

搜索中的自然语言先验知识

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Outline

- 大数据与先验知识
- 自然语言先验知识的简介
- Bing搜索中的一些answer
- 搜索中自然语言先验知识的应用

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大数据与先验知识

- 从“猴子围棋学”谈起
- 终极规则

先验知识

- Prepared Learning (preparedness learning)
 - In psychology, preparedness is a concept developed to explain why certain associations are learned more readily than others.[1]
 - City-dwelling children from Los Angeles & Shuar children from the Amazon region of Ecuador [2]
- Pretrain

[1] Seligman, Martin (1971). "Phobias and preparedness". *Behavior Therapy*. pp. 307–321.

[2] HC Barrett, J Broesch Prepared social learning about dangerous animals in children. *Evolution and Human Behavior* 2012

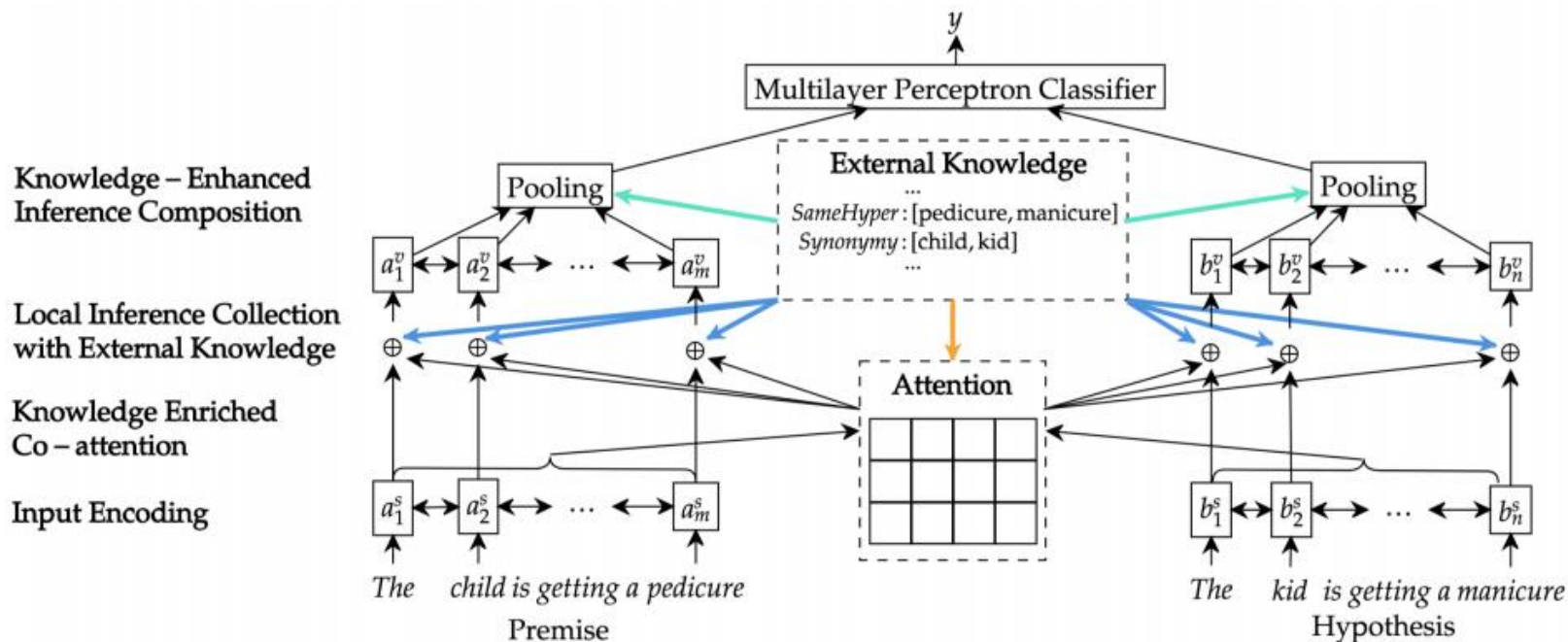
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自然语言先验知识的简介

- 语法
- 知识图谱
- 语言模型

Neural language inference models enhanced with external knowledge.

