

Natural Question Answer Research

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Objective

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Brewing

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"Brewer" redirects here. For other uses, see [Brewer \(disambiguation\)](#).

This article is about the brewing of beer. For homebrewing, see [Homebrewing](#). For other uses, see [Brewing \(disambiguation\)](#).


Brewing is the production of [beer](#) by [steeping](#) a [starch](#) source (commonly [cereal grains](#), the most popular of which is [barley](#)),^[1] in water and [fermenting](#) the resulting sweet liquid with [yeast](#). It may be done in a [brewery](#) by a commercial brewer, at home by a [homebrewer](#), or by a variety of traditional methods such as communally by the [indigenous peoples in Brazil](#) when making [caulim](#).^[2] Brewing has taken place since around the 6th millennium BC, and archaeological evidence suggests that emerging civilizations including [ancient Egypt](#)^[3] and [Mesopotamia](#) brewed beer.^[4] Since the nineteenth century the [brewing industry](#) has been part of most western economies.

The basic ingredients of beer are water and a [fermentable](#) starch source such as [malted barley](#). Most beer is fermented with a [brewer's yeast](#) and flavoured with [hops](#).^[5] Less widely used starch sources include [millet](#), [sorghum](#) and [cassava](#).^[6] Secondary sources ([adjuncts](#)), such as maize (corn), rice, or sugar, may also be used, sometimes to reduce cost, or to add a feature, such as adding wheat to aid in retaining the foamy head of the beer.^[7] The proportion of each starch source in a beer recipe is collectively called the [grain bill](#).

Steps in the brewing process include [malting](#), [milling](#), [mashing](#), [lautering](#), [boiling](#), [fermenting](#), [conditioning](#), [filtering](#), and [packaging](#). There are three main fermentation methods, [warm](#), [cool](#) and [spontaneous](#). Fermentation may take place in an open or closed fermenting vessel; a secondary fermentation may also occur in the [cask](#) or [bottle](#). There are several additional [brewing methods](#), such as barrel aging, double dropping, and Yorkshire Square.

Contents [\[hide\]](#)

- 1 History
- 2 Ingredients
- 3 Brewing process
- 4 Mashing
 - 4.1 Lautering
- 5 Boiling
 - 5.1 Brew kettle or copper

