Project Suggestions

Enterprise Search

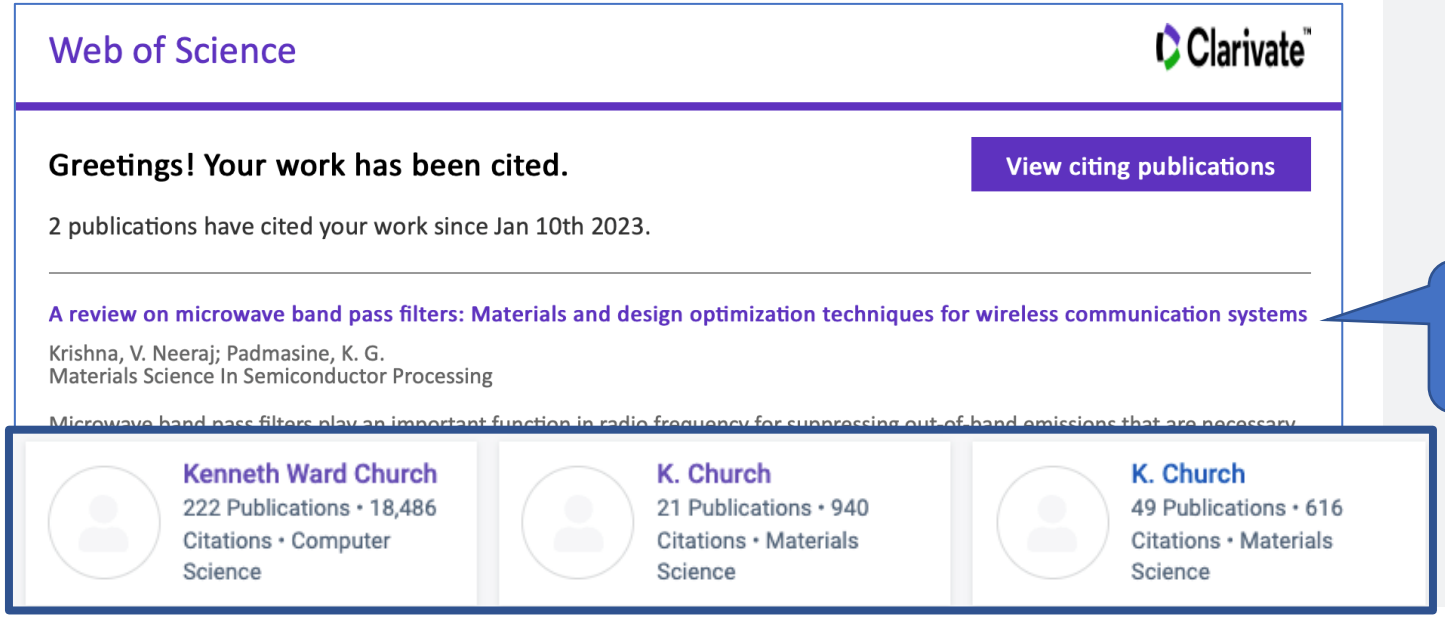
- Omar's pitch on the 1st class
  - People in industry (usually) don't talk about stuff they are really working on
  - But there is more talk than you might expect
    - https://www.amazon.com/Regional-Advantage-Culture-Competition-Silicon/dp/0674753402
- Enterprise Search: Some history of failures
  - https://en.wikipedia.org/wiki/Google_Search_Appliance
  - Enterprise search is harder than web search because of network effects
    - https://en.wikipedia.org/wiki/Metcalfe%27s_law
    - When benefits scale with edges (links between pages)
      - and costs scale with nodes (web pages)
      - then rich get richer (easier to find good stuff in larger graphs than smaller graphs)
      - (There are more links to good stuff in larger graphs)