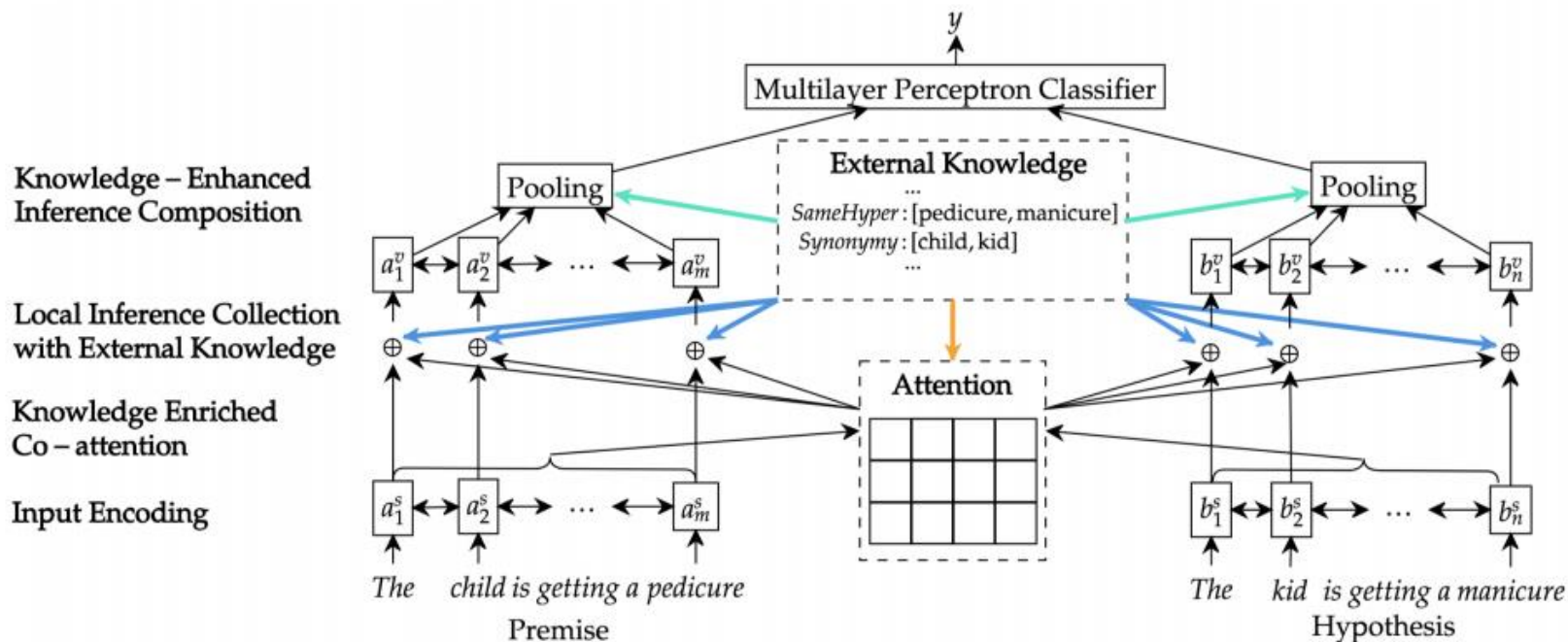


Natural Language Inference (NLI)

- Entailment
 - p: A soccer game with multiple males playing.
 - h: Some men are playing a sport.
- Neutral
 - p: An older and younger man smiling.
 - h: Two men are smiling and laughing at the cats playing on the floor.
- Contradiction
 - p: A lady standing in a wheat field.
 - h: A person standing in a corn field.

<https://nlp.stanford.edu/projects/snli/>

Neural language inference models enhanced with external knowledge.



Neural natural language inference models enhanced with external knowledge.

