

In the article *Document Expansion by Query Prediction*[5] the authors introduce a model called Doc2Query; a model that for a given document, predicts a query, which can then be appended to the document. The authors trained a sequence-to-sequence model that generates possible questions that the document might answer. This can be used to better index documents, to provide more accurate document search for search engines, help with Domain specific training data generation and can be used for generating pairs for a given collection of unlabelled texts. Doc2Query uses a simple seq-to-seq trans-

former to produce a query from the document, both of which are segmented using BPE[6] after being tokenized with the MOSES tokenizer. The document and queries are then truncated to avoid excessive memory usage. Once the model is trained, it predicts 10 queries using the top-k random sampling. The model was trained on the MSMARCO[7] dataset.

The article *Doc2Query–: When Less is More*[8] expands on the Doc2Query approach by trying to eliminate the “hallucinations” that Doc2Query might produce by generating questions that are not present in the source text. The authors argue that Doc2Query is prone to hallucination and that this harms retrieval effectiveness and inflates the index size. They explore and propose techniques for filtering out these harmful queries prior to indexing. Doc2Query– estimates the relevance of a query with relevance models. With this the retrieval effectiveness of indexes improves by up to 16%, while also reducing index size. The major drawback of this approach is the higher computational cost that arises by removing irrelevant queries.

The authors of the article *BEIR: A Heterogeneous Benchmark for Zero-shot Evaluation*[1] propose a new robust heterogeneous evaluation benchmark for IR (Benchmarking-IR, BEIR), leveraging a careful selection of 18 publicly selected datasets from diverse text retrieval tasks and domains. The authors evaluated 10 state of the art IR systems with their BEIR benchmark to find their strengths and weaknesses, where it proved to be a good benchmark for IR evaluation.

In the article *SQuAD: 100,000+ Questions for Machine Comprehension of Text*[2] the authors introduce a large scale benchmark designed for evaluating machine comprehension systems. It comprises over 100000 question-answer pairs, sourced from over 500 Wikipedia articles, covering a wide range of topics. The dataset is structured such that each question is posed with reference to a specific paragraph from the corresponding article, and the answer to the question lies within that paragraph. It allows fine-grained evaluation of a models ability to understand and extract information from text.

Methods

Use the Methods section to describe what you did and how you did it – in what way did you prepare the data, what algorithms did you use, how did you test various solutions ... Provide all the required details for a reproduction of your work.

Below are L^AT_EX examples of some common elements that you will probably need when writing your report (e.g. figures, equations, lists, code examples ...).

Equations

You can write equations inline, e.g. $\cos \pi = -1$, $E = m \cdot c^2$ and α , or you can include them as separate objects. The Bayes’s rule is stated mathematically as:

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}, \quad (1)$$

where A and B are some events. You can also reference it – the equation 1 describes the Bayes’s rule.

Lists

We can insert numbered and bullet lists:

1. First item in the list.
2. Second item in the list.
3. Third item in the list.

- First item in the list.
- Second item in the list.
- Third item in the list.

We can use the description environment to define or describe key terms and phrases.

Word What is a word?.

Concept What is a concept?

Idea What is an idea?

Random text

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Figures

You can insert figures that span over the whole page, or over just a single column. The first one, Figure 1, is an example of a figure that spans only across one of the two columns in the report.

On the other hand, Figure 2 is an example of a figure that spans across the whole page (across both columns) of the report.

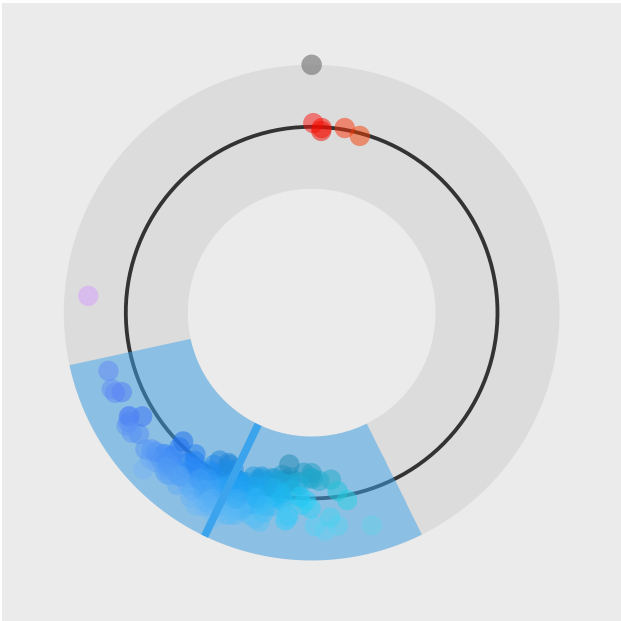


Figure 1. A random visualization. This is an example of a figure that spans only across one of the two columns.

