

The Life of a Search System

by
Women of Search

presented by
Elzbieta Jakubowska

Who are we?

- Founded **3 years ago**, in May 2021
- **257** members strong 💪
- A vibrant community dedicated to **empowering & celebrating women in search & related tech fields**
- Provide a platform for networking, mentorship, and knowledge-sharing
- Join our [slack channel!](#)

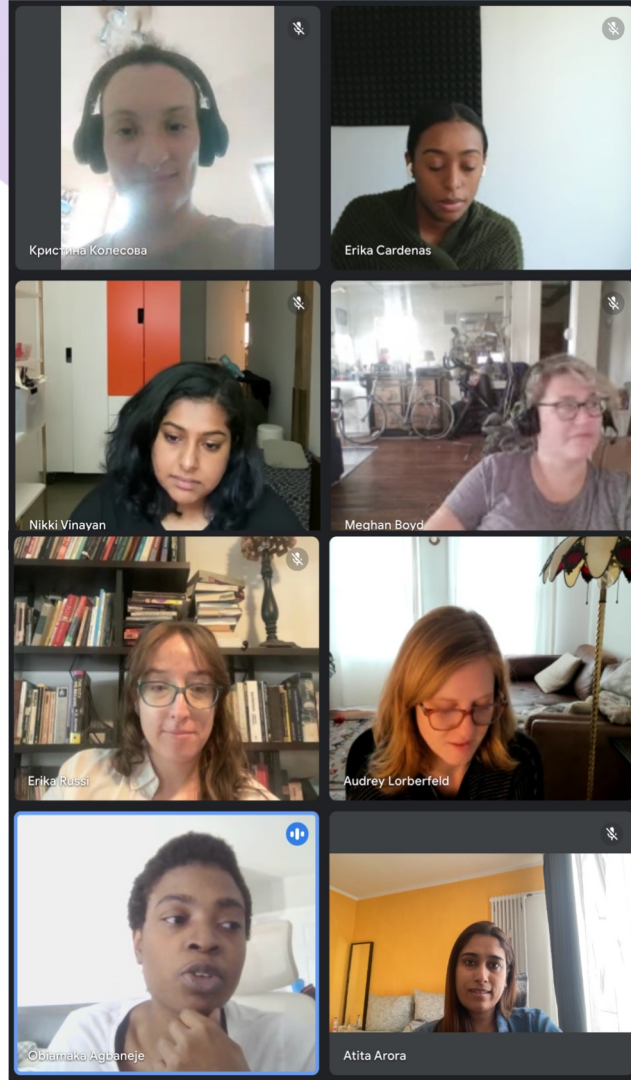


Group updates



Updates

- **'Happy Hour'** continues: the 1st Wednesday of each month at 9 am PT.
- **Typescript Working Group**, founded and led by Moon Limb (S. Korea)



**Let's zoom
in on our
topic**



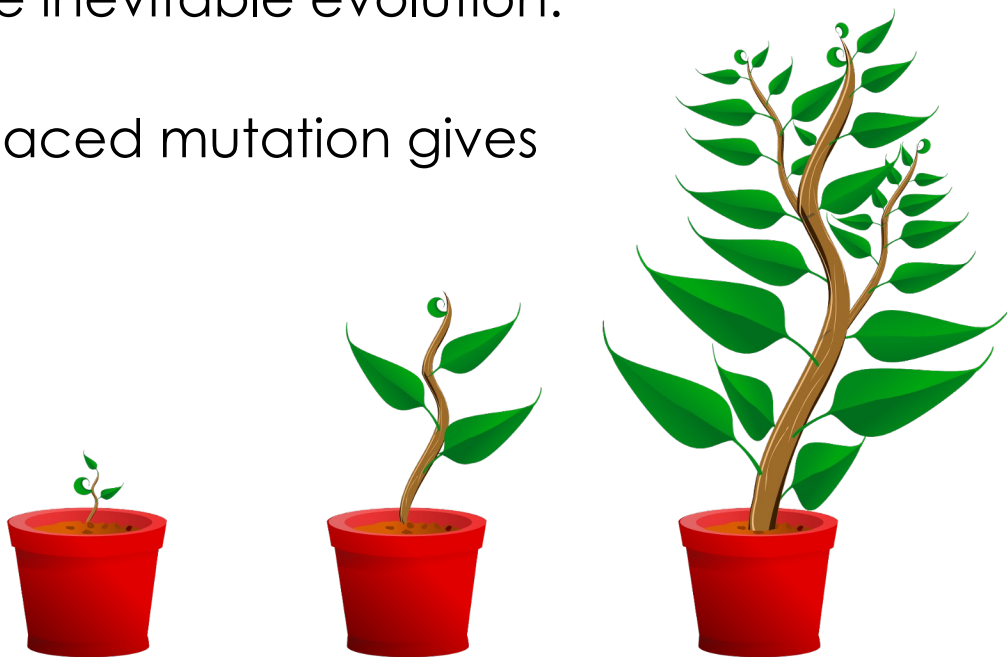
The big idea

A Search system is like a living organism.

