MAPS Medical™ Affairs Professional Society
FOR Medical Affairs Professionals BY Medical Affairs Professionals

Welcome!

Demystifying Artificial Intelligence:

What is AI and why does it matter to Medical Affairs?

Presenters

Richard Graves

CCO and Cofounder

Sorcero

Luca Dezzani, MD

VP, US Oncology Medical Affairs

Janssen Pharmaceutical Companies of Johnson & Johnson

Walter Bender

CTO and Cofounder

Sorcero

Educational Objectives

This session will provide a learning opportunity for our audience by:

- Defining key terminology and capabilities of artificial intelligence
- How Medical Affairs can direct AI in its application
- Examining ways AI can enhance Medical Affairs workflows
- Best practices for building a partnership between AI and Medical Affairs

Poll #1:

Why are you interested in learning more about AI?

A. I want to better understand how AI can support my workflows in medical affairs.

B. I want to engage in deeper discussions with my vendors to partner on crafting solutions.

C. I want to be able to separate the reality from the claims and build trust in AI.

D. I want to make faster, data-backed decisions with the support of AI and advanced analytics.

Medical Affairs and Artificial Intelligence

Why is Medical Affairs growing more interested in learning about AI?

- Digital transformation of Medical Affairs
- Extracting evidence from rapidly growing, complex sources
- Impact of COVID-19 on workload and new data needs
- Making the shift from multichannel to omnichannel

Poll #2:

What is your biggest roadblock when it comes to getting started with AI?

A. I am uncertain what problems AI can help with.
B. I am uncertain which approaches to use, (ie. NLP vs. ML)
C. I don't know how to quantify or verify the efficacy of the AI.
D. I worry about model accuracy, maintenance, and bias.