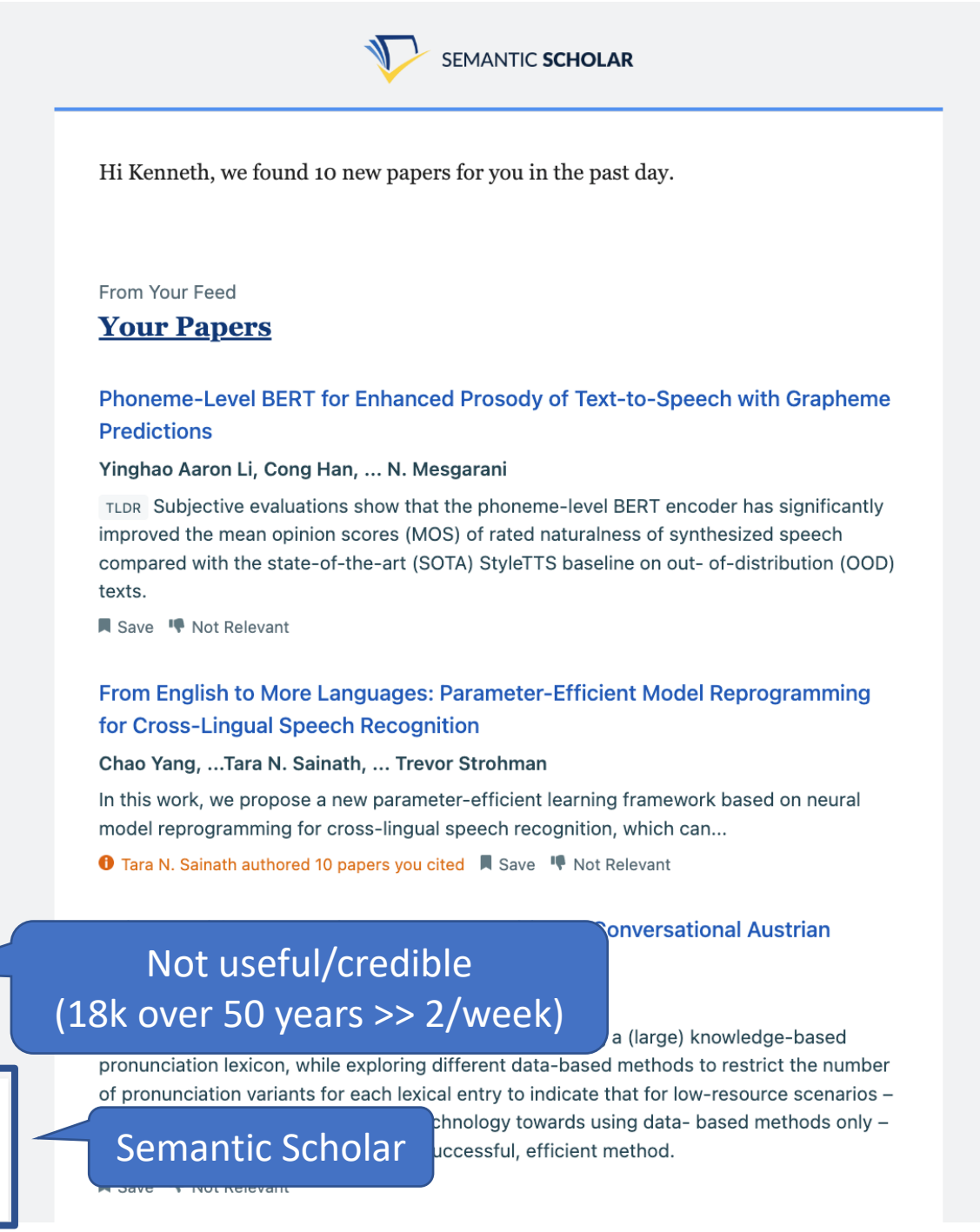
Conference Automation

- Routing of submissions to reviewers
- https://blog.allenai.org/conference-peer-review-with-the-semantic-scholar-api-24ab9fce2324
- Current status:
  - Many venues use routing tools:
    - https://openreview.net/
    - https://easychair.org/
    - https://www.softconf.com/
    - https://cmt3.research.microsoft.com/
  - Not clear these tools are safe and effective (better than manual routing)
  - Tools are too hard for program committees (see blog above)

Recommender Systems

- I regularly receive spam suggestions
  - Rarely credible
  - At best, recommendations are
    - recent,
    - buzz-word compliant
    - but not credible
  - Credible (Seminal) >> Recent