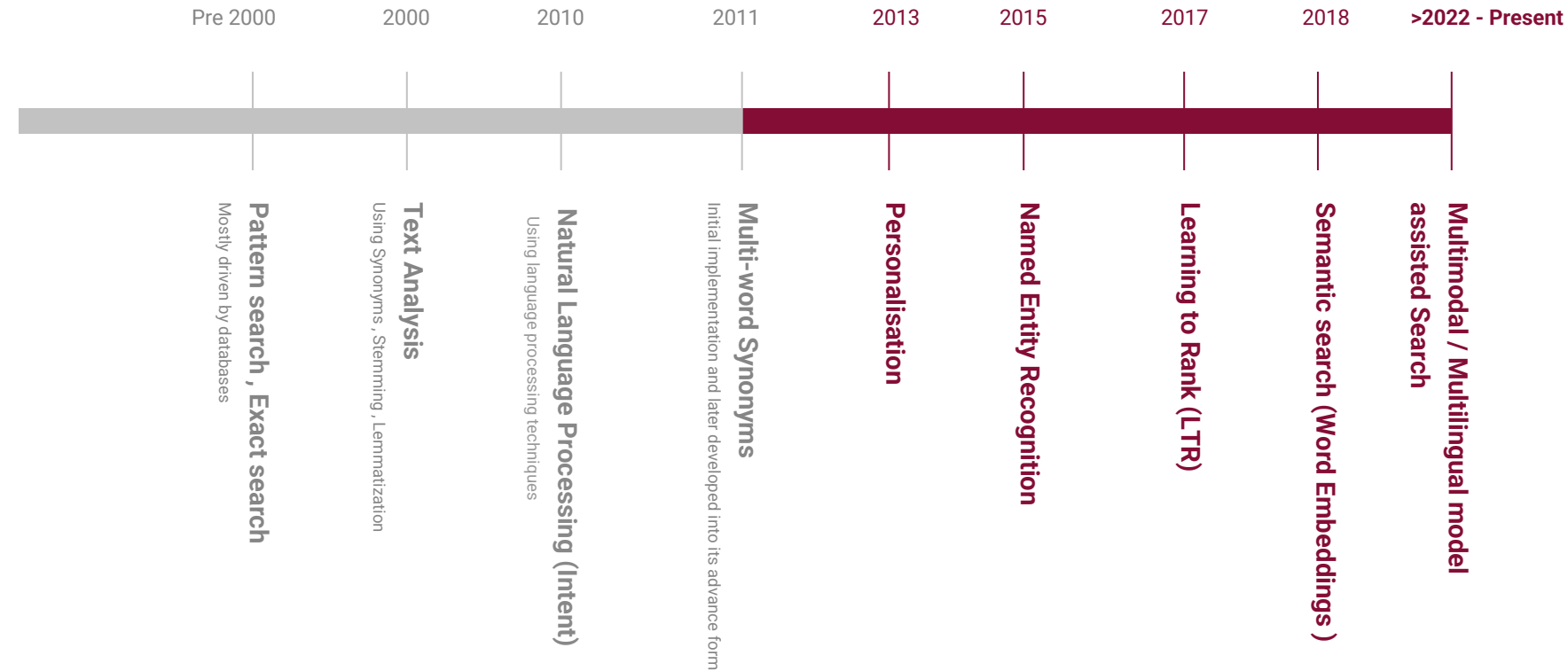
It starts simple and can't escape inevitable evolution.

The only challenge is that fast-paced mutation gives rise to chaos and complexity.

The options are extensive...



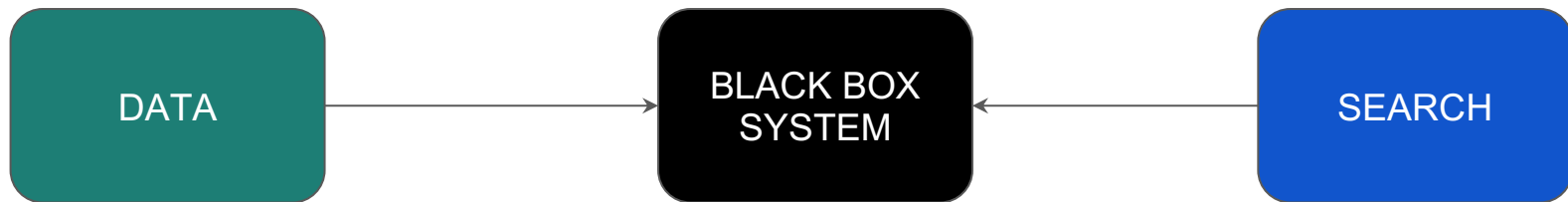
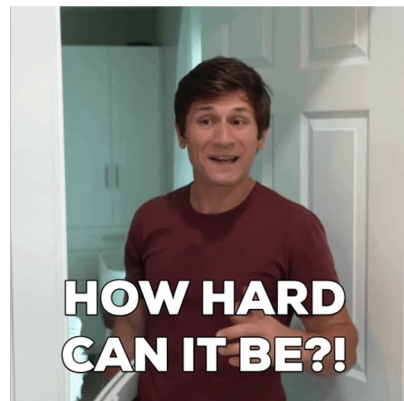
The Evolution of Search



Agenda

- 1. Search in a grand scheme of things
- 1. How things usually evolve
- 1. Adjustments to improve things
- 1. Upleveling
- 1. Our advice

Search in a grand scheme of things



This is my
data just
take it!

What
should I
do?

This is a
scary
world!

There's
nothing
to fear...

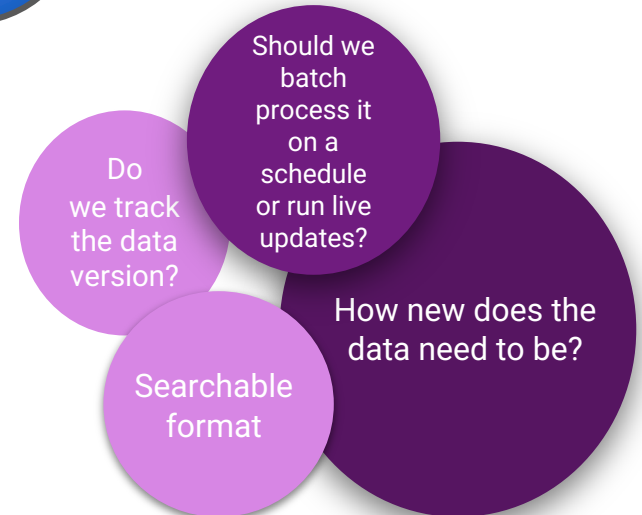
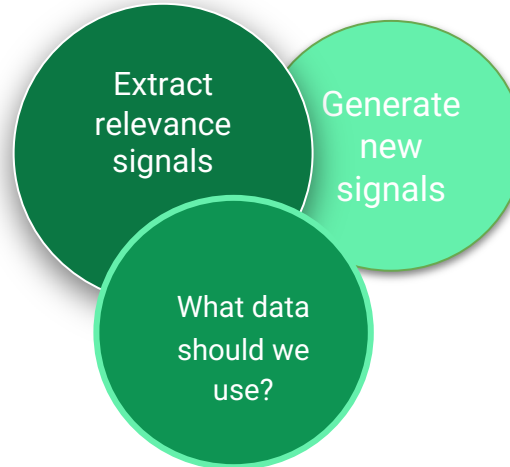
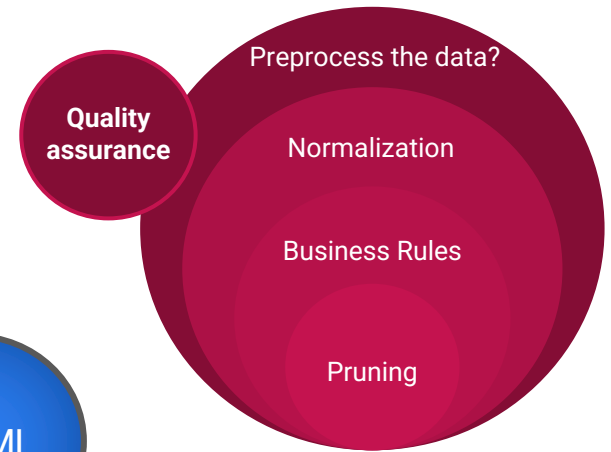
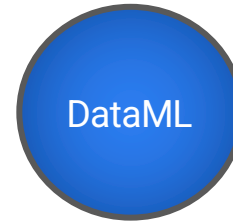
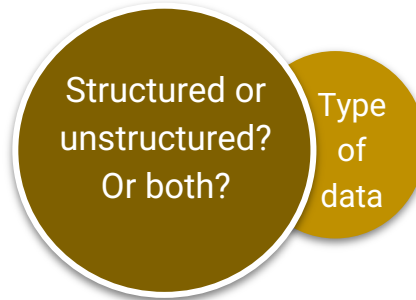
I just want
my search
to work!



