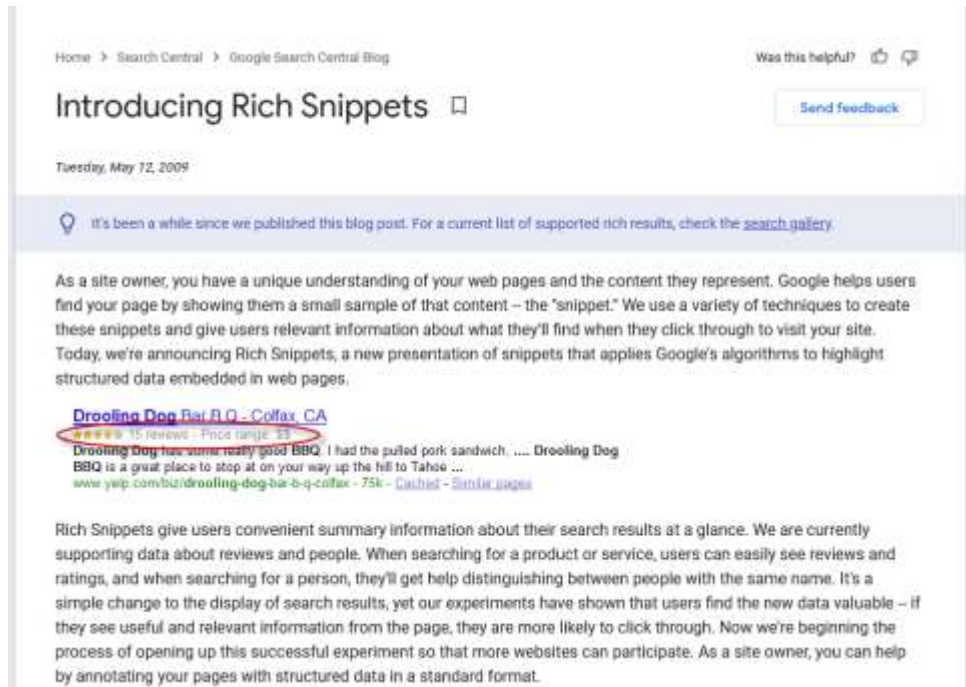
3RD VERSION OF THIS PATENT

1st Version: November 5, 2013 – [Rich results relevant to user search queries for books](#)

2nd Version: July 28, 2015 – [Rich results relevant to user search queries for books](#)

3rd Version: December 17, 2019 - [Rich results relevant to user search queries](#)

Google Blog Post from 2009 on Rich Results



Home > Search Central > Google Search Central Blog

Was this helpful?

Introducing Rich Snippets

Send feedback

Tuesday, May 12, 2009

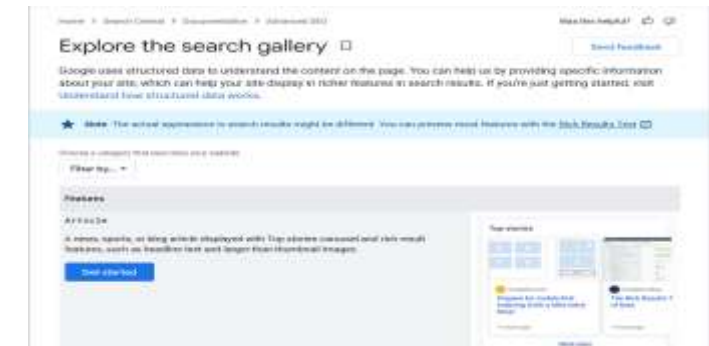
It's been a while since we published this blog post. For a current list of supported rich results, check the [search gallery](#).

As a site owner, you have a unique understanding of your web pages and the content they represent. Google helps users find your page by showing them a small sample of that content – the “snippet.” We use a variety of techniques to create these snippets and give users relevant information about what they’ll find when they click through to visit your site. Today, we’re announcing Rich Snippets, a new presentation of snippets that applies Google’s algorithms to highlight structured data embedded in web pages.

Drooling Dog Bar B Q - Colfax, CA
★★★★ 15 reviews - Food range: \$3
Drooling Dog has some really good BBQ. I had the pulled pork sandwich. Drooling Dog BBQ is a great place to stop at on your way up the hill to Tahoe ...
[www.yelp.com/biz/drooling-dog-bar-b-q-colfax - 75k - Cached - Similar pages](#)

Rich Snippets give users convenient summary information about their search results at a glance. We are currently supporting data about reviews and people. When searching for a product or service, users can easily see reviews and ratings, and when searching for a person, they’ll get help distinguishing between people with the same name. It’s a simple change to the display of search results, yet our experiments have shown that users find the new data valuable – if they see useful and relevant information from the page, they are more likely to click through. Now we’re beginning the process of opening up this successful experiment so that more websites can participate. As a site owner, you can help by annotating your pages with structured data in a standard format.