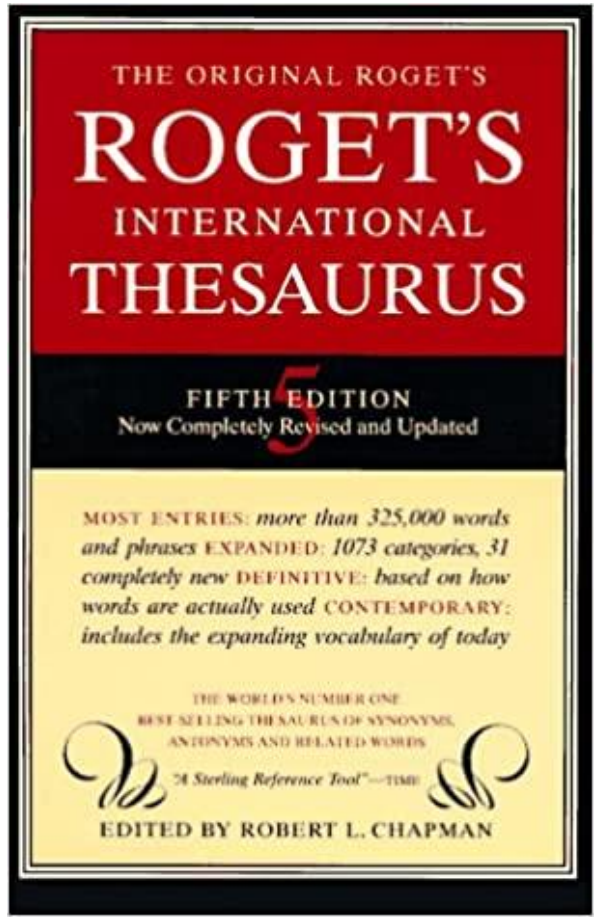


Not useful/credible
(18k over 50 years >> 2/week)

Semantic Scholar

Thesaurus → Deep Nets (ChatGPT)

- Good writers use resources
  - Dictionaries, Thesauruses, etc.
- Active vocab << Passive vocab
  - Hard to find the right word,
  - But easier when prompted
  - (Especially in 2nd language)
- So too, there may be a role for deep nets
  - https://www.npr.org/2023/01/24/1151160196/how-to-stop-worrying-and-love-or-at-least-live-with-chatgpt
- Deep nets are better on fluency than truth
  - https://www.cambridge.org/core/journals/natural-language-engineering/article/gpt3-whats-it-good-for/0E05CFE68A7AC8BF794C8ECBE28AA990
  - "Unreliable doesn't mean useless"



Nanny Cameras for Young and Old

- In China, massive migration from rural areas to cities
  - Cities are not designed for families
  - Workers move to cities, and leave children with their parents in rural areas
  - Children miss their parents (might see them just once a year at New Year)
  - Workers can do 30 minutes of homework per day before calling home
  - Can we summarize a day of video down to 30 minutes?
- In much of the world, seniors are living alone, far from their children
  - Children would like to know that their parents are ok
  - If parents fall, or need help, could nanny cam take appropriate action
    - No need for wake-up words
    - My father couldn't remember ``Alexa''
    - If he fell, he wouldn't think to ask for help (because that wasn't a thing in his day)

Where is my phone? My kid? My father?

- Where did I leave my keys?
- Where are my eyeglasses?
  - You shouldn’t need your eyeglasses to find your eyeglasses…
- Where is that book I was reading a few years ago?

Where did my day go?

- Can you help me be more productive?
- Time and motion study of my life
- https://en.wikipedia.org/wiki/MyLifeBits

Workflow

- Example scenario: Access to medical expertise
  - Better hospitals in urban areas than rural areas in China (and everywhere)
  - Medical expertise tends to be concentrated near top medical schools
  - Biopsies from rural areas are digitized and sent to experts
  - No need for expertise to be physically near patients
- Traditionally, Amazon Mechanical Turk is used for low-skill tasks
  - Is there a Human-in-the-Loop opportunity for high-skill task?
- If so, can we log workflows to collect data for machine learning?
- Can we create exchanges like Ad exchange, Futures exchange (FTX)
  - https://en.wikipedia.org/wiki/Ad_exchange