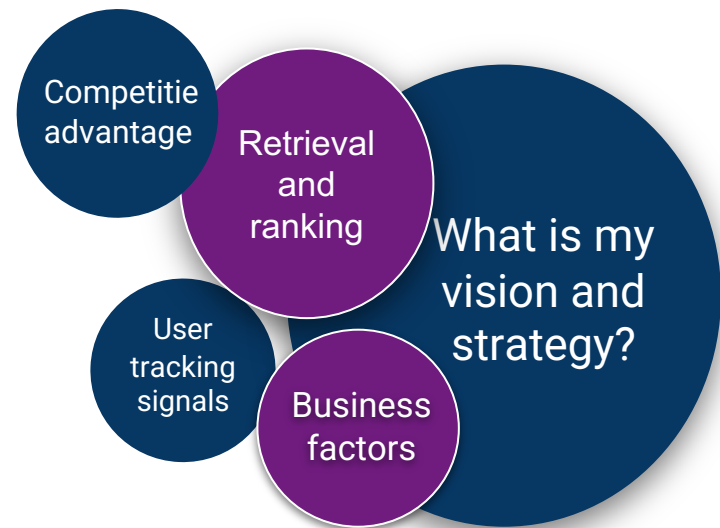
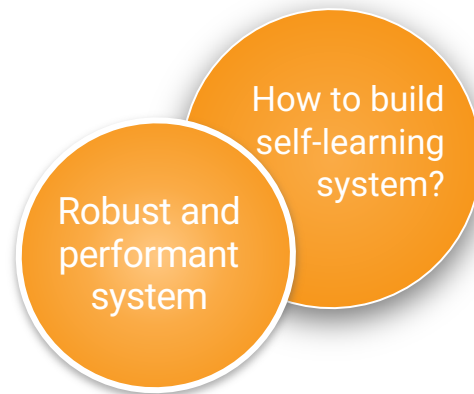
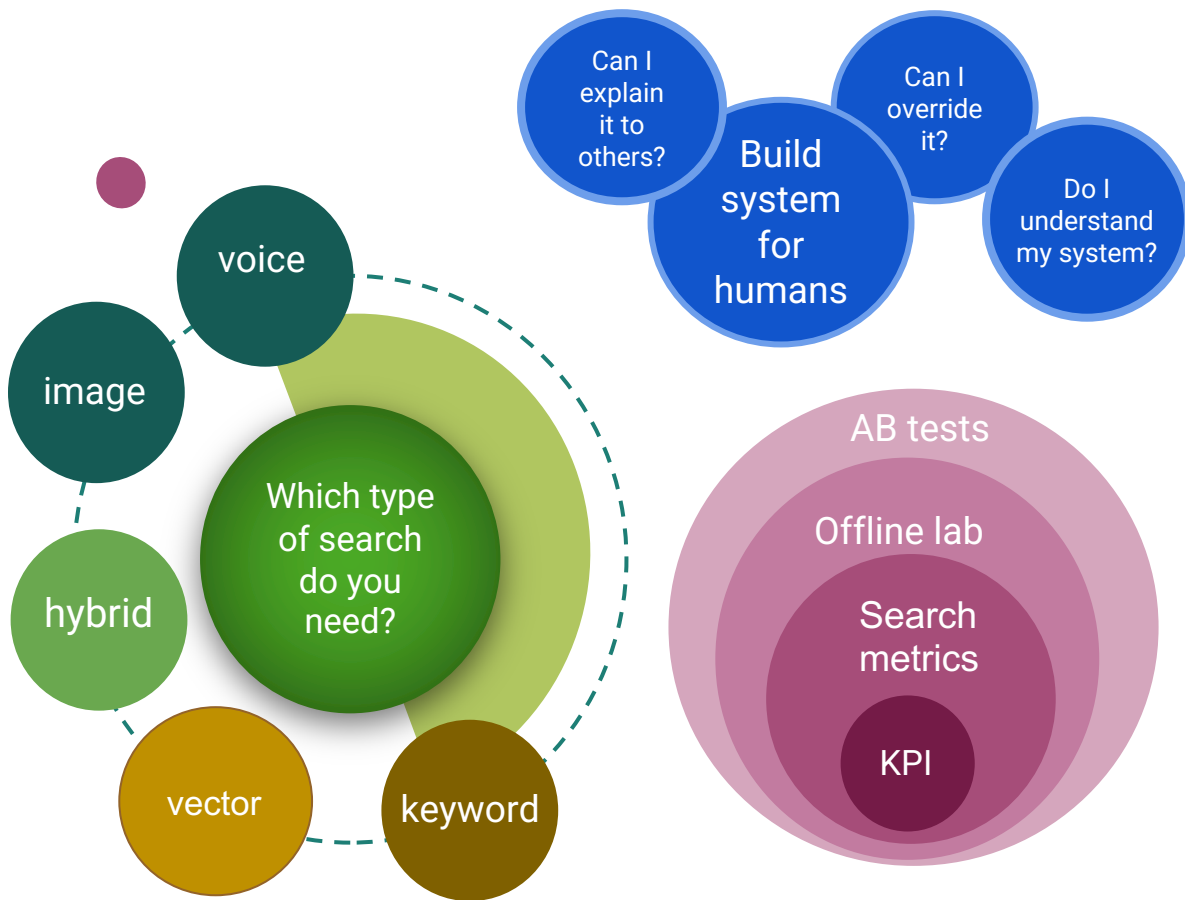
It's a complexity hidden in multidisciplinary tasks.

