Opening the Black Box(es)

or, what I wish I had done ten years ago

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Data Driven Philosophy, 2025-10-17

UCLouvain

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LOUVAIN INSTITUTE OF BIOMOLECULAR SCIENCE AND TECHNOLOGY

ACADÉMIE ROYALE DE BELGIQUE 1772

A Strange Talk

This is a weird talk: I've found myself getting progressively more worried about the state of DH, and I'm using you all as free therapy.


MIDLIFE
CRISIS
AHEAD

Opening the Black Box

Topics

Documents

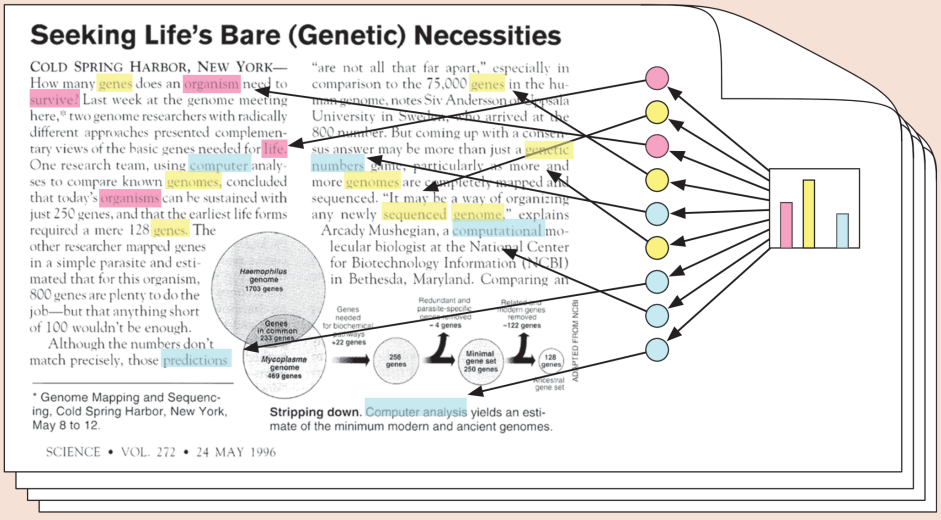
Topic proportions and assignments

gene	0.04
dna	0.02
genetic	0.01
...	

life	0.02
evolve	0.01
organism	0.01
...	

brain	0.04
neuron	0.02
nerve	0.01
...	

data	0.02
number	0.02
comp	
...	



Blei (2012)

A “Gray” Box

- Inference details remain fairly opaque, and can sometimes be very sensitive to user choices (of number of topics, of hyperparameters)
- But! At least you can carefully read **a lot** of intermediates:
  - top words in topics
  - top documents for topics
  - topic probability distributions for selected documents
  - word probability distributions across topics (!)

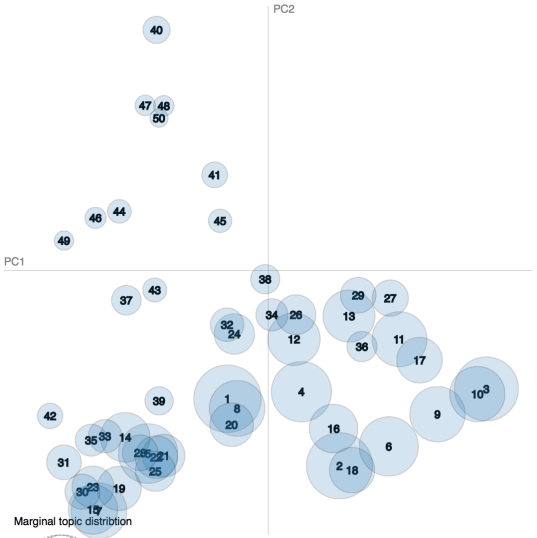
Selected Topic: 0 Previous Topic Next Topic Clear Topic

Slide to adjust relevance metric:(2)