BOTUS

https://www.npr.org/transcripts/522897876

- Today on the show PLANET MONEY builds a robot,
  - a bot to trade stocks with real money.
- The official Twitter handle, yeah. BOTUS, bot of the United States.
- Task
  - Input: Trump Tweets
  - Output: Trades

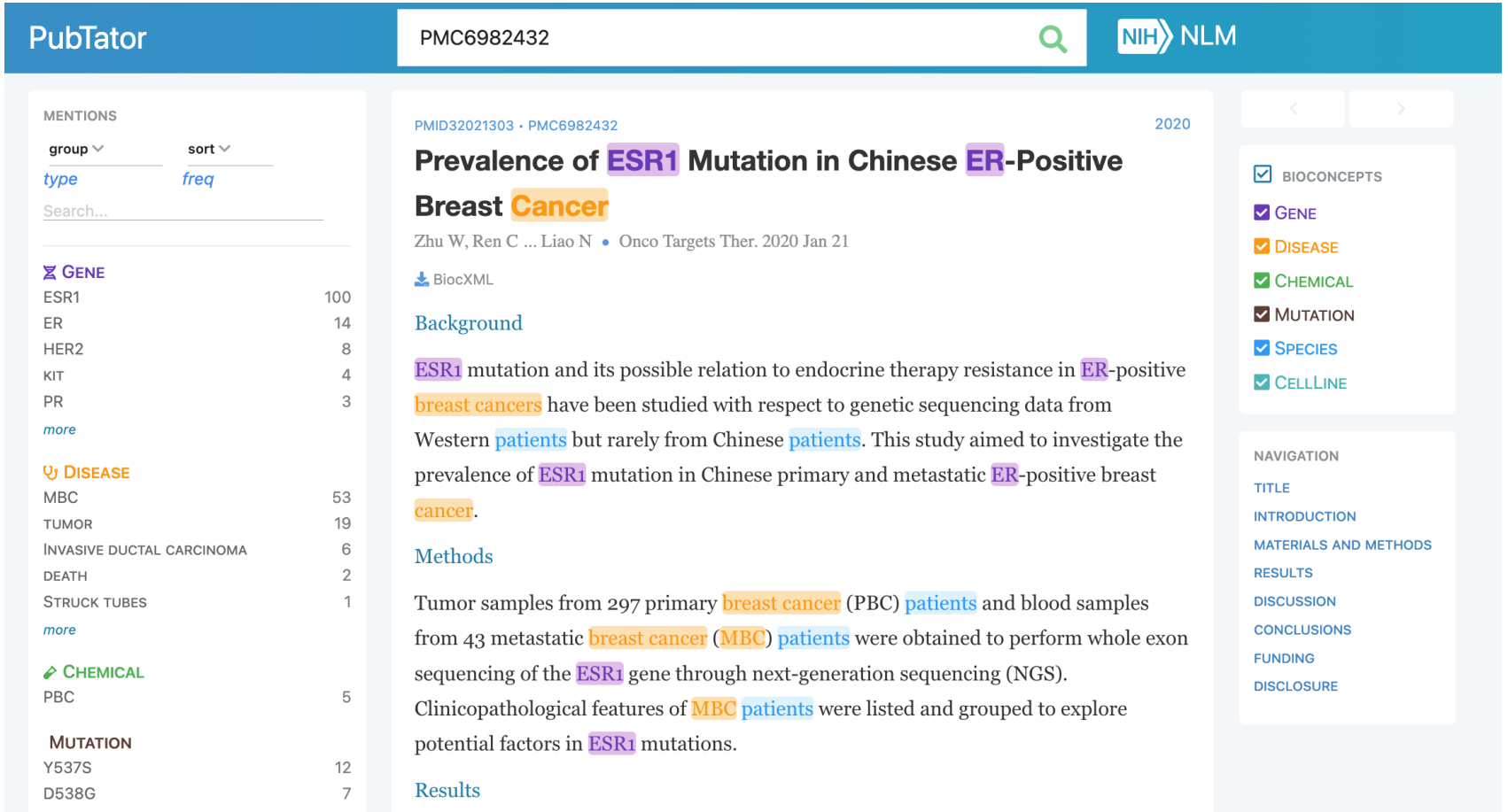
- Technologies
  - Crawl tweets
    - Filter for Trump tweets
  - Sentiment analysis
    - Tweet → Buy / Sell
  - Named Entity Recognition (NER)
    - Tweet → Stock
- Spoiler Alert:
  - They lost $$

