



DeSci Sensemaking Networks

Adding a sensemaking layer to DeSci

Ronen Tamari

DeSci -> Broadening access to science

??? -> Making sense of all the new research DeSci is creating

The **X** factor in science

[Submitted on 15 Jun 2023 (v1), last revised 24 Jun 2023 (this version, v2)]

Exploring the MIT Mathematics and EECS Curriculum Using Large Language Models

Sarah J. Zhang, Samuel Florin, Ariel N. Lee, Eamon Niknafs, Andrei Marginean, Annie Wang, Keith Tyser, Zad Chin, Yann Hicke, Nikhil Singh, Madeleine Udell, Yoon Kim, Tonio Buonassisi, Armando Solar-Lezama, Iddo Drori

We curate a comprehensive dataset of 4,550 questions and solutions from problem sets, midterm exams, and final exams across all MIT Mathematics and Electrical Engineering and Computer Science (EECS) courses required for obtaining a degree. We evaluate the ability of large language models to fulfill the graduation requirements for any MIT major in Mathematics and EECS. Our results demonstrate that GPT-3.5 successfully solves a third of the entire MIT curriculum, while GPT-4, with prompt engineering, achieves a perfect solve rate on a test set excluding questions based on images. We fine-tune an open-source large language model on this dataset. We employ GPT-4 to automatically grade model responses, providing a detailed performance breakdown by course, question, and answer type. By embedding questions in a low-dimensional space, we explore the relationships between questions, topics, and classes and discover which questions and classes are required for solving other questions and classes through few-shot learning. Our analysis offers valuable insights into course prerequisites and curriculum design, highlighting language models' potential for learning and improving Mathematics and EECS education.

Comments: **Did not receive permission to release the data or model fine-tuned on the data**

Subjects: **Computation and Language (cs.CL)**; Artificial Intelligence (cs.AI); Machine Learning (cs.LG)

Cite as: arXiv:2306.08997 [cs.CL]

(or arXiv:2306.08997v2 [cs.CL] for this version)

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Submission history

From: Iddo Drori [view email]

[v1] Thu, 15 Jun 2023 09:48:14 UTC (10,482 KB)



Aran Komatsuzaki

@arankomatsuzaki

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Presents a comprehensive dataset of 4,550 questions and solutions from all MIT EECS courses required for obtaining a degree

arxiv.org/abs/2306.08997

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Sarah J. Zhang*
MIT
sjzhang@mit.edu

Sam Florin*
MIT
sflorin@mit.edu

Ariel N. Lee
Boston University
ariellee@bu.edu

Eamon Niknafs
Boston University
en@bu.edu

Andrei Marginean
MIT
atmargi@mit.edu

Annie Wang
MIT
annevwang@mit.edu

Keith Tyser
Boston University
ktyser@bu.edu

Zad Chin
Harvard University
zadchin@college.harvard.edu

Yann Hicke
Cornell University
y1h8@cornell.edu

Nikhil Singh
MIT
nsingh1@mit.edu

Madeleine Udell
Stanford University
udell@stanford.edu

Yoon Kim
MIT
yoonkim@mit.edu

Tonio Buonassisi
MIT
buonassisi@mit.edu

Armando Solar-Lezama
MIT
asolar@csail.mit.edu

Iddo Drori
MIT, Columbia University, Boston University
idrori@csail.mit.edu

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Nikhil Singh MIT nsingh1@mit.edu	Madeleine Udell Stanford University udell@stanford.edu	Yoon Kim MIT yoonkim@mit.edu	Tonio Buonassisi MIT buonassi@mit.edu
Armando Solar-Lezama MIT asolar@csail.mit.edu		Iddo Drori MIT, Columbia University, Boston University idrori@csail.mit.edu	

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A recent work from @iddo claimed GPT4 can score 100% on MIT's EECS curriculum with the right prompting.

My friends and I were excited to read the analysis behind such a feat, but after digging deeper, what we found left us surprised and disappointed.

dub.sh/gptsucksatmit



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Aran Komatsuaki @arankomatsuaki

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Keith Tyeer Boston University ktyeer@bu.edu	Zai Chin Harvard University zai@cs.harvard.edu	Yoon Hicke Cornell University yjh@cornell.edu	
Nikhil Singh MIT nsingh@mit.edu	Madeline Udell Stanford University mdu@stanford.edu	Yoon Kim MIT ykim@mit.edu	Tevin Bannam MIT tbannam@mit.edu
Armando Salar-Lezana MIT asalar@mit.edu	Sidd Doshi MIT, Columbia University, Boston University sdoshi@mit.edu		

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Raunak Chowdhuri @rauharda

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tub.slv/jtstucksatmit

Aran Komatsuaki @arankomatsuaki · Jun 15

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Julian Togelius @togelius

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Interaction Type	Count
Retweets	284
Quotes	20
Likes	1,243
Bookmarks	177

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No, GPT4 can't ace MIT

What follows is a critical analysis of "Exploring the MIT Mathematics and EECS Curriculum Using Large Language Models"

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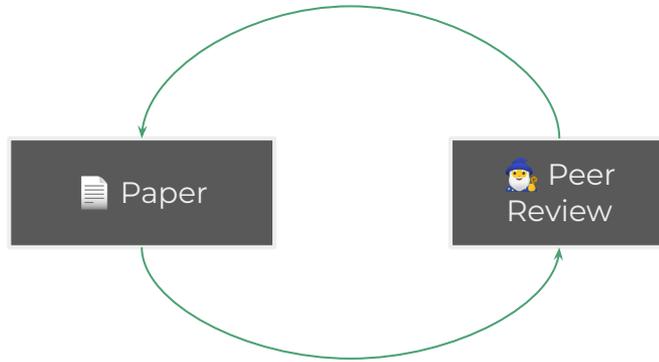
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Paper page - Exploring the MIT Mathematics and EECS Curric...
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This is a joint document written by three MIT EECS seniors (Class of 2024): Raunak Chowdhuri, Neil Deshmukh, and David Koplev.