Look to the Google Developer Pages to understand how Google wants to see Schema on pages to provide rich results in SERPs - <https://developers.google.com/search/docs/advanced/structured-data/search-gallery>



Home > Search Central > Search Central > Advanced SERP

Explore the search gallery

Send feedback

Google uses structured data to understand the content on the page. You can help us by providing specific information about your site, which can help your site display a richer results at search results. If you're just getting started, our structured data wizard can help.

★ **idea** - The actual appearance to search results might be different. You can preview your changes with the [Rich Results Test](#)

Filter by...

Features

App data

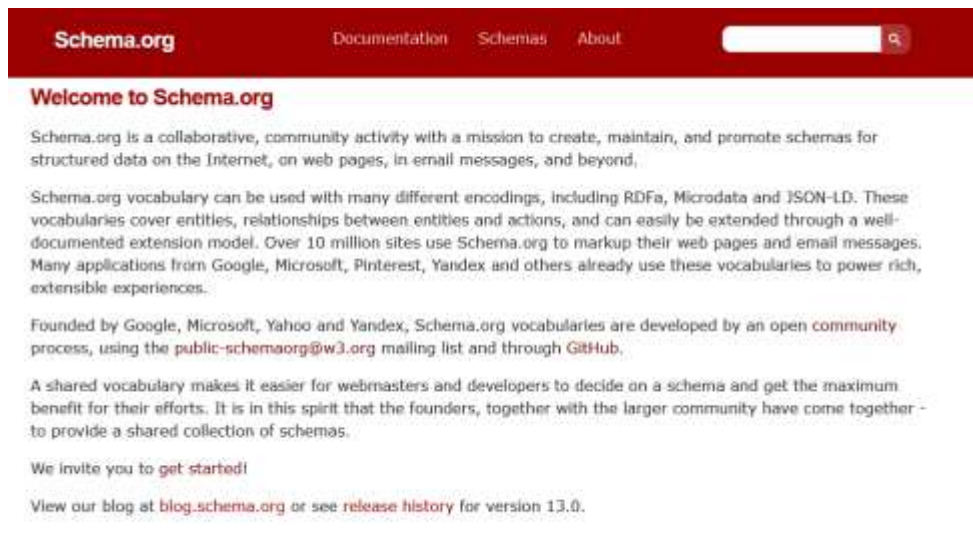
A news article, or blog article displayed with top stories (vertical) and rich result buttons, such as featured text and larger than standard images.

[View examples](#)

[Test structured data](#)

[View the Rich Results Test](#)

Google Schema - 2009



The screenshot shows the Schema.org website homepage. At the top, there is a dark red navigation bar with the text "Schema.org" on the left and "Documentation Schemas About" on the right, followed by a search input field. Below the navigation bar, the heading "Welcome to Schema.org" is displayed. The main content area contains several paragraphs of text describing the project's mission, the use of Schema.org vocabularies, and information about the community and founding organizations. At the bottom of the page, there are links for "Terms and conditions" and "Help" (partially visible).

Subscribe to the Schema.org mailing list:

<https://lists.w3.org/Archives/Public/public-schemaorg/>



The screenshot shows the "public-schemaorg@w3.org Mail Archives" page. At the top, there are links for "W3C home", "Mailing lists", and "Public". The main heading is "public-schemaorg@w3.org Mail Archives". Below this, there is a brief description of the mailing list and several links for "About this list", "Index by category", "Index by month", "Index by author", "Index by subject", "Mailbox format", "RSS", "Mail actions", "Subscribe to this list", and "Unsubscribe from this list". A search bar is present with the text "Search this list for:" and a "Search" button. Below the search bar is a table with columns for "period", "re-sorted", and "messages". The table lists messages from August 2001 to September 2010, with the number of messages for each period.