Tables

Use the table environment to insert tables.

Table 1. Table of grades.

Name		Grade
First name	Last Name	
John	Doe	7.5
Jane	Doe	10
Mike	Smith	8

Code examples

You can also insert short code examples. You can specify them manually, or insert a whole file with code. Please avoid inserting long code snippets, advisors will have access to your repositories and can take a look at your code there. If necessary, you can use this technique to insert code (or pseudo code) of short algorithms that are crucial for the understanding of the manuscript.

Listing 1. Insert code directly from a file.

```
import os
import time
import random

fruits = ["apple", "banana", "cherry"]
for x in fruits:
    print(x)
```

Listing 2. Write the code you want to insert.

```
import (dplyr)
```

```
import (ggplot)

ggplot (diamonds,
        aes(x=carat, y=price, color=cut)) +
  geom_point() +
  geom_smooth()
```

Results

Use the results section to present the final results of your work. Present the results in a objective and scientific fashion. Use visualisations to convey your results in a clear and efficient manner. When comparing results between various techniques use appropriate statistical methodology.

More random text

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Discussion

Use the Discussion section to objectively evaluate your work, do not just put praise on everything you did, be critical and exposes flaws and weaknesses of your solution. You can also explain what you would do differently if you would be able

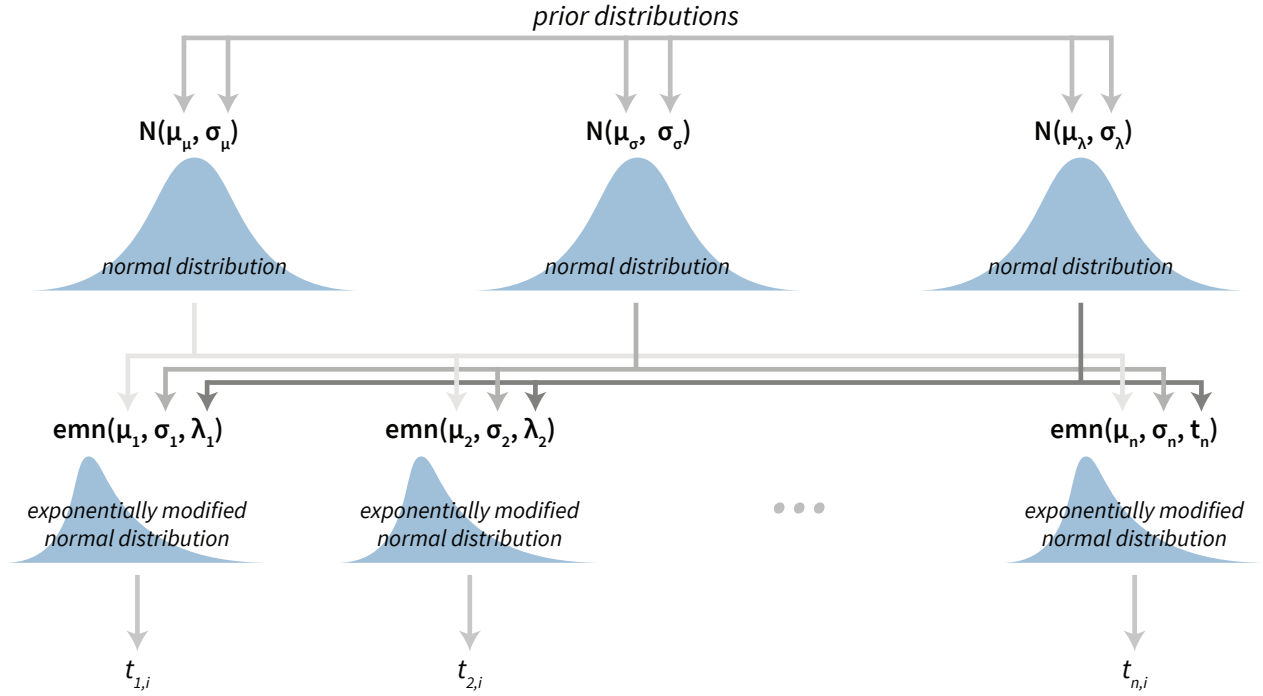


Figure 2. Visualization of a Bayesian hierarchical model. This is an example of a figure that spans the whole width of the report.

to start again and what upgrades could be done on the project in the future.

Acknowledgments

Here you can thank other persons (advisors, colleagues ...) that contributed to the successful completion of your project.

References

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- [7] Tri Nguyen, Mir Rosenberg, Xia Song, Jianfeng Gao, Saurabh Tiwary, Rangan Majumder, and Li Deng. MS MARCO: A human generated machine reading comprehension dataset. *CoRR*, abs/1611.09268, 2016.
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