Model	Test
LSTM Att. (Rocktäschel et al., 2015)	83.5
DF-LSTMs (Liu et al., 2016a)	84.6
TC-LSTMs (Liu et al., 2016b)	85.1
Match-LSTM (Wang and Jiang, 2016)	86.1
LSTMN (Cheng et al., 2016)	86.3
Decomposable Att. (Parikh et al., 2016)	86.8
NTI (Yu and Munkhdalai, 2017b)	87.3
Re-read LSTM (Sha et al., 2016)	87.5
BiMPM (Wang et al., 2017)	87.5
DIIN (Gong et al., 2017)	88.0
BCN + CoVe (McCann et al., 2017)	88.1
CAFE (Tay et al., 2018)	88.5
ESIM (Chen et al., 2017a)	88.0
KIM (This paper)	88.6

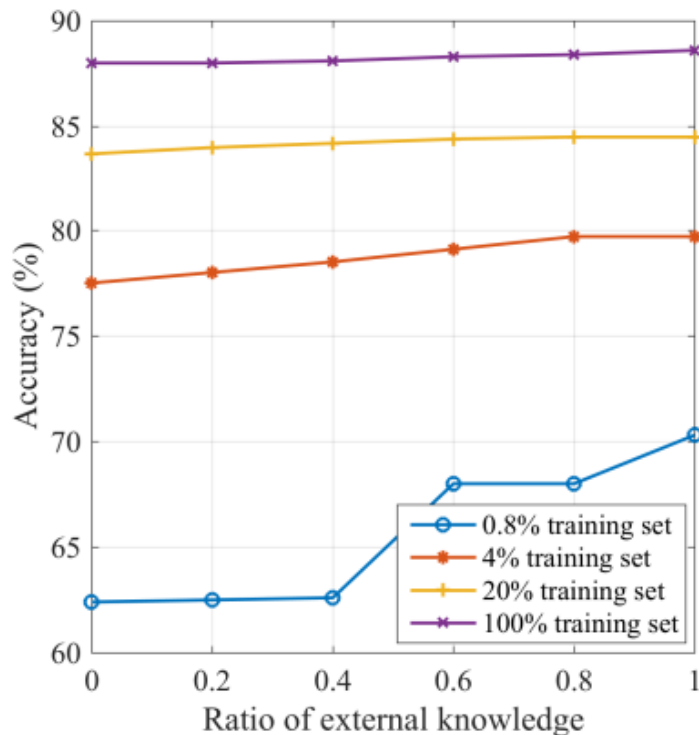
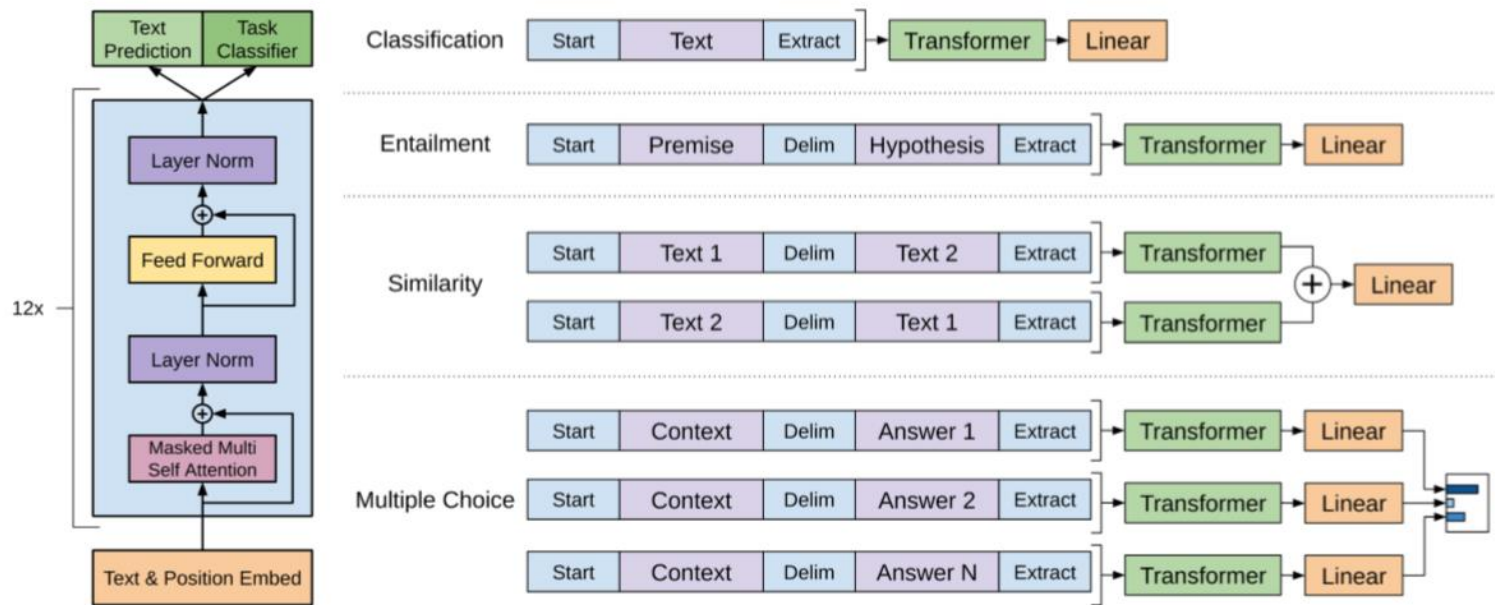