Building search is not linear.

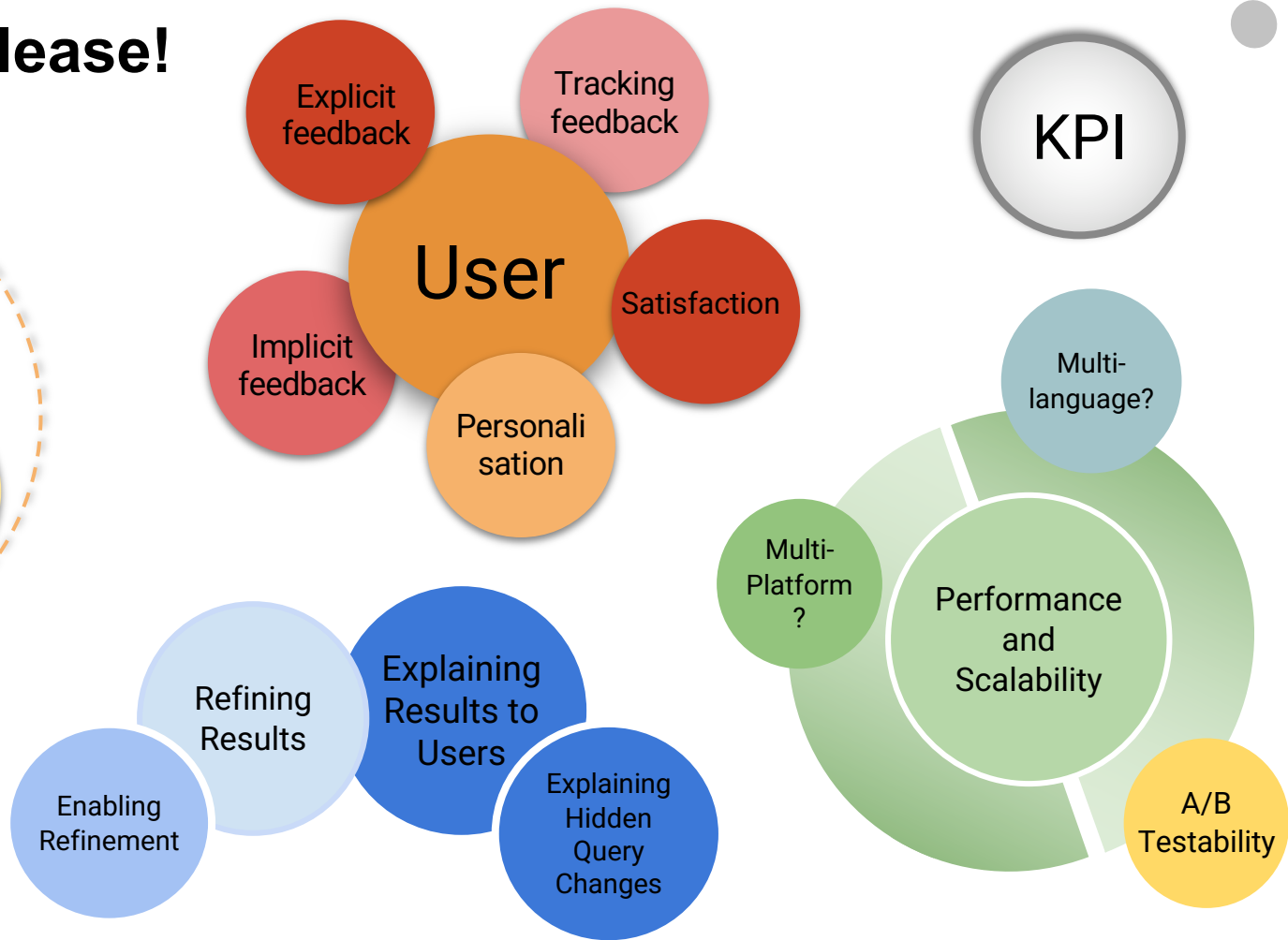
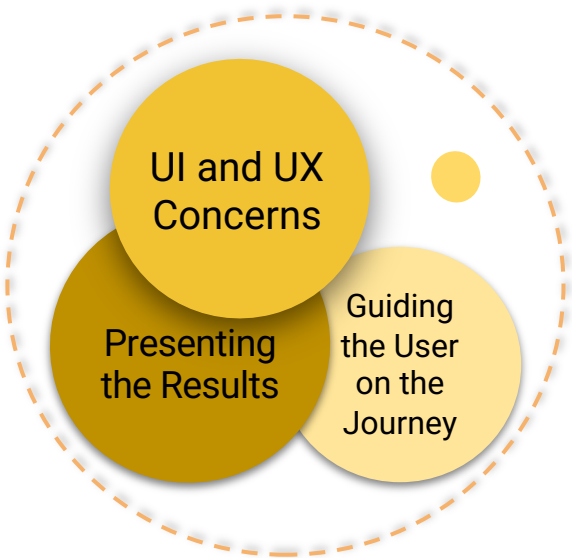
What's so hard about the data?



The black box magic?