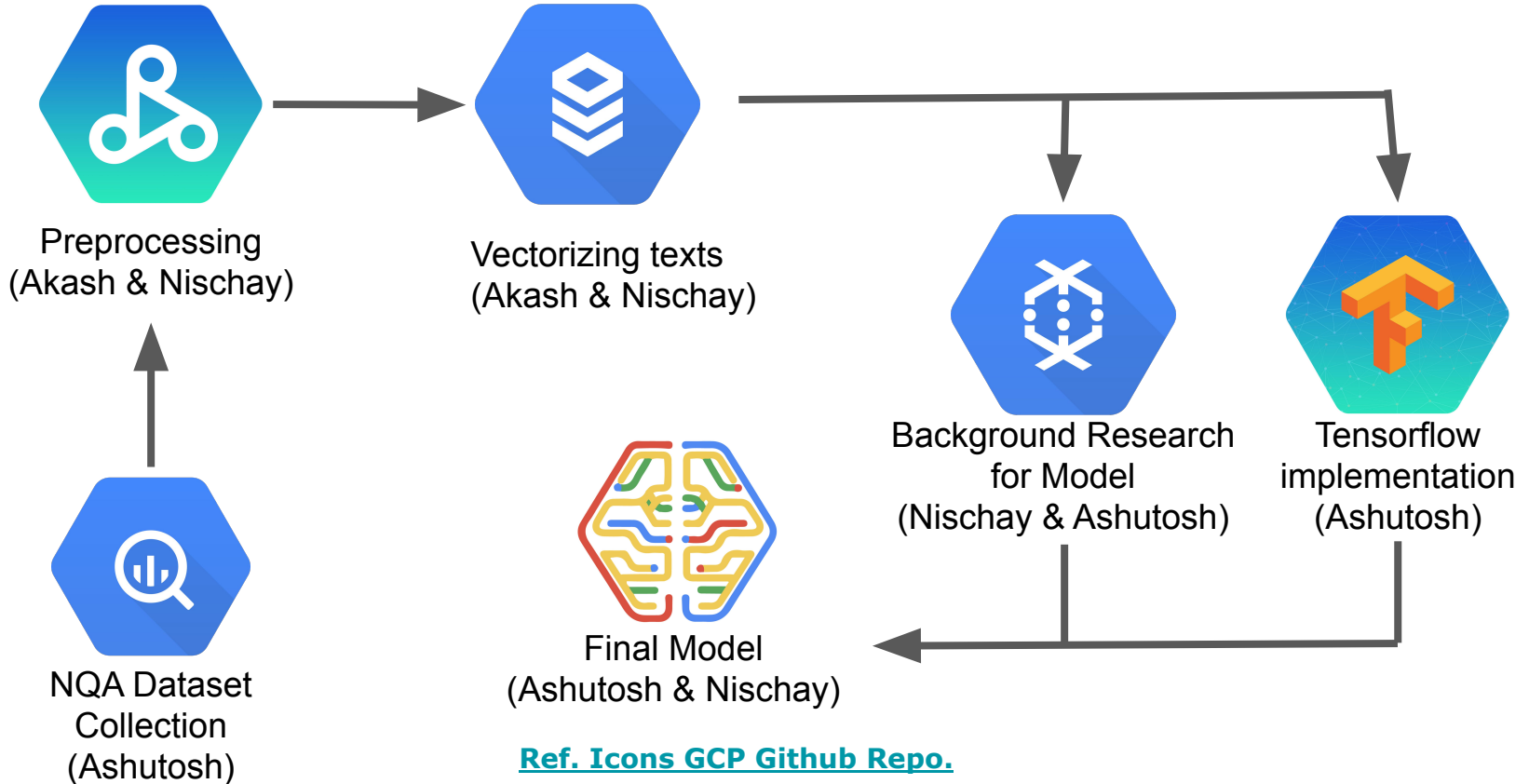


A 16th-century brewery

Main Goal ?

To Improve micro F1-score by
modifying existing models.

Build Map



Datasets Used

- [Jian Zhang's SQuAD 2016](#)
- [Google AI's NQA benchmark Dataset 2019](#)

Parameters

- **document_text**
- **question_text**
- **Long_answer_candidates**
- **Annotations**
- **Document_url**
- **example_id**

To Predict

- **long_answer_range** - Range of the long answer in terms of index of words in the document if long answer is found, else it will predict $[-1, -1]$
- **short_answer_range** - Range of the short answer in terms of index of words in the document if short answer is found, else it will predict $[-1, -1]$

Evaluation Parameter : F1-Score

Preprocessing & Vectorization

- Position Embedding
- Segment Embedding
- Token embedding

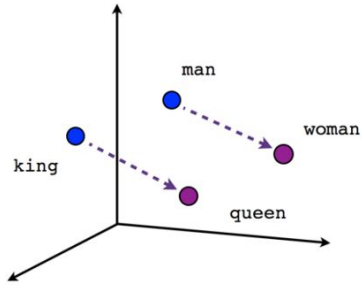
For Example:

This	is	a	boy
V1	V2	V3	V4

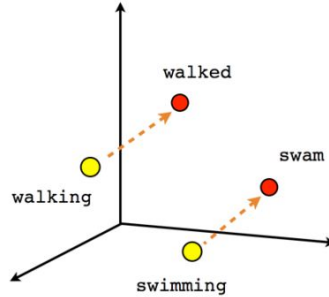
Preprocessing usage : tokenization.FullTokenizer(object)
Embedding Usage : BERT

[Ref. Jonathan Bratt's tokenization 2012](#)

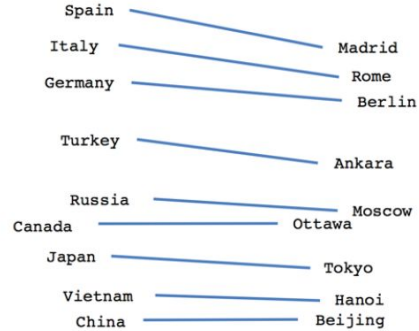
Word2Vec (By Tomas Mikolov 2013)