3 problems with traditional science publishing



1. Lacks reach + rapid feedback

 **Aran Komatsuzaki** ✓
@arankomatsuzaki

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yhb@cornell.edu

Nikhil Singh MIT
nsingh1@mit.edu

Madeleine Udell Stanford University
udell@stanford.edu

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yoonkim@mit.edu

Tonio Buonassisi MIT
buonassisi@mit.edu

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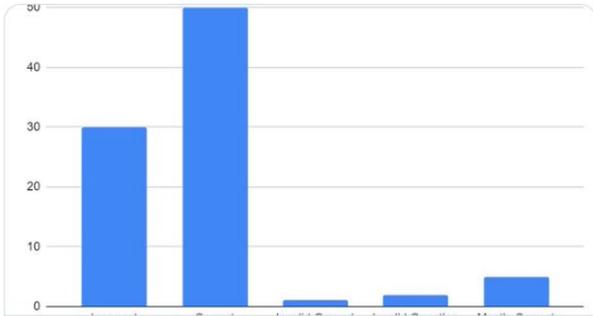
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2. Lacks support for diverse publishing formats and scales

announce



Aran Komatsuaki @arankomatsuaki · Jun 15

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endorse

review

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Paper page - Exploring the MIT Mathematics and EECS Curric...

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This is a joint document written by three MIT EECS seniors (Class of 2024): Raunak Chowdhuri, Neil Deshmukh, and David Koplev.

 **Adam Safron** 
@adamsafron

Looking forward to reading this.

 **Xinchi Yu** @Xinchi_Yu · Nov 1, 2022

Excited to share the preprint of a letter/opinion paper I wrote with my supervisor Ellen Lau! In this paper we propose a new research program, 'Binding Problem 2.0', extending the question from visual representations to conceptual representations. 1/9 psyarxiv.com/8hj7f

8:51 PM · Nov 2, 2022

reading-status

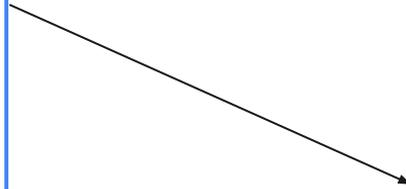


 **@emilybender@dair-community.social** ... @emily... · Apr 6, 2022 ...

Also, that em-dash makes it hard to tell if this is a bald assertion or part of what some AI researchers believe or what they believe might be the case. I'm guessing the average reader will miss that nuance and read it as a bald assertion.

But some artificial intelligence researchers now believe that the sound of your voice might be the key to understanding your mental state — and A.I. is perfectly suited to detect such changes, which are difficult, if not impossible, to perceive otherwise. The result is a set of apps and online tools designed to track your mental status, as well as programs that deliver real-time mental health assessments to telehealth and call-center providers.

2 1 72



inline-annotation

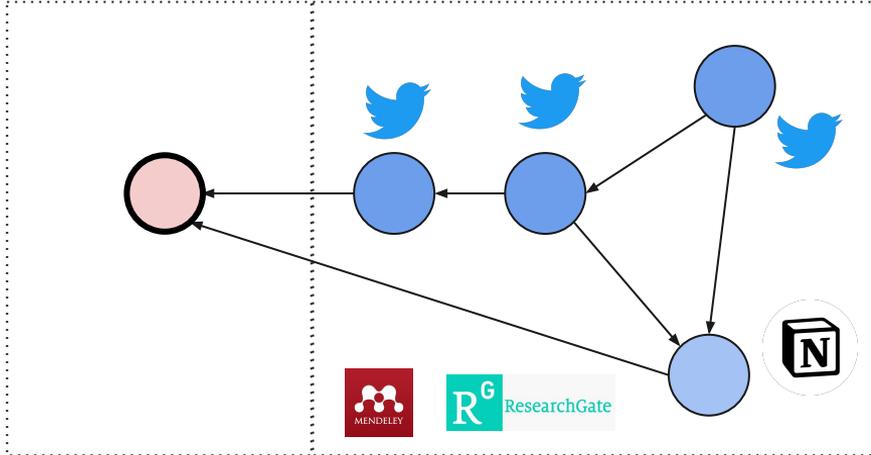
3. Data siloed/fragmented across multiple apps & formats

“altmetrics have been hamstrung by a lack of open access to the event streams we want to analyze...Most APIs are heavily restricted or very expensive to use at scale (e.g., Twitter) or they just don't exist: ever-greater swaths of the scholarly conversation now disappear into the profiteering maw of ResearchGate and other walled gardens, never to be seen again.”

[The state of altmetrics](#) (2019)