Table 2: Accuracies of models on SNLI.

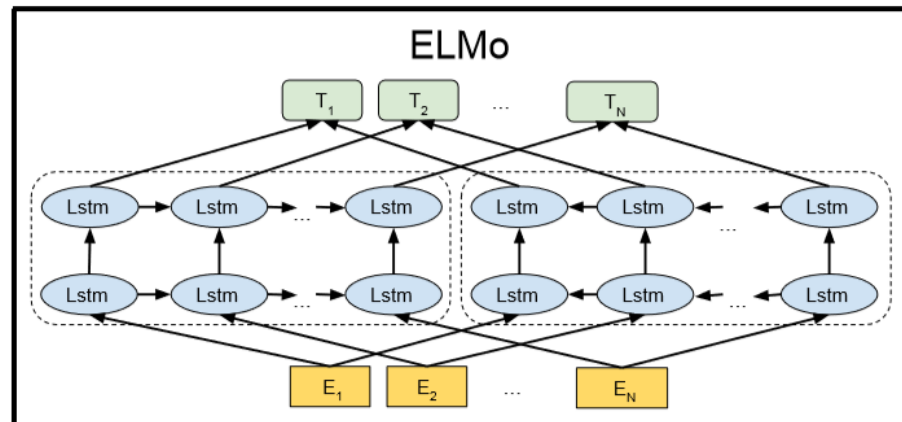
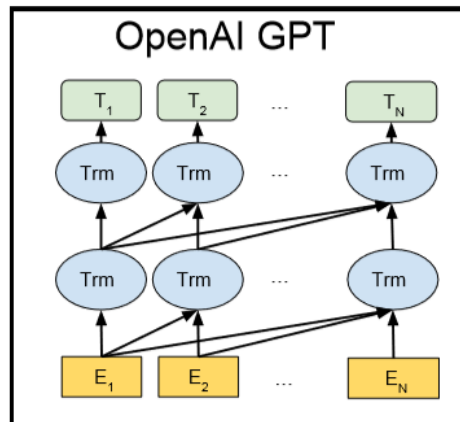
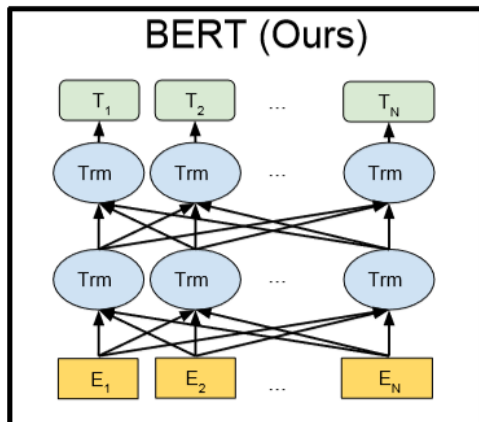
Generative Pre-trained Transformer