HuggingFace Tutorials

- Sentiment Analysis
  - https://huggingface.co/blog/sentiment-analysis-python
- Named Entity Recognition (NER)
  - https://huggingface.co/dslim/bert-base-NER
  - https://huggingface.co/course/chapter7/2
- General Fine-Tuning (GFT)
  - https://github.com/kwchurch/gft

PubTator

https://www.ncbi.nlm.nih.gov/research/pubtator/?view=docsum&query=PMC6982432

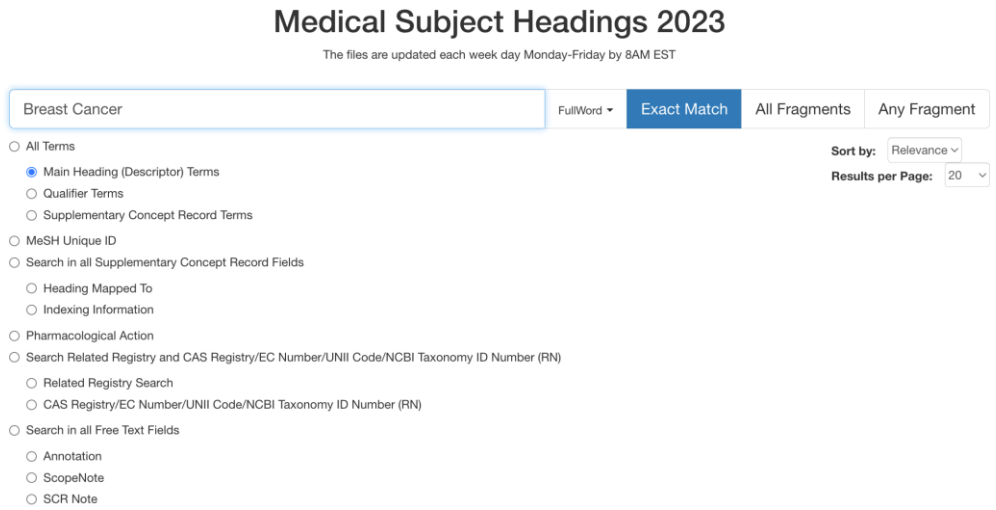


Medical Resources

- PubTator: Abstracts (papers) with annotations (entities)
  - https://www.ncbi.nlm.nih.gov/research/pubtator/?view=docsum&query=PMC6982432
- Pubmed: Abstracts (papers) with annotations (MeSH)
  - https://www.ncbi.nlm.nih.gov/mesh/
- MeSH: Medical Subject Headings (Ontology / Knowledge Graph)
  - https://www.ncbi.nlm.nih.gov/mesh/