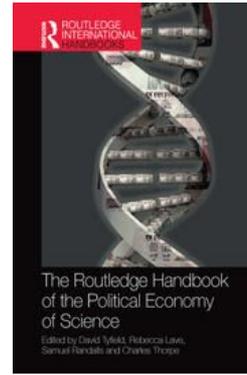
Paper

Sensemaking *about* paper



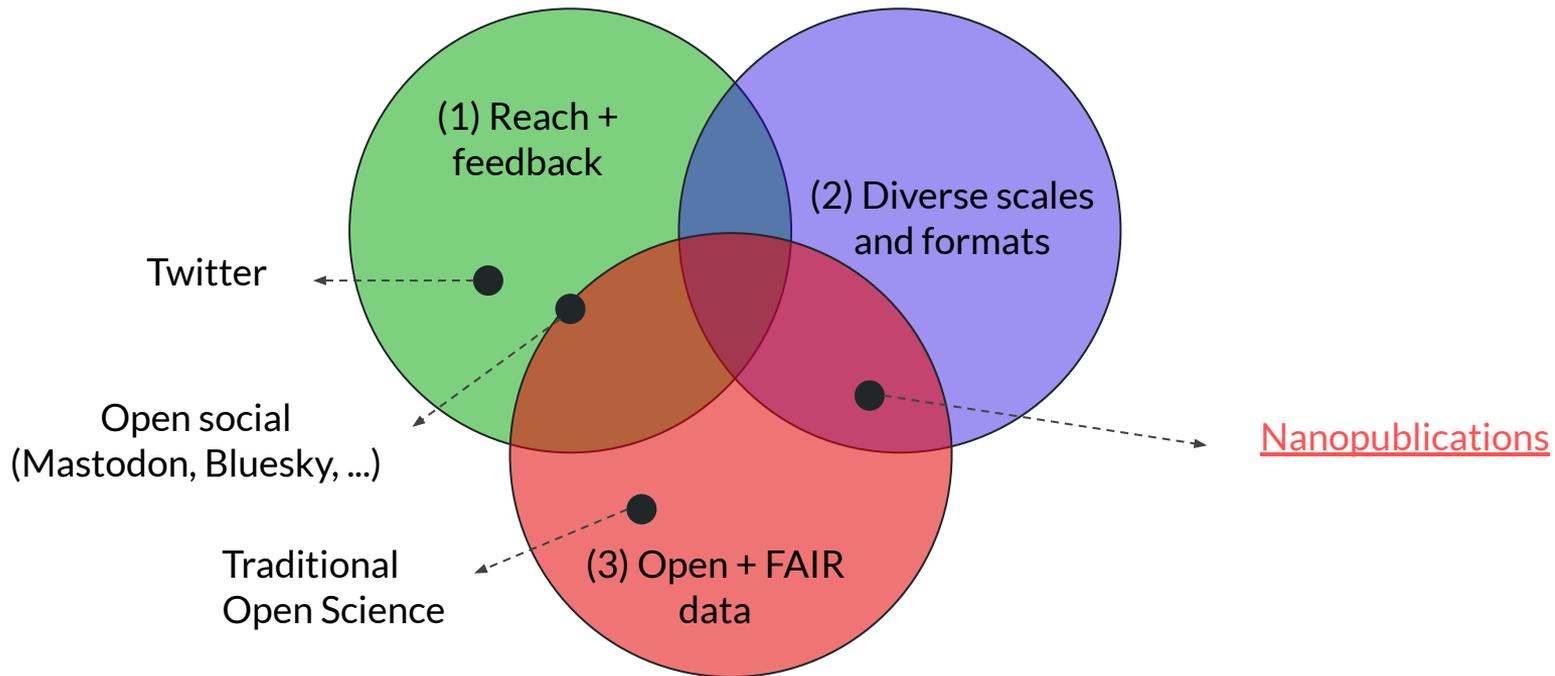
Scientific record,
Open Access

Off scientific record,
controlled by commercial
Platforms



Open Access Panacea
(Muellerleile, 2017)

*"...focusing too closely on ... openness may be distracting us from the ways that capital is sneaking in the back door and enclosing the **very tools we need to make sense** of this new world"*



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Assertion: Announcing a paper that I have read [^]

I (Ronen Tamari) have read the paper the paper with DOI

DOI for the paper starting with '10:'

The paper with DOI DOI for the paper starting with '10.'

has my comment " comment text " (optional)

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Assertion: Making a review comment according to the LinkFlows model [^]

This comment is a review comment

This comment refers to identifier of the object that is reviewed (e.g. a text or nanopublication)

This comment refers to the mentioning of identifier of a thing mentioned in the object that is reviewed (optional) [+](#)

This comment is a **comment about the content**

This comment is a **positive comment**

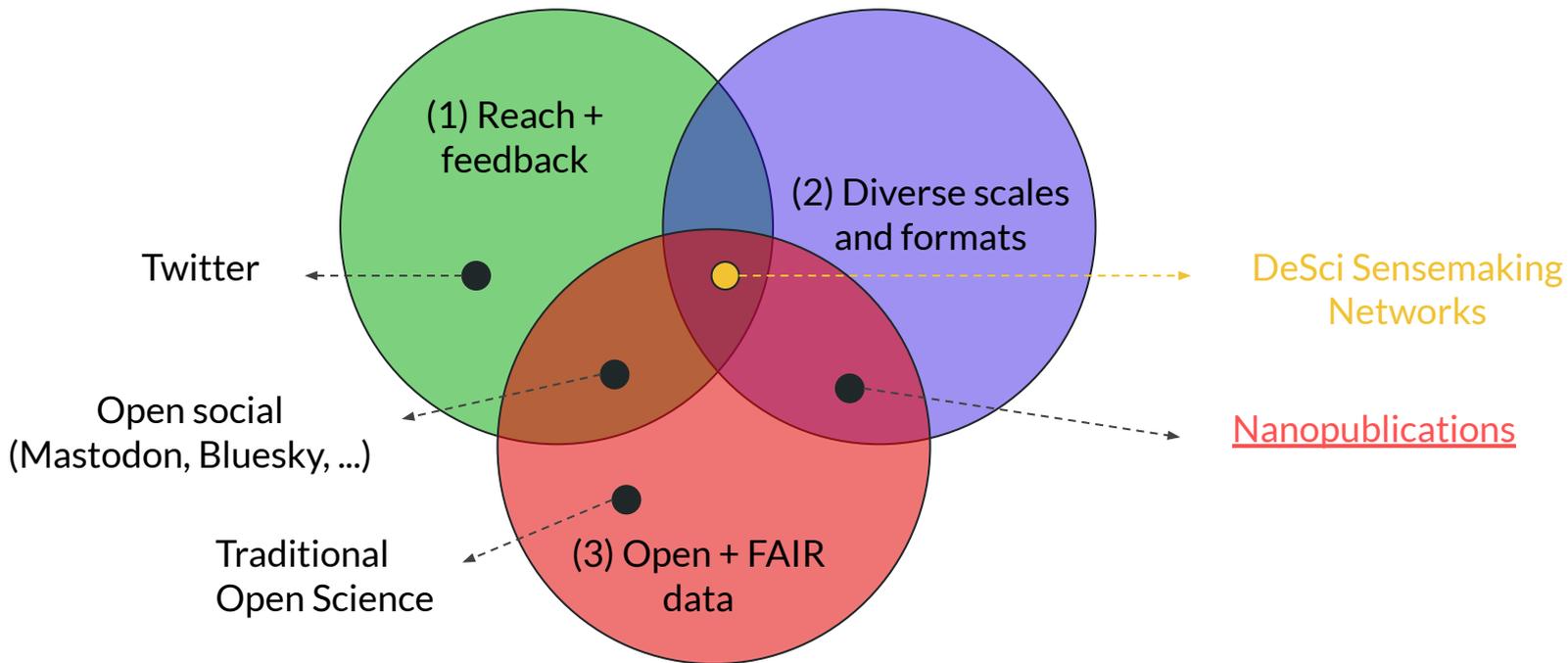
This comment is a **suggestion**

This comment has impact level " 4 "

This comment has the comment text " The content of this comment as free text "

Nanopublications

- Human **authors** as **authoritative** source for scientific knowledge (not algos!)
- “Text mining? ...Why bury it first and then mine it again?” - Barend Mons



DeSci Sensemaking Networks

- Twitter-style social network
- Posts are “sensemarks”: structured semantic objects (nanopubs) with interaction affordances (share, like, etc)
- Open + FAIR data
- Configurable algorithmic feeds
- ID: ORCID or similar web3 variant (OpSci)

Search or paste URL



Home



mastodon



@ronent
Edit profile



What's on your mind?