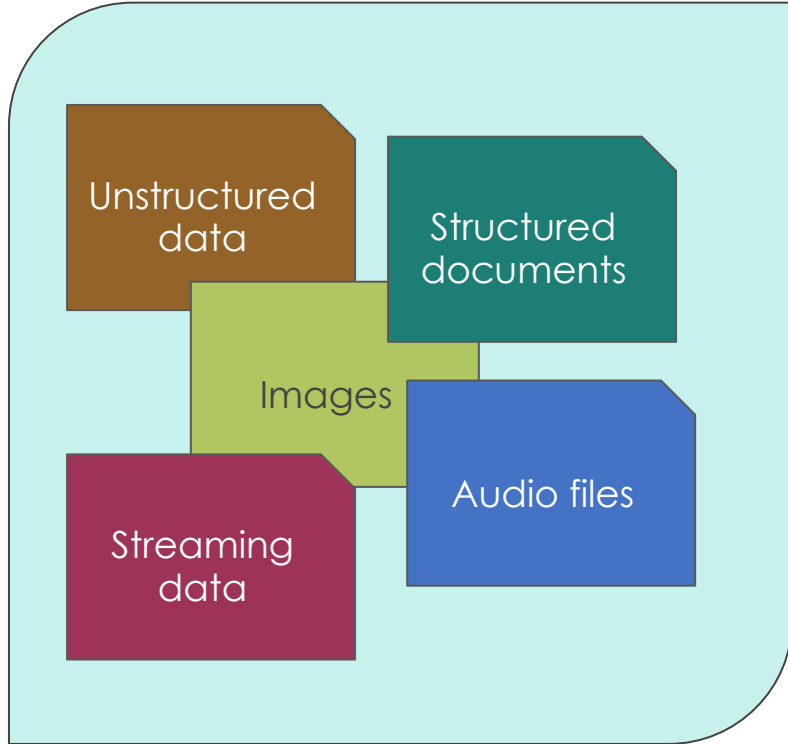


Just search, please!

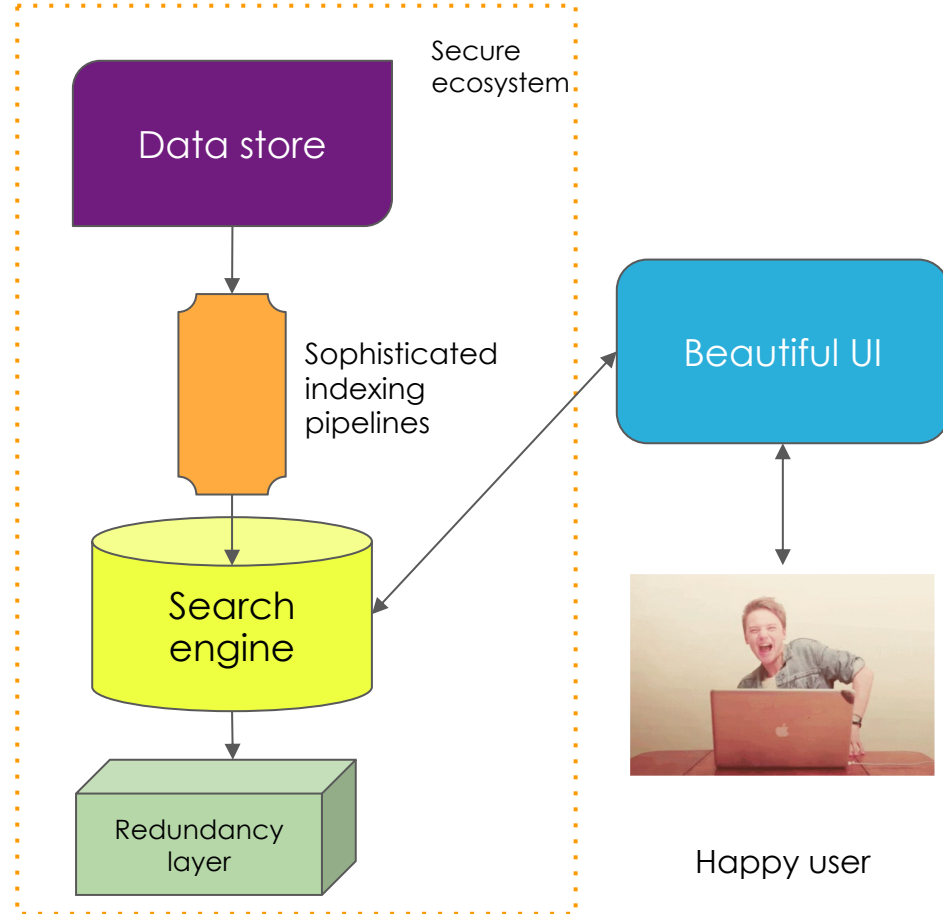


You are here

Data store



You want to get here!