period	re-sorted	messages
August 2001	by thread by author by subject	5
July 2001	by thread by author by subject	5
June 2001	by thread by author by subject	6
May 2001	by thread by author by subject	5
April 2001	by thread by author by subject	15
March 2001	by thread by author by subject	5
February 2001	by thread by author by subject	20
January 2001	by thread by author by subject	2
December 2000	by thread by author by subject	6
November 2000	by thread by author by subject	15
October 2000	by thread by author by subject	26
September 2000	by thread by author by subject	14
August 2000	by thread by author by subject	19
July 2000	by thread by author by subject	19
June 2000	by thread by author by subject	44
May 2000	by thread by author by subject	35
April 2000	by thread by author by subject	34
March 2000	by thread by author by subject	34
February 2000	by thread by author by subject	23
January 2000	by thread by author by subject	10
December 2010	by thread by author by subject	8
November 2010	by thread by author by subject	15
October 2010	by thread by author by subject	45
September 2010	by thread by author by subject	7



AUGMENTED SEARCH RESULTS & KNOWLEDGE



Location: Paris, France

Height: 1,063 feet (324 m)

Completed: 1889

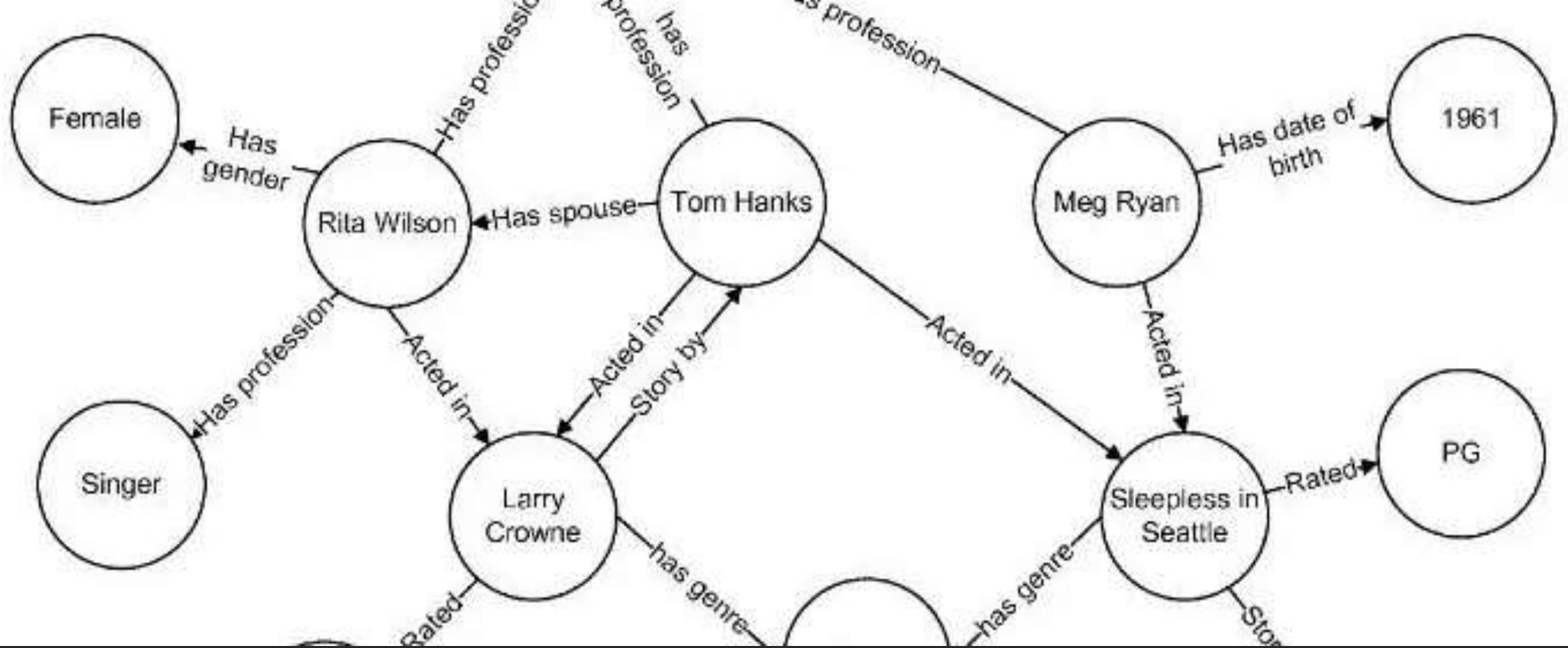
Scientific name: Panthera leo

Weight: 350-400 lbs



Google Knowledge Graph

Includes information about people, places, and things as real world entities.