Generative Pre-trained Transformer

DATASET	TASK	SOTA	OURS
SNLI	Textual Entailment	89.3	89.9
MNLI Matched	Textual Entailment	80.6	82.1
MNLI Mismatched	Textual Entailment	80.1	81.4
SciTail	Textual Entailment	83.3	88.3
QNLI	Textual Entailment	82.3	88.1

BERT




BERT

System	MNLI-(m/mm) 392k	QQP 363k	QNLI 108k	SST-2 67k	CoLA 8.5k	STS-B 5.7k	MRPC 3.5k	RTE 2.5k	Average -
Pre-OpenAI SOTA	80.6/80.1	66.1	82.3	93.2	35.0	81.0	86.0	61.7	74.0
BiLSTM+ELMo+Attn	76.4/76.1	64.8	79.9	90.4	36.0	73.3	84.9	56.8	71.0
OpenAI GPT	82.1/81.4	70.3	88.1	91.3	45.4	80.0	82.3	56.0	75.2
BERT _{BASE}	84.6/83.4	71.2	90.1	93.5	52.1	85.8	88.9	66.4	79.6
BERT _{LARGE}	86.7/85.9	72.1	91.1	94.9	60.5	86.5	89.3	70.1	81.9

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Bing搜索中的Intelligent Answer



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Tundra Biome Facts


SUMMARIZED FROM 3 SOURCES

- The word tundra comes from the Finnish word tunturia which means treeless land. Some animals opt to hibernate during the winter and others migrate to warmer temperatures. Animal populations fluctuate throughout the seasons in the tundra biome.[1]
- Tundra ecosystems are treeless regions found in the Arctic and on the tops of mountains, where the climate is cold and windy and rainfall is scant. Tundra lands are snow-covered for much of the year, until summer brings a burst of wildflowers. Tundras are among Earth's coldest, harshest biomes.[2]
- Lemmings are small mammals that burrow under the snow to eat grasses and moss during the winter. The tundra is a very fragile biome that is shrinking as the permafrost melts. The word tundra comes from a Finnish word tunturi, which means treeless plain or barren land.[3]


Sources: [1] [softschools.com](#) · [2] [nationalgeographic.com](#) · [3] [ducksters.com](#)

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Tundra


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In physical geography, tundra is a type of biome where the tree growth is hindered by low temperatures and short growing seasons. The term tundra comes through Russian тундра (tundra) from the Kildin Sami word tūndâr "uplands", "treeless mountain tract". There are three types of tundra: arctic tundra, alpine tundra, and Antarctic tundra.


 [Wikipedia](#)