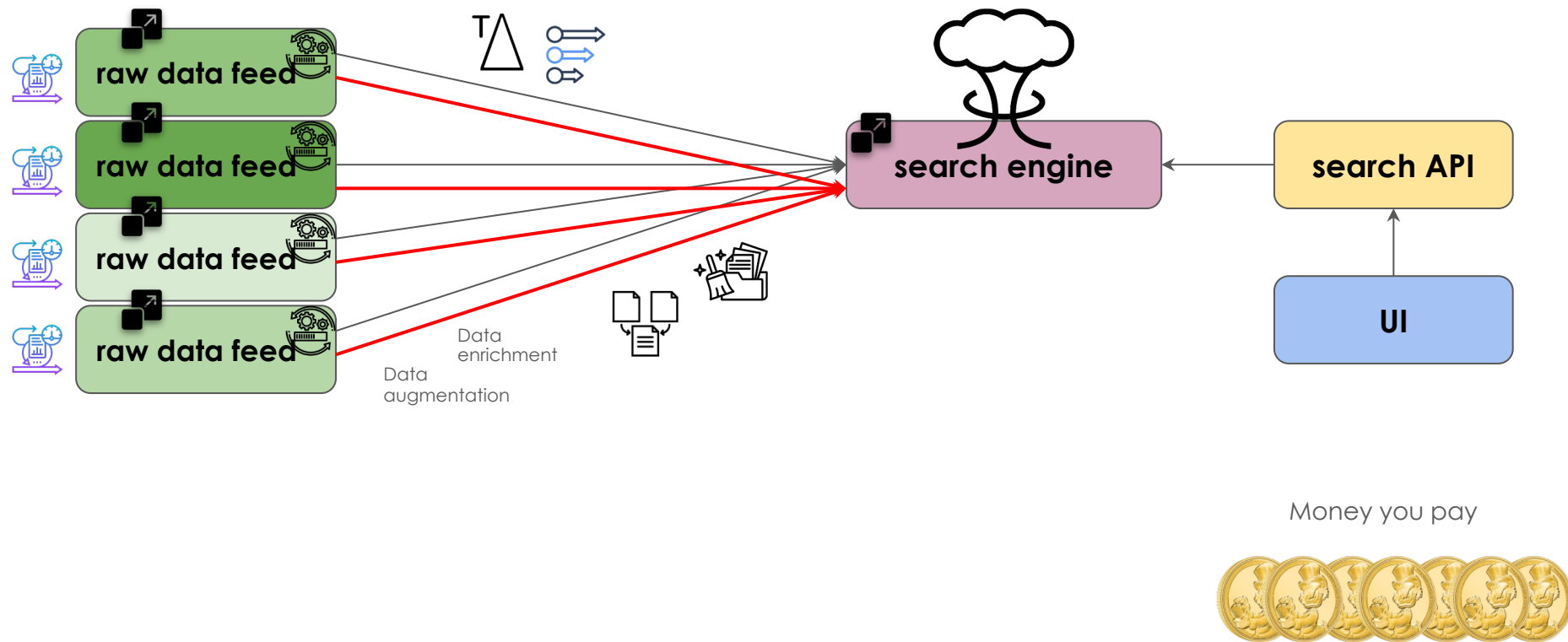




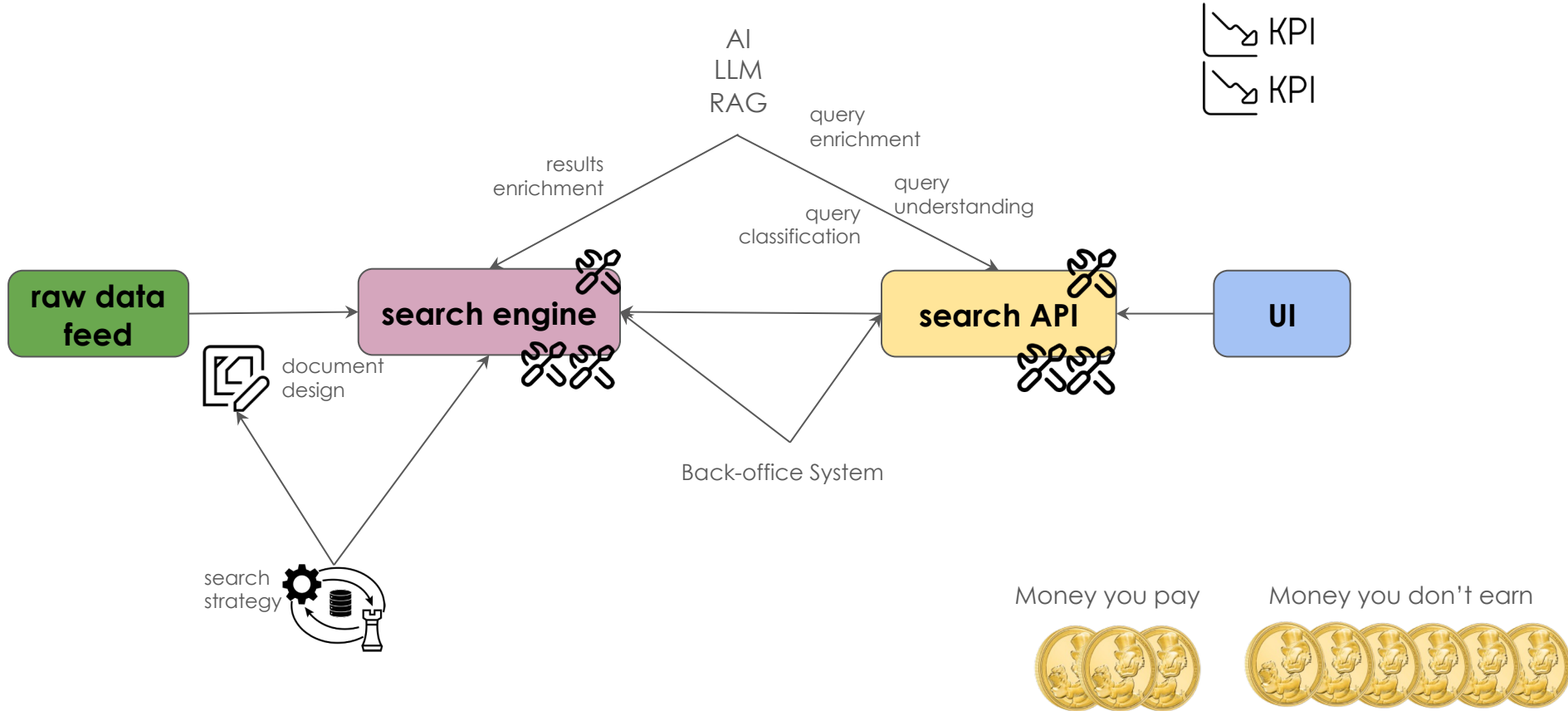
How things usually evolve

maybe you can relate...