Select template...

500

nanopublish!



Björn Brembs
@brembs

16m

Yup, that's what "transformative agreements" look like:

"We run a substantial risk of getting stuck in a perpetual transformation that also contributes to increasing costs."

su.se/english/news/open-access...



www.su.se

Open access: Need to move away from transformative agreements - Stockholm University

Open access: Need to move away from transformative agreements Sweden is far ...

#openaccess



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Notifications

Explore

Live feeds

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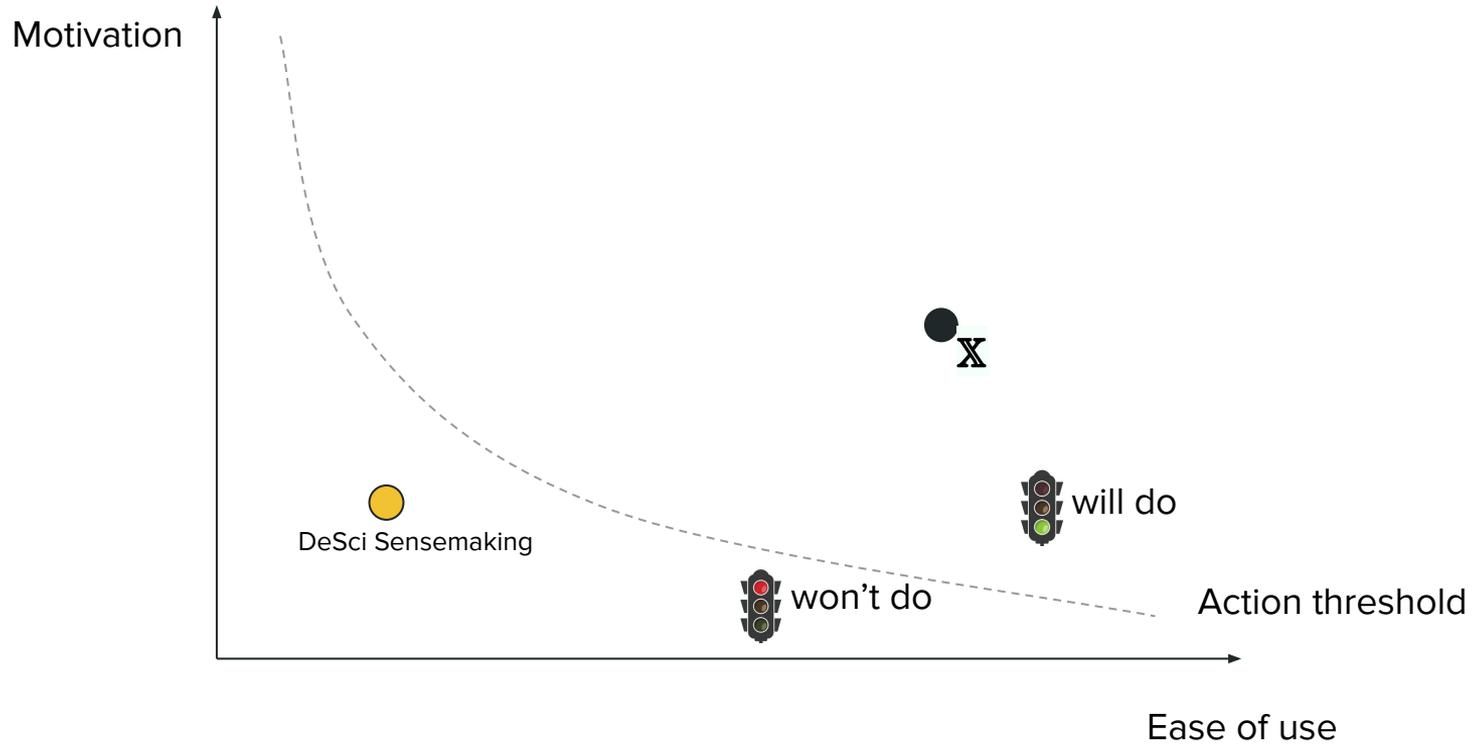
Bookmarks