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Taiga




Alpine tundra



Temperate deciduous

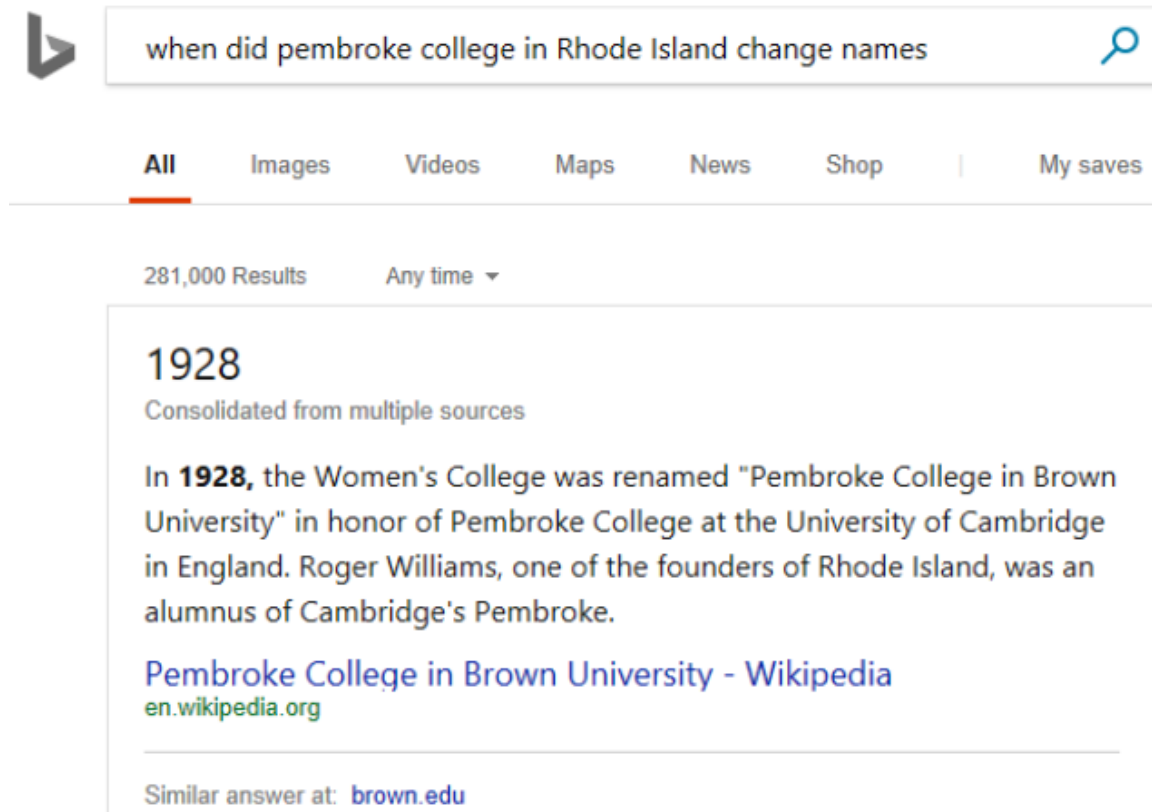


Subarctic climate



Köppen climate

Bing搜索中的Intelligent Answer



Bing search interface showing the query: "when did pembroke college in Rhode Island change names". The search results are filtered to "All" (underlined in red). The results show 281,000 Results and "Any time" filter.

1928
Consolidated from multiple sources

In **1928**, the Women's College was renamed "Pembroke College in Brown University" in honor of Pembroke College at the University of Cambridge in England. Roger Williams, one of the founders of Rhode Island, was an alumnus of Cambridge's Pembroke.

[Pembroke College in Brown University - Wikipedia](#)
en.wikipedia.org

Similar answer at: brown.edu

Bing搜索中的Trustworthy Answer

Coffee

PERSPECTIVES FROM THE WEB

You could **burn more fat**. Caffeine is found in almost every over-the-counter fat-burning supplement commercially available today. And for good reason. It's been shown to **increase metabolism** by 3 to 11 percent, and to increase the burning of fat from 10 to 29 percent, depending on your body type.

9 Surprising Reasons Why **Coffee** Is Really Good for Y...
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Research Showing Harmful Effects of Caffeine. More than 4 cups of coffee **linked to early death**. Caffeine consumption may **raise blood pressure**. Increased risk of **heart attacks** among young adults. Caffeine linked to **gout** attacks. Breast Tissue **Cysts** In Women. Caffeine could cause **incontinence**. Caffeine may cause **insomnia**.

20+ **Harmful Effects of Caffeine**
[caffeineinformer.com](#)



Jamal Khashoggi Died In Consulate In Istanbul, Saudi State TV Reports

NPR · 14m

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Rundown

- A look at the journalists killed in EU member states in the past year
[Financial Times](#)
- 10/18/2018
Trump says he now believes Khashoggi is dead
[New York Times](#)
- 10/17/2018
Khashoggi's last column, written shortly before his Oct. 2 disappearance, 'What the Arab world needs most is free expression,' is published
[The Washington Post](#)
- 10/15/2018
President Trump sends Secretary of State Mike Pompeo to meet with Saudi king over Khashoggi's disappearance

Perspectives VARIOUS OPINIONS FROM THE WEB

Journalists around the world like Jamal Khashoggi are in danger and that is deadly for democracy

That Saudi Arabia, a key U.S. ally, could lure him to its diplomatic mission and butcher him with impunity...sends a chilling message not only to would-be critical Saudi journalists but to journalists e...