Knowledge = Relationships

Edges between Entities indicate how they are connected to each other, which makes a knowledge graph into a graph

Google Looks for Entities in Queries

SMX WEST 2016 - HOW GOOGLE WORKS: A GOOGLE RANKING ENGINEER'S STORY

BY PAUL HAAHR

I HAVE WRITTEN AROUND A COZEN PATENTS FROM PAUL HAAHR AT SEOBYTHESEA.COM.

HERE HE STATES THAT GOOGLE LOOKS FOR ENTITIES IN ALL QUERIES THESE DAYS.



[Propagating useful information among related web pages, such as web pages of a website](#)
Invented by Daniel Egnor, Paul Haahr, Kevin Lacker, John Lamping, Amitabh K. Singhal, and Ke Yang
US Patent Application 20070233808
Published October 4, 2007
Filed: March 31, 2006

Knowledge Results Are Filling SERPs

AUGMENTED SEARCH QUERIES USING KNOWLEDGE GRAPH INFORMATION

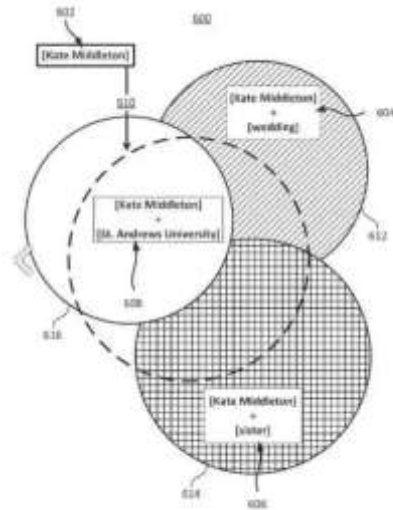


FIG. 6

PROVIDING SEARCH RESULTS USING AUGMENTED SEARCH QUERIES

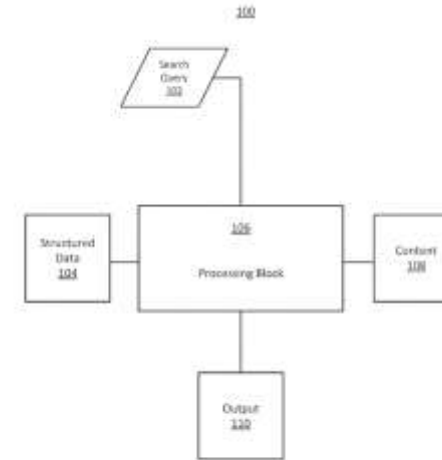


FIG. 1

In Response to a Query, Google May generate a knowledge Graph to Answer Questions with

[GENERATING RANKED LISTS OF ENTITIES](#)

Inventors: Toshiaki Fujiki, Slaven Bilac, Kavi J. Goel, Shuhei Takahashi, Tomohiko Kimura
Assignee: Google LLC
US Patent: 10,691,702
Granted: June 23, 2020
Filed: August 31, 2017

[NATURAL LANGUAGE PROCESSING WITH AN N-GRAM MACHINE](#)

Pub. No.: WO2019083519A1
Publication Date: May 2, 2019
International Filing Date: October 25, 2017
Inventors: Ni Lao, Jiazhong Nie, Fan Yang



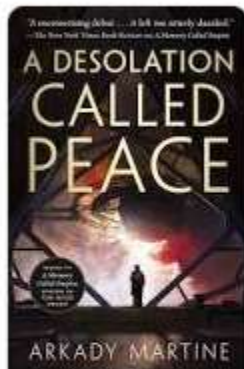
science fiction books 2021



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[Tools](#)

Books / 2021 / Science fiction



A Desolation
Called Peace
Arkady Mar...



Fugitive
Telemetry
Martha Wel...



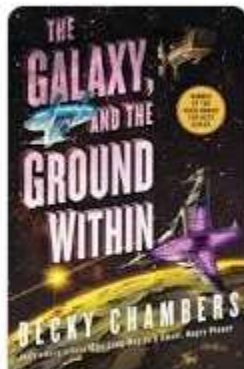
Remote
Control
Nnedi Okor...



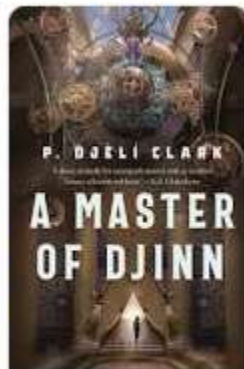
Sorrowland
Rivers Solo...



The Last
Watch
J. S. Dewes...