Favorites

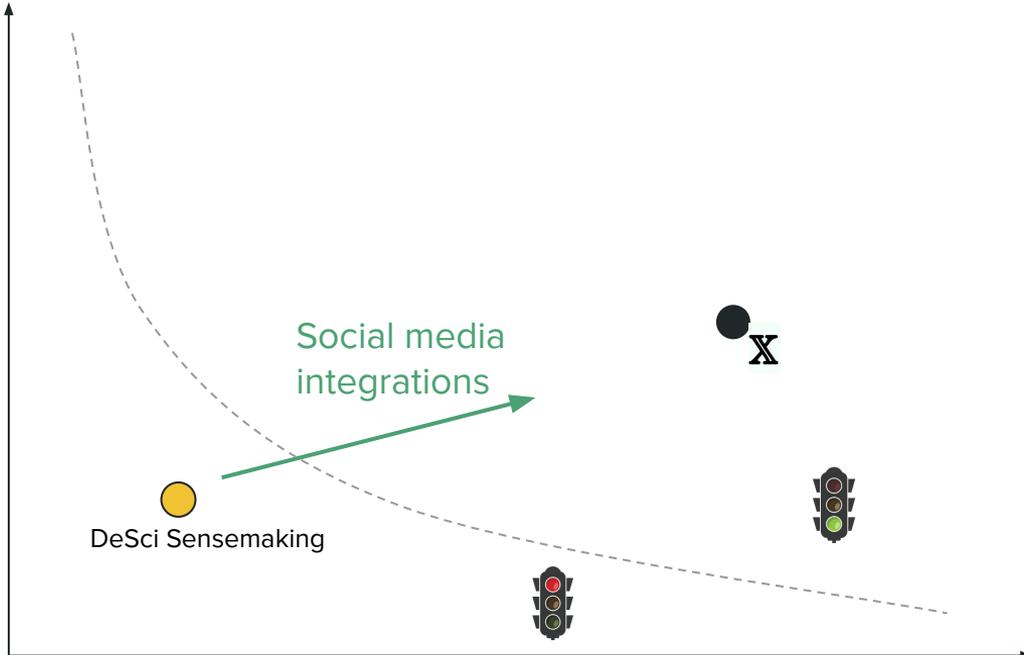
Lists

Test

Preferences



Motivation

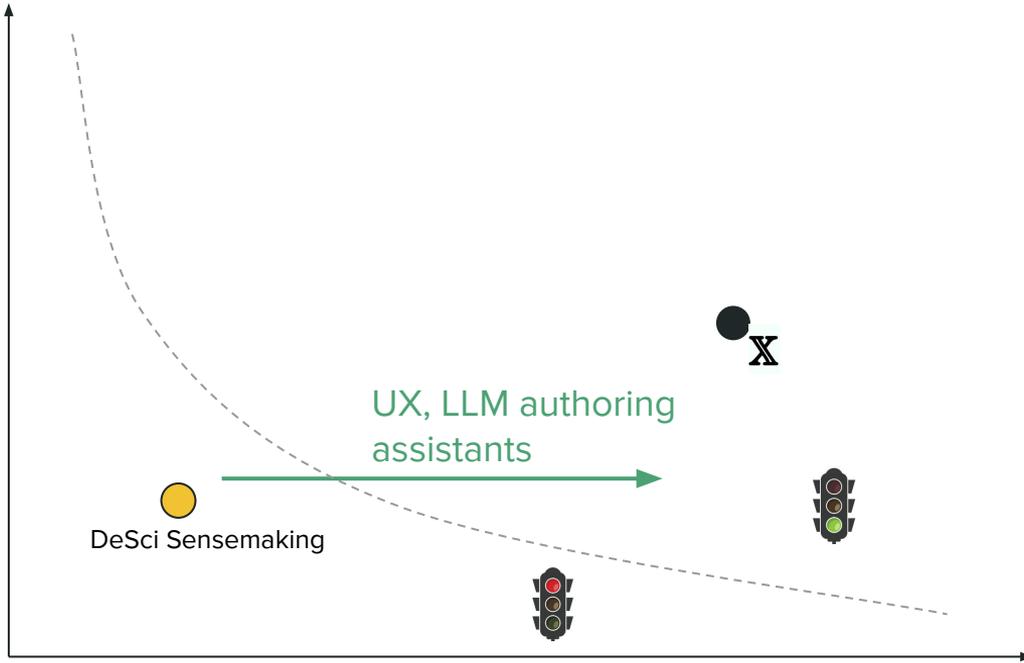


DeSci Sensemaking

Social media
integrations

Ease of use

Motivation

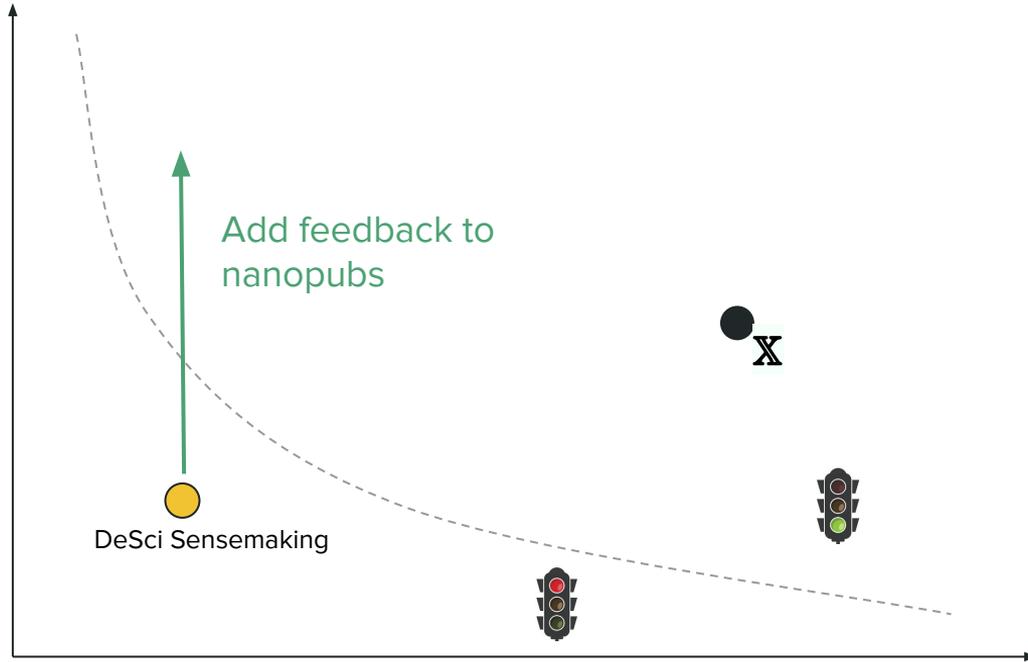


DeSci Sensemaking

UX, LLM authoring assistants

Ease of use

Motivation

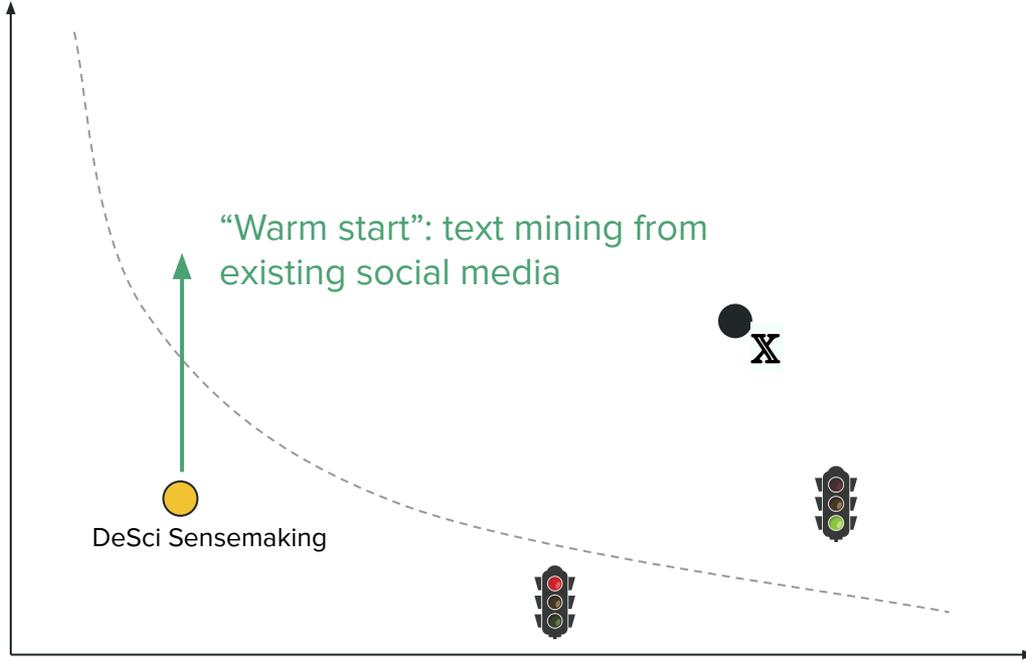


Add feedback to
nanopubs

DeSci Sensemaking

Ease of use