MeSH

https://meshb.nlm.nih.gov/search



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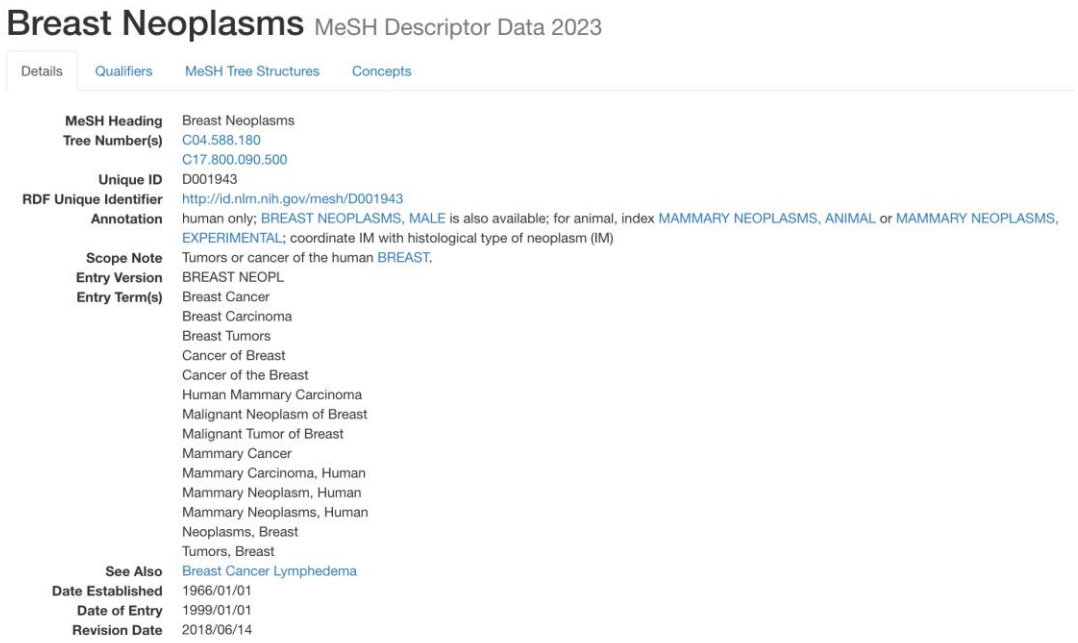


Many start-up companies in this space

- Use cases
  - Personalized medicine:
    - Many rare diseases
    - Literature is large (and growing quickly)
    - Doctors can’t keep up
    - Opportunity to help doctors find papers relevant to patient
  - Bloomberg-terminal for drug companies
  - Electronic Health Records
    - Map records to codes (for insurance purposes)
      - Maximize bills (for doctors)
      - Minimize bills (for insurance companies)

Wikipedia search

- Can we improve Wikipedia search?
- What would be an alternative to 10-blue links for Wikipedia?
- https://en.wikipedia.org/wiki/Wikipedia:Database_download

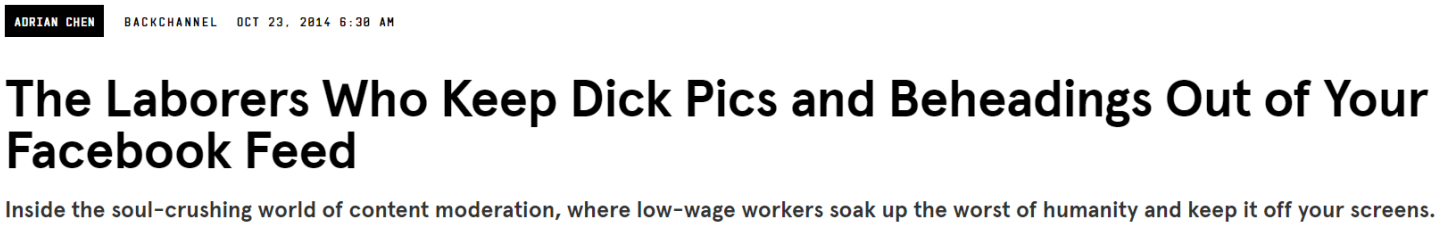
Q&A systems

- Question-answering system exist from the early days.
- Quora, StackOverflow, etc.
- ChatGPT is a new incarnation
- What to do when there are potentially alternative answers?
- How to organize non-factoid answers

Labeling

- Ground truth is a key component of ML projects
- Current tools like Mechanical Turk are somewhat primitive
- Are there new alternatives for content moderation tasks?
- Further reading
  - https://www.wired.com/2014/10/content-moderation/
  - https://time.com/6247678/openai-chatgpt-kenya-workers/


Exclusive: OpenAI Used Kenyan Workers on Less Than $2 Per Hour to Make ChatGPT Less Toxic


ADRIAN CHEN BACKCHANNEL OCT 23, 2014 6:30 AM

The Laborers Who Keep Dick Pics and Beheadings Out of Your Facebook Feed

Inside the soul-crushing world of content moderation, where low-wage workers soak up the worst of humanity and keep it off your screens.

Reddit

- Lots of interesting content on Reddit
- Not well organized and not easy to find
- Perception that Google's search is not as good as it used to be
- How would you organize Reddit data for better access?
- https://dkb.io/post/google-search-is-dying
- https://paperswithcode.com/dataset/reddit