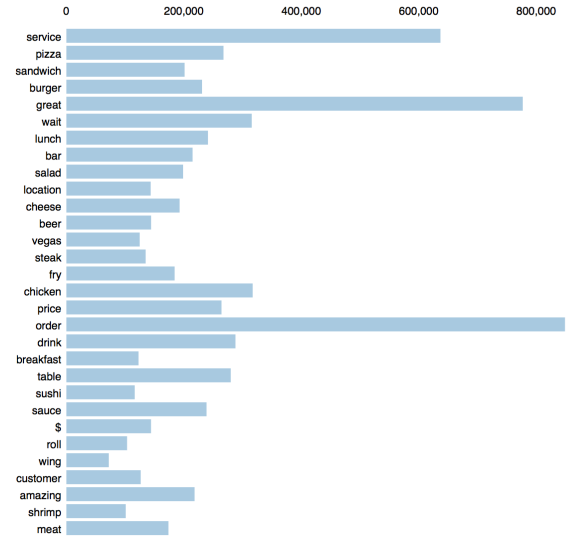
λ = 1

0.0 0.2 0.4 0.6 0.8 1.0

Intertopic Distance Map (via multidimensional scaling)



Top-30 Most Salient Terms (1)



A Significantly Darker Box

- Selection criteria for language models
  - lack of information about initial training sets
  - **hard to evaluate except by considering output quality**
  - fine-tuning and retraining?

dbmdz / **bert-large-cased-finetuned-conll03-english** like 91 Follow Bayerische Staatsbibli… 92

Token Classification | Transformers | PyTorch | TensorFlow | JAX | Rust | Safetensors | bert

Model card | Files and versions xet | Community 7 | Train | Deploy | Use this model

No model card

New: Create and edit this model card directly on the website!

Contribute a Model Card

Downloads last month
1,390,350

Safetensors Model size 334M params | Tensor type F32 | Files info

Inference Providers NEW — HF Inference API

Token Classification — Examples

Your sentence here...

Generate

View Code Snippets — Maximize

Model tree for dbmdz/bert-large-cased-finetuned-conll03-english

Finetunes 1 model

Quantizations 1 model

Spaces using dbmdz/bert-large-cased-finetuned-conll03-english 100

Zoe911/Transformers-NER | tchans123/resume_enhancement_tool | Guillanno/Reservoir-properties-calculator | sam6309/text_to_video | Gopi9177/NLP | zjunlp/KGEditor | UjjwalVIT/Text_analysis_and_metadata_app

Computer Science > Computation and Language

[Submitted on 18 Jan 2018 (v1), last revised 23 May 2018 (this version, v5)]

Universal Language Model Fine-tuning for Text Classification

Jeremy Howard, Sebastian Ruder

Inductive transfer learning has greatly impacted computer vision, but existing approaches in NLP still require task-specific modifications and training from scratch. We propose Universal Language Model Fine-tuning (ULMFiT), an effective transfer learning method that can be applied to any task in NLP, and introduce techniques that are key for fine-tuning a language model. Our method significantly outperforms the state-of-the-art on six text classification tasks, reducing the error by 18-24% on the majority of datasets. Furthermore, with only 100 labeled examples, it matches the performance of training from scratch on 100x more data. We open-source our pretrained models and code.

Comments: ACL 2018, fixed denominator in Equation 3, line 3

Subjects: **Computation and Language (cs.CL)**; Machine Learning (cs.LG); Machine Learning (stat.ML)

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(or arXiv:1801.06146v5 **[cs.CL]** for this version)

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A Significantly Darker Box

- Selection criteria for language models
  - lack of information about initial training sets
  - **hard to evaluate except by considering output quality**
  - fine-tuning and retraining?
- Algorithmic details involve more free user choice
- Intermediates
  - context-dependent vectors for each token in the corpus (nope)
  - (sometimes) vectors for each document in the corpus (...maybe?)
  - final outputs like cluster assignments (sure, but...)

A broader question: What exactly are we willing to outsource, and to whom?

Expertise

It is, of course, possible to build expertise in all of these questions ourselves.

But! Is it possible to do that and still be a subject-matter expert in our own research areas?

Expertise

Have we reached the point at which we can no longer maintain the full collection of both **digital** and **humanities** skills? Is it time to consider that we might be forced to divide concerns?

A Classic Problem

Collaborating with computer scientists tends to be difficult: the kinds of problems that we want to resolve *usually* aren't actually cutting-edge or innovative in CS terms.

We're boring!

So what we need to do, it seems, is hire research programmers. But precious few DH projects in philosophy are going to be big enough to justify an FTE of programming time.

Taken together: a strong argument for constructing our own infrastructure in digital humanities.