Male-Female

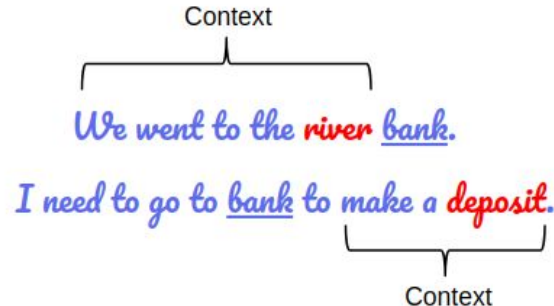


Verb tense

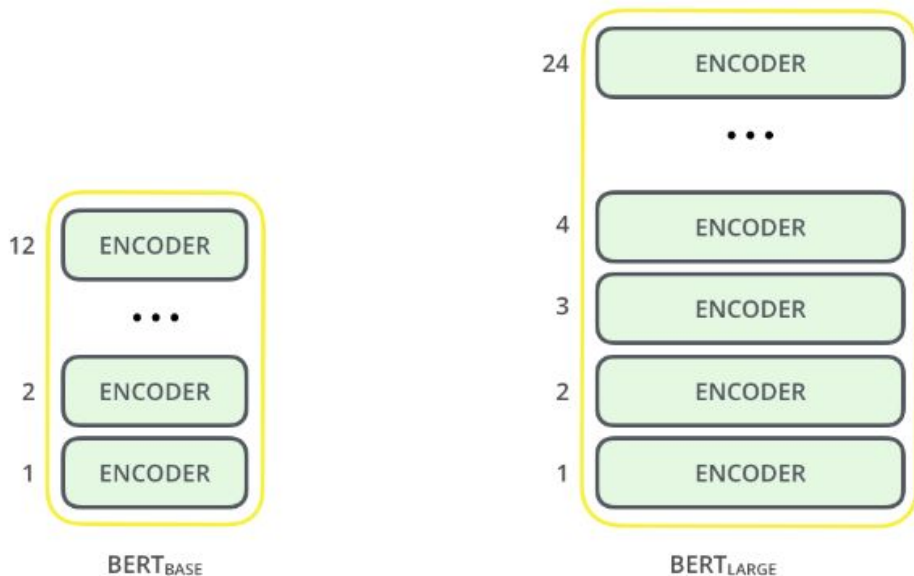


Country-Capital

Drawback :



BERT (by Google AI 2019)



Ref. Blog Analytics Vidya 2019

- BERT Base: 12 layers (transformer blocks), 12 attention heads, and 110 million parameters
- BERT Large: 24 layers (transformer blocks), 16 attention heads and, 340 million parameters

Training on Cloud (on kaggle)

Masking :

Input: The man went to the [MASK]₁ . He bought a [MASK]₂ of milk .
Labels: [MASK]₁ = store; [MASK]₂ = gallon

Ref. Google AI Blog on BERT 2019

Context Recognition:

Sentence A = The man went to the store.
Sentence B = He bought a gallon of milk.
Label = IsNextSentence

Sentence A = The man went to the store.
Sentence B = Penguins are flightless.
Label = NotNextSentence

Ref. Google AI Blog on BERT 2019

Implementation



Ref. Tensorflow 2.0

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{  
  "attention_probs_dropout_prob": 0.1,  
  "hidden_act": "gelu",  
  "hidden_dropout_prob": 0.1,  
  "hidden_size": 1024,  
  "initializer_range": 0.02,  
  "intermediate_size": 4096,  
  "max_position_embeddings": 512,  
  "num_attention_heads": 16,  
  "num_hidden_layers": 24,  
  "type_vocab_size": 2,  
  "vocab_size": 30522  
}
```

Ref. Implementation

Conclusion

F1-score on test : 0.70

SQuAD1.1 Leaderboard

Rank	Model	EM	F1
	Human Performance <i>Stanford University</i> (Rajpurkar et al. '16)	82.304	91.221
1 Oct 05, 2018	BERT (ensemble) <i>Google AI Language</i> https://arxiv.org/abs/1810.04805	87.433	93.160
2 Sep 09, 2018	nlnet (ensemble) <i>Microsoft Research Asia</i>	85.356	91.202
3 Jul 11, 2018	QANet (ensemble) <i>Google Brain & CMU</i>	84.454	90.490

Implementation Codes

**Refer this github repo bit.ly/nqa_iiitk for
Project Report, Presentation slides and
complete implementation of end-to-end
model.**

References

- [BERT Github Repo 2019 by Google AI](#)
- [Jian Zhang's SQuAD 2016](#)
- [Google AI's NQA benchmark Dataset 2019](#)
- [Ming-Wei Chang's BERT Paper 2019](#)
- [Google AI Blog on BERT 2019](#)
- [Effective TensorFlow 2.0 Guide](#)