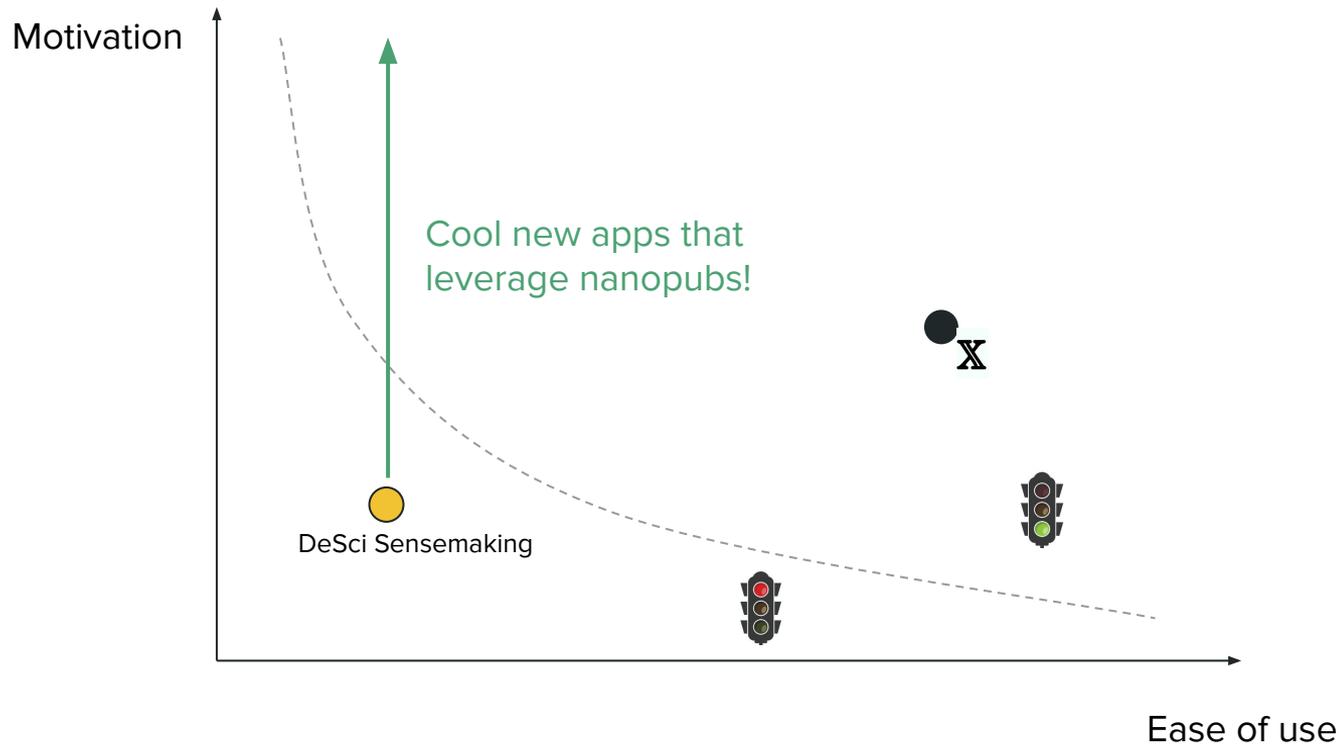
Motivation



DeSci Sensemaking

“Warm start”: text mining from existing social media

Ease of use





New Results

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Generalization in Sensorimotor Networks Configured with Natural Language Instructions

Reidar Riveland, Alexandre Pouget

doi: <https://doi.org/10.1101/2022.02.22.200000>

This article is a preprint and has not been certified by peer review.