[Dallas Morning News](#)

Khashoggi was a free speech warrior and the latest casualty in a global war on journalists

Journalists make a living calling out entitlement. Now they are getting killed for it and, like Khashoggi, 'disappeared.' Which side is America on?

[USA Today](#)

After Jamal Khashoggi, it's time to rethink our role in the Middle East

There is a six-decade history of maladroit U.S. involvement in the snake pit of the Middle East's geopolitics. Not much of an argument can be made that those interventions have made the Middle East be...

[The Arizona Republic](#)

After reporters like Jamal Khashoggi die, outrage melts into indifference

Shaming by human rights organizations, foreign officials and the media — the traditional tactics for defending the lives of journalists and dissidents — has lost much of its potency.

[The Morning Call](#)

Will Trump let Saudis get away with alleged murder of Jamal Khashoggi?

...the Khashoggi affair...has become a test of whether an American president is prepared to tolerate overseas assassinations of political opponents by strongmen whom Trump openly admires.

[Dallas Morning News](#)

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- Question answering
- Semantic Similarity (Query Paraphrase)
- Summarization
- Sentiment Classification

Question answering



when did pembroke college in Rhode Island change names



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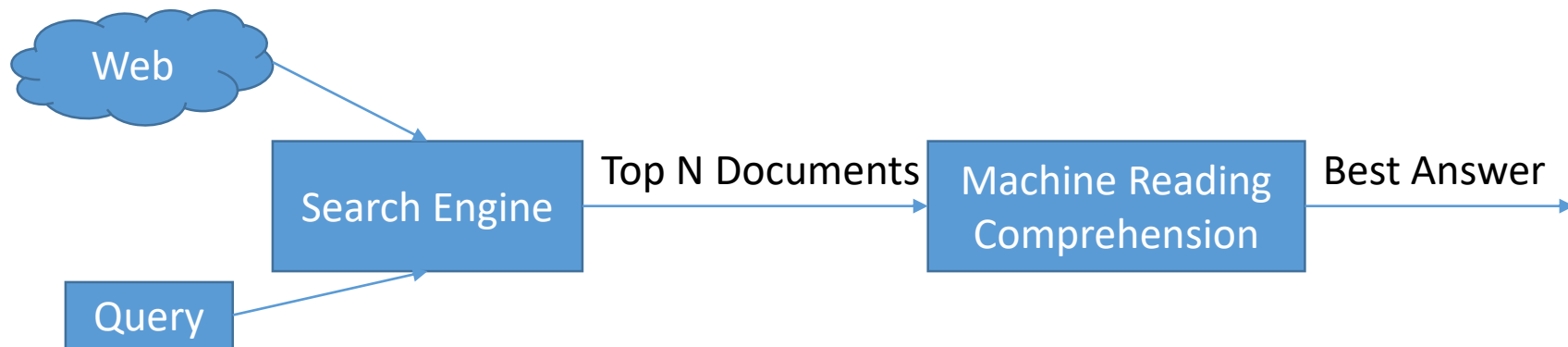
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[Pembroke College in Brown University - Wikipedia](https://en.wikipedia.org)
en.wikipedia.org

Question answering (Open QnA)



Semantic Similarity (Query Paraphrase)

- Who killed jfk
- The guy who killed jfk
- People who killed JFK
- Who was jfk killer
-

Summarization



tundra biomes facts



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Tundra Biome Facts - Soft Schools: Tundra

[www.softschools.com/facts/biomes/tundra_biome_facts/171](#)

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Taiga

Alpine
tundraTemperate
deciduousSubarctic
climateKöppen
climate

Sentiment Classification

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