The Galaxy,
and the Gr...
Becky Cha...



A Master of
Djinn
P. Djèlí Clar...



Klara and the
Sun
Kazuo Ishig...



A Psalm for
the Wild-Built
Becky Cha...

The Future of Search from 2013

With Wavii, Did Google Acquire the Future of Web Search?

05/07/2013 by Bill Slawski

Sharing is caring!



211 SHARES

Google acquired the company Wavii for a little more than \$ 30 Million in April. There was some speculation that Wavii was an effort to match Yahoo's purchase of Summly, which summarizes news from the Web.



We're excited to announce that Wavii has teamed up with Google!

- [Open Information Extraction](#)
- [Open Information Extraction: the Second Generation](#) (pdf) by Oren Etzioni, Anthony Fader, Janara Christensen, Stephen Soderland, and Mausam Ollie
- [Open Information Extraction Software](#)
- [Open Language Learning for Information Extraction](#) (pdf), by Mausam, Michael Schmitz, Robert Bart, Stephen Soderland, and Oren Etzioni

Google can Learn From And Answer Queries by Using Word Vectors

[COMPUTING NUMERIC REPRESENTATIONS OF WORDS IN A HIGH-DIMENSIONAL SPACE](#)

Inventors: Tomas Mikolov, Kai Chen, Gregory S. Corrado, and Jeffrey A. Dean

Assignee: Google Inc.

US Patent: 9,740,680

Granted: August 22, 2017

Filed: May 18, 2015

[SELECTING ANSWER SPANS FROM ELECTRONIC DOCUMENTS USING NEURAL NETWORKS](#)

Inventors: [Thomas Mieczyslaw Kwiatkowski](#), [Ankur P. Parikh](#), [Swabha Swayamdipta](#)

Filed Date: October 29, 2018

Publication Number US20200265327

Publication Date: August 20, 2020

Applicants Google LLC

Google Has Used the Language Model Bert to Index and Learn From the Web

[RETRIEVAL-AUGMENTED LANGUAGE MODEL PRE-TRAINING AND FINE-TUNING](#)

Inventors: Kenton Chiu Tsun Lee, Kelvin Gu, Zora Tung, Panupong Pasupat, and Ming-Wei Chang
Assignee: Google LLC
US Patent: 11,003,865
Granted: May 11, 2021
Filed: May 20, 2020

BERT QUESTION-ANSWERING AT GOOGLE

<https://www.seobythesea.com/2021/05/bert-question-answering-at-google/>

Entity Recognition

Parts of Speech Tagging

Tuple Creation

Question Answering

Google Is Extracting Entities from the Web and Relationship Information too.

[COMPUTERIZED SYSTEMS AND METHODS FOR EXTRACTING AND STORING INFORMATION REGARDING ENTITIES](#)

Inventors: Christopher Semturs, Lode Vandevenne, Danila Sinopalnikov, Alexander Lyashuk, Sebastian Steiger, Henrik Grimm, Nathanael Martin Scharli and David Lecomte
Assignee: GOOGLE LLC
US Patent: 10,198,491
Granted: February 5, 2019
Filed: July 6, 2015

**ENTITY EXTRACTIONS FOR KNOWLEDGE GRAPHS AT
GOOGLE**

<https://gofishdigital.com/entity-extractions-knowledge-graphs/>

Google May Extract Entity Information Using Data Wrappers

[DISTANTLY SUPERVISED WRAPPER INDUCTION FOR SEMI-STRUCTURED DOCUMENTS](#)

Inventors: Jeffrey Dalton, Karthik Raman, Evgeniy Gabrilovich, Kevin Patrick Murphy, and Wei Zhang

Assignee: Google LLC

US Patent: 10,977,573

Granted: April 13, 2021

Filed: April 15, 2016

EXTRACTING ENTITIES WITH AUTOMATED DATA WRAPPERS

<https://www.seobythesea.com/2021/04/extracting-entities-with-automated-data-wrappers/>

Google can extract Entity Information from Data Graphs

[QUERYING A DATA GRAPH USING NATURAL LANGUAGE QUERIES](#)

Inventors Amarnag Subramanya, Fernando Pereira, Ni Lao, John Blitzer, Rahul Guptag
Applicants GOOGLE LLC
US20210026846
Patent Filing Date October 13, 2020
Patent Number 20210026846
Granted: January 28, 2021

SEO TURNS TO DATA GRAPHS TO LEARN ABOUT THE WEB

<https://gofishdigital.com/data-graph/>