Building Infrastructure

CMU Library Labs (2020-2024)

Scott B. Weingart & Matthew Lincoln
Fall 2019 *(edited January 2021)*

http://dx.doi.org/10.1184/R1/13522718


A
@SCOTTIE.MARSH
WALT DISNEY CONCERT HALL
LA Phil
The Moments That Move Us

Project Incubator

1. Charter Phase (1 sem.): write a project charter and get everyone on board
2. Incubation Phase (1 sem.): execute on the project charter, build the project
3. Full Warranty Phase (1 sem.): one further semester of bug-fix work and production of a report detailing what was executed

Project Incubator

4. Maintenance Phase (1 yr.): maintenance-only, ensuring that the project will continue to function in the same manner
5. Stewardship Phase (5 yr.+): rolling five-year maintenance contracts, only to ensure that the project is available (perhaps in a static or degraded form)

Projects have to end. Plan now for the death of your creation.

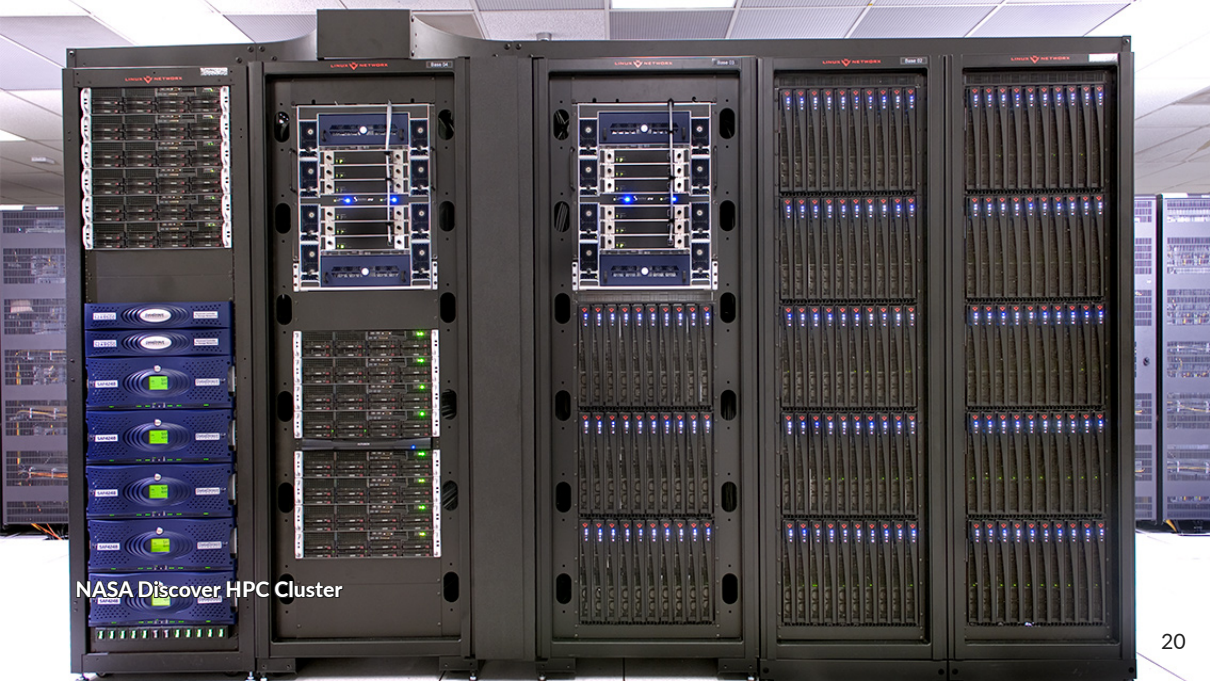
Bring Money

Storage and basic computing expenses have always been significant, but still within the range of “normal” grant funding.

This gets worse with LLMs.

You cannot afford this on your grant.

Major computing infrastructure has to be attached to something durable.



NASA Discover HPC Cluster


Trinity College, Dublin

All of a sudden…

…we're not just talking about getting up and running for a project. If you want to have DH make up a sustainable part of your career, you'll need to either be somewhere with this infrastructure, or build and maintain it yourself.

Summing Up

Two Main Worries

1. Can we keep up with the **pace of methodological change** without bringing in external collaborators?
2. Can we cultivate those collaborations (and pay for them) without building **durable infrastructure?**

(and what can you do if you don't have that infrastructure to begin with?)

Questions?

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