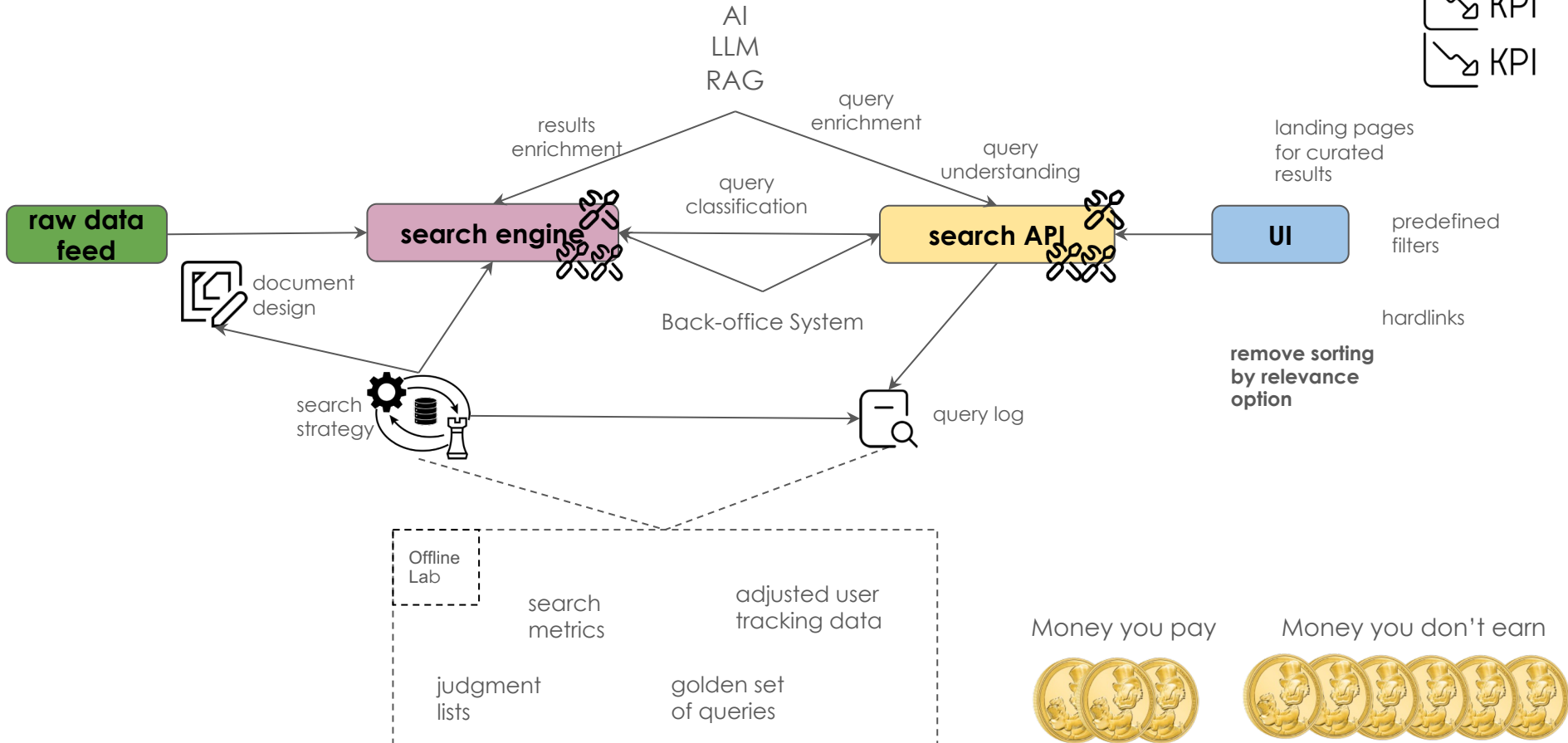
The typical story of building a search system, part I



The typical story of building a search system, part II



The typical story of building a search system, part III





Adjustments to improve things

our story continues...

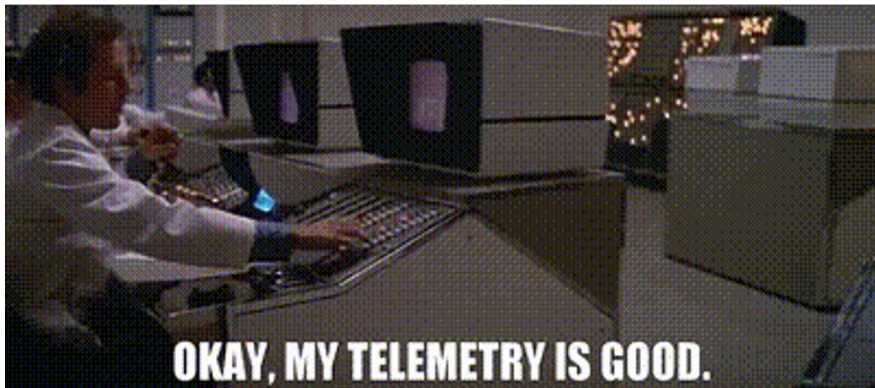
Some adjustments: data warehouse

- Centralize in-flight processes and focus on producing a custodial data warehouse
- Own data flowing through your system
- Authoritative source of truth: changes are being tracked
- Standardized data with unified quality
- Control rate and throughput of writes
- Costly operations performed once



Some adjustments: track the user journey

- High effort, high ROI
- Track users *before* and *after* their search session
- Use data to understand users and their problems, and to prioritize fixes
- Define universal schema for events
- Use for personalization, ML tasks



- Use to measure offline relevance
- Break cycle of isolated improvements and broad side effects

Some adjustments: build a testing framework

- Framework for offline and online experiments
- High effort with high ROI
- Create 'golden set' of queries to measure against
- Yes, manual dataset labelling still matters
- Standardize analysis for easier comparison of experiments' results
- Choose the right offline search metric(s)
- Monitor alignment between offline and online metrics



Some adjustments: manual curation

- Occasionally override the default behaviour of your system
- Use sparingly; temporary fix
- Most useful when users exhibit brand new search behavior
- Most useful in specialized domains (e.g. medical fields)
- It can save your day!



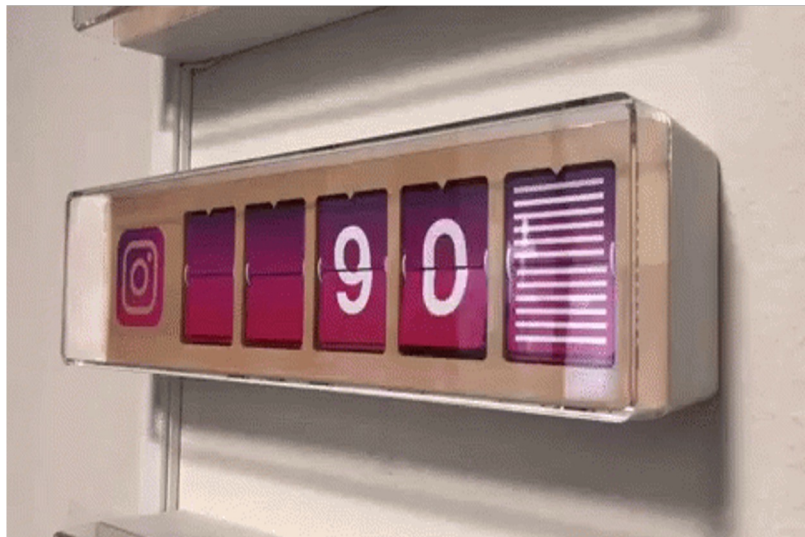
Some adjustments: search strategy

- Split retrieval; it is the first sequential stream
- It can be a multistage process
- Document's design-for-search needs to support your search strategy
- Have fallback when fancy things need emergency shut-down
- Monitor your latency, always



Some adjustments: ranking strategy

- Split ranking; it is the second sequential stream
- It can be a multistage process
- Rate candidates based on business values and quality checks
- Sometimes it is a game changer
- Apply own personalization, data-points are in search tracking



- Learning-to-Rank is great, try first with offline approach before online

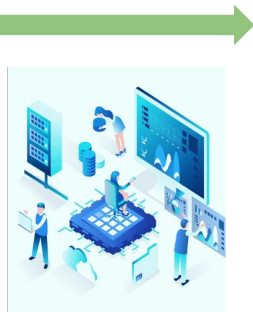


Level up

When should you reach for more? part I

Do you...