Abstract

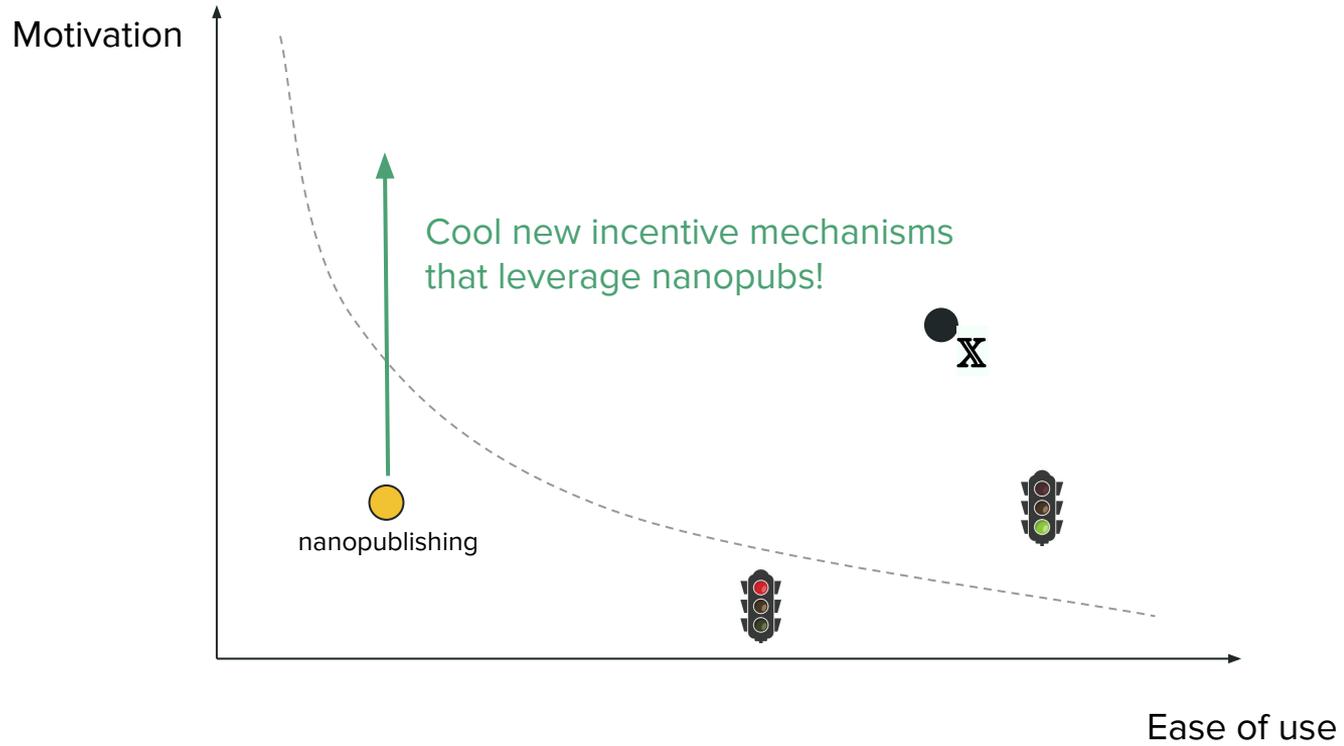
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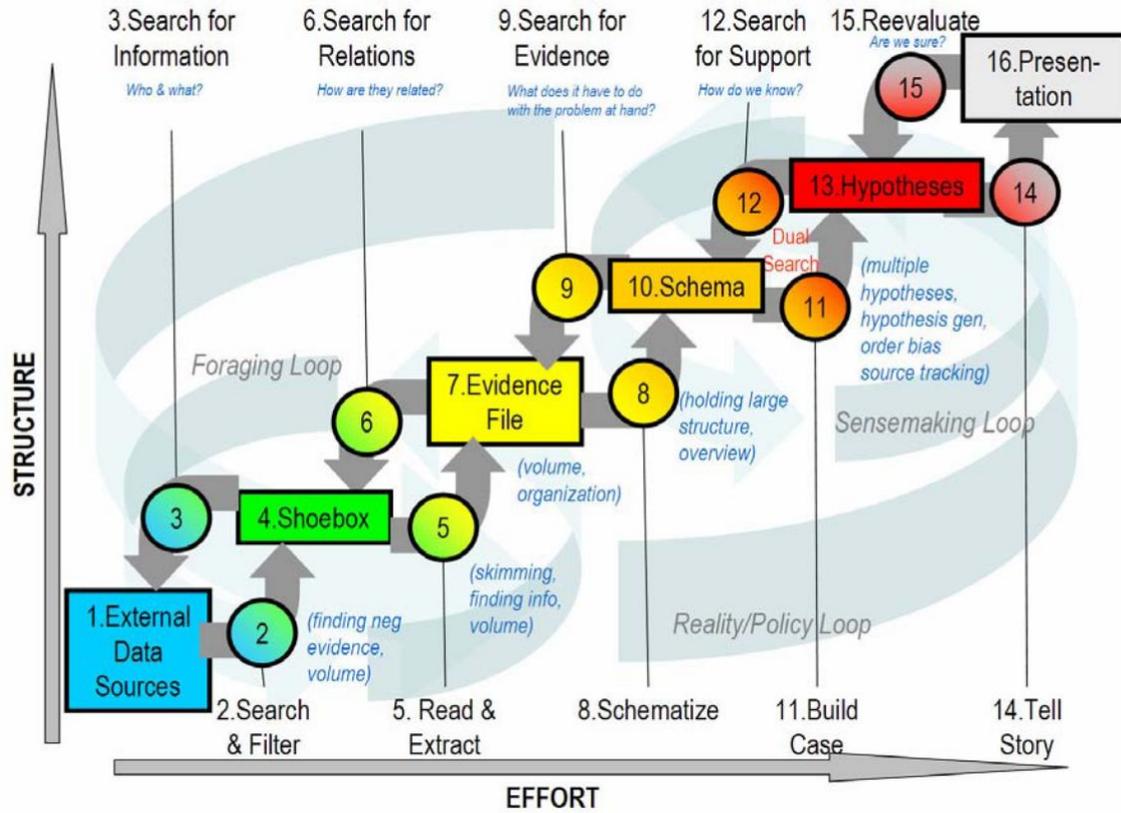
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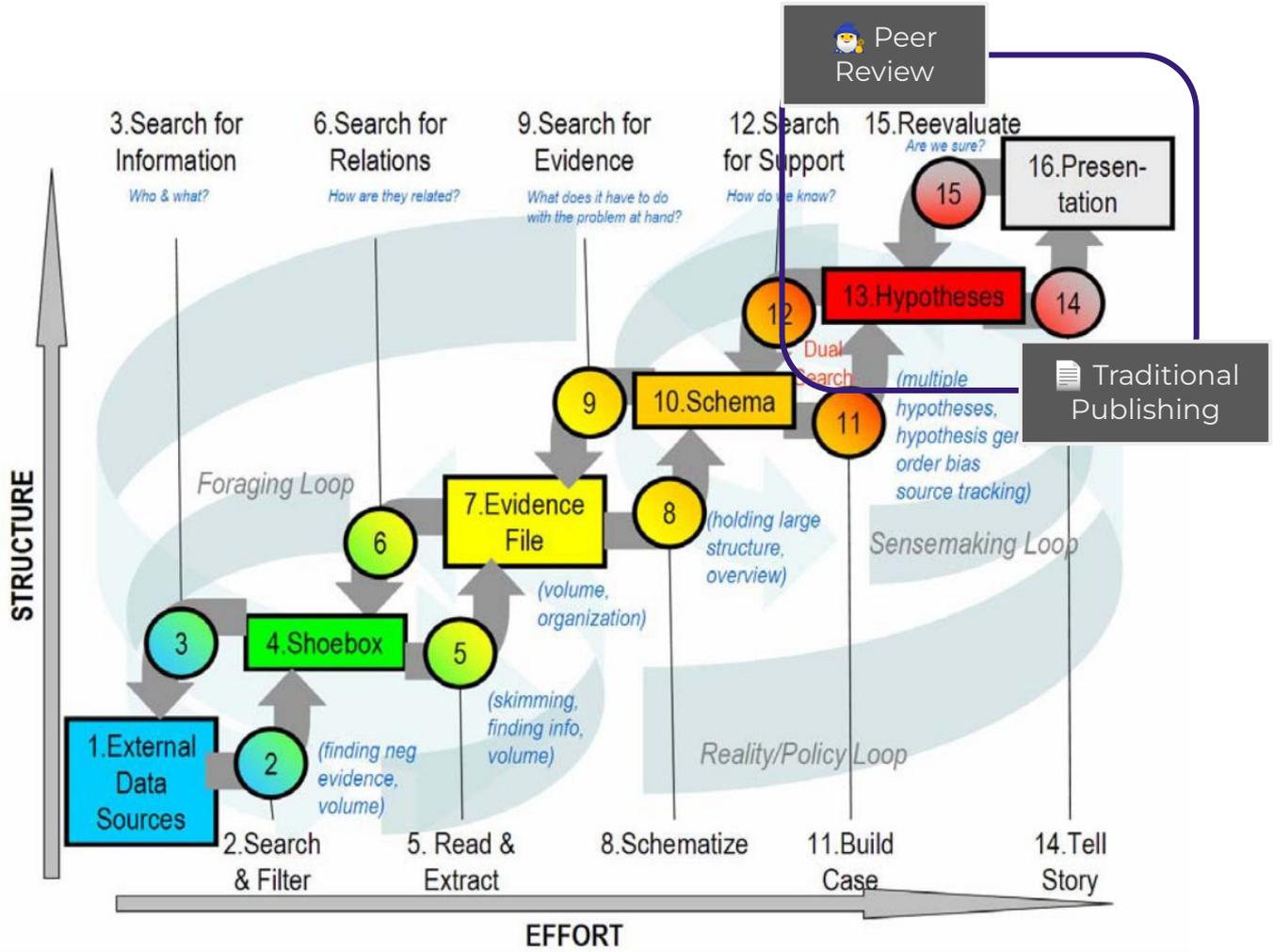
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 [4.5 Avg. review score \(4 verified reviews\)](#)
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 [4 Inline annotations](#)
 [2 discourse graphs reference this research](#)