- ✓ Have lots of unstructured data?
- ✓ Pretty good end-to-end search system in place already?
- ✓ Enough engineers to greenfield a new project?
- ✓ Sizable budget for vector databases and LLMs?



Then you might be ready for GenAI!

- Enrich your existing search results with semantic results
- Build a RAG chat interface
- Include RAG-based signals into Learning-to-Rank
- Generate Did-You-Mean candidates
- Augment spell check
- Generate keywords, metadata

When should you reach for more? part II

Do you...

- ✓ Have data with inherent hierarchical relationships (e.g. eComm categories, specialized vocabularies)
- ✓ Is your data relationship-based (e.g. social networks)?
- ✓ Do you have specialists that can help with the information science aspects?



Then you might be ready to build a Knowledge Graph!

- Disambiguate user intent
- Increase recall by pulling overarching concepts



Our advice

Introducing: Need-Driven Development (NDD)

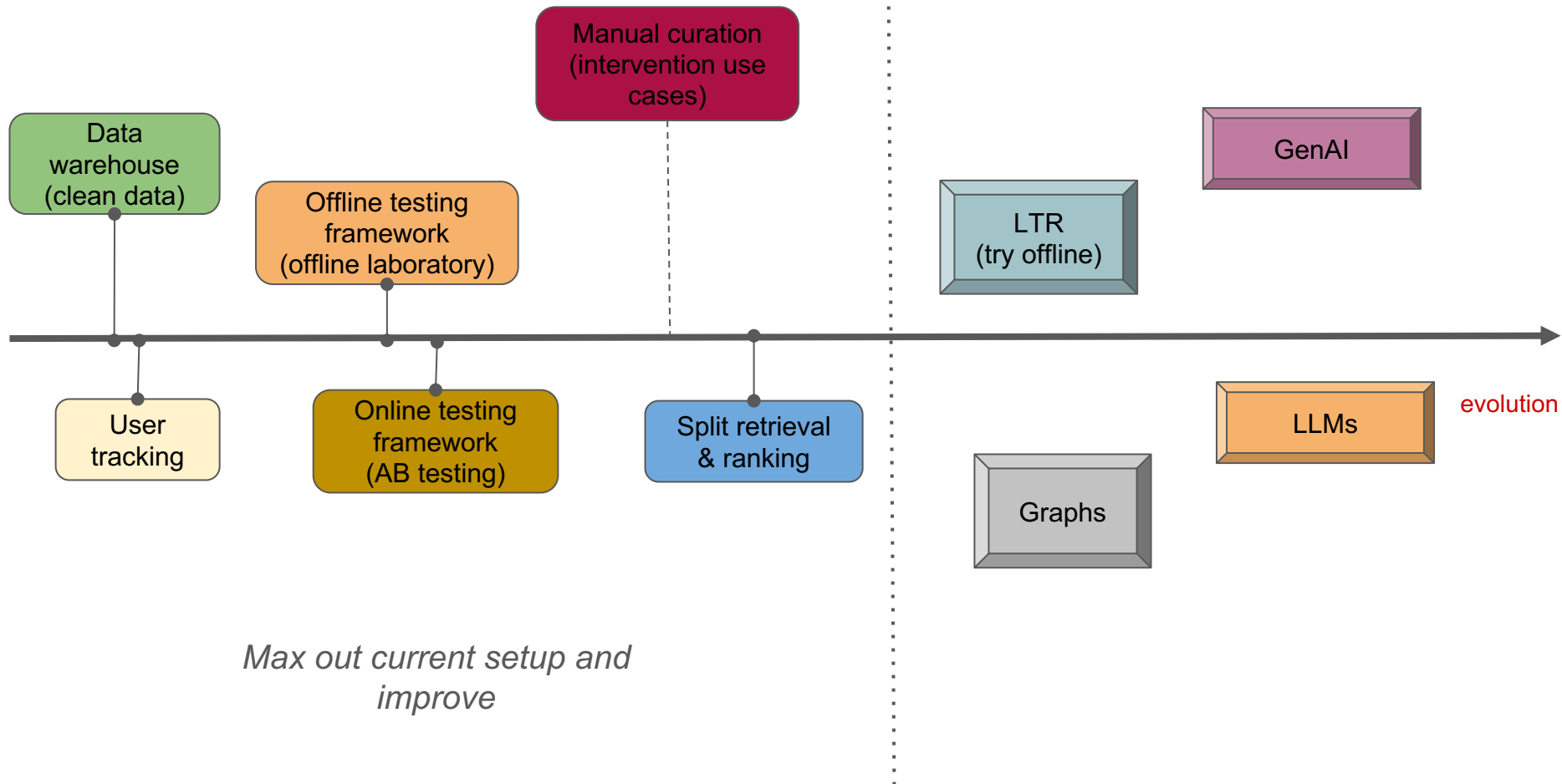
- Build what you need, as you need it
- Start small and simple, pick the easiest tool for the job to start now
- Technology is just a medium towards your goal
- Read, research, exercise on questions and options - do your due diligence!

Dos and Dont's

- ✓ Measure *something* (anything!) that you can benchmark against
- ✓ Don't do things to sound cool; use things that work for you!
- ✓ Limit entropy of your technology stack
- ✓ Establish good practice for working with data and then extrapolate
- ✗ Take shortcuts on data quality
- ✗ Overstate impact of new technologies but don't be ignorant
- ✗ Build rigid system, search is not a colosseum

NDD - Need Driven Development

The timeline



Thank you!

Contributors

- Elzbieta Jakubowska
- Atita Arora
- Audrey Lorberfeld
- Elizabeth Alvarez

Don't hesitate to reach out to us, we have collective knowledge.