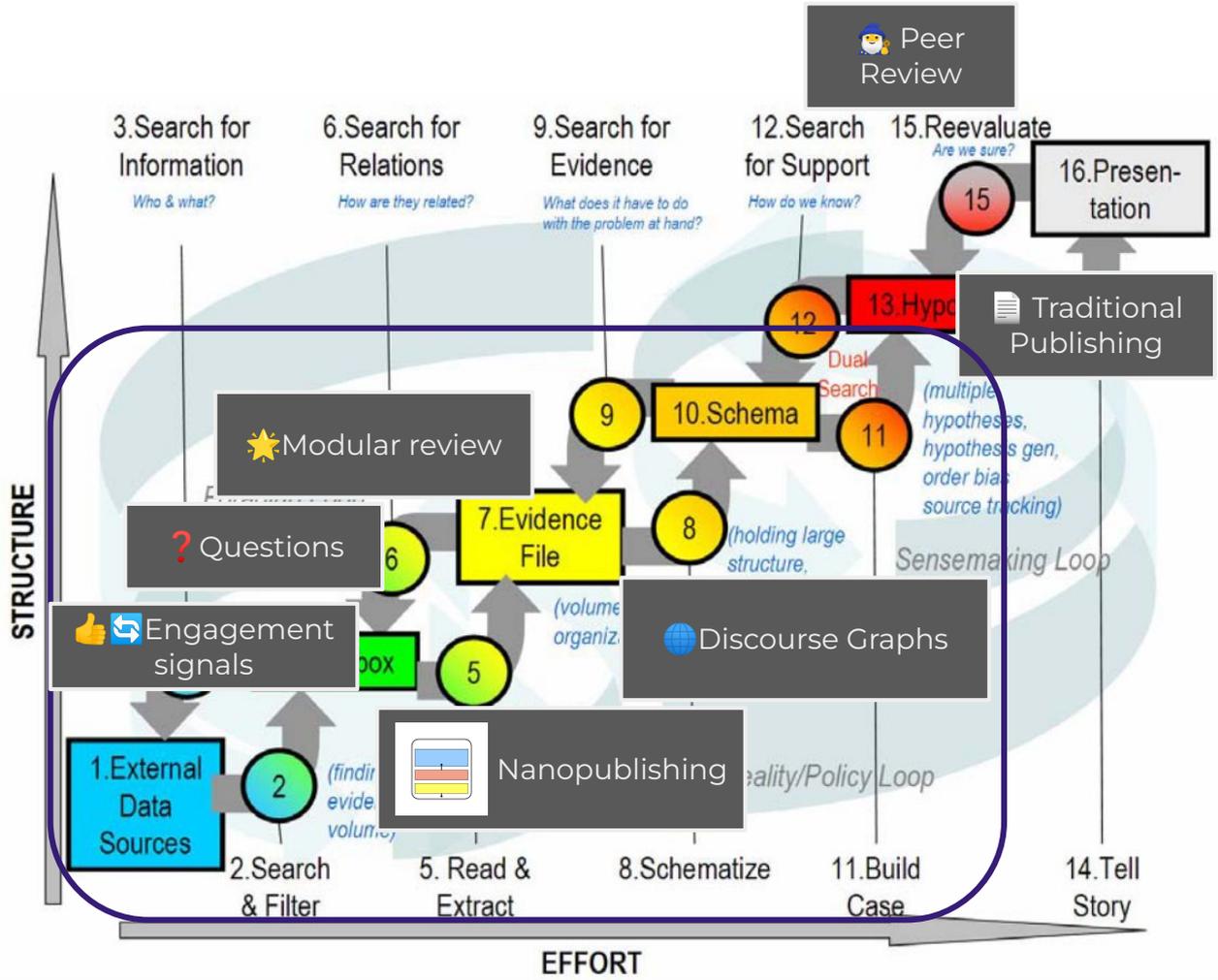
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PDF



Source: Pirolli, P., & Card, S. (2005)





EFFORT

DeSci Sensemaking as a sociotechnical movement

Traditional Science Sensemaking	DeSci Sensemaking
Power Centralization	Power Decentralization
Exclusive, monoculture participation ecosystem	Inclusive, diverse participation ecosystem
Neoliberal science - driven by competition	Regen science - driven by cooperation
Knowledge fragmentation , data enclosure	Knowledge integration , data sharing

Calling fellow SenseMakers!

Collective sensemaking is... collective!

Join us if you're interested in contributing to {research, development, community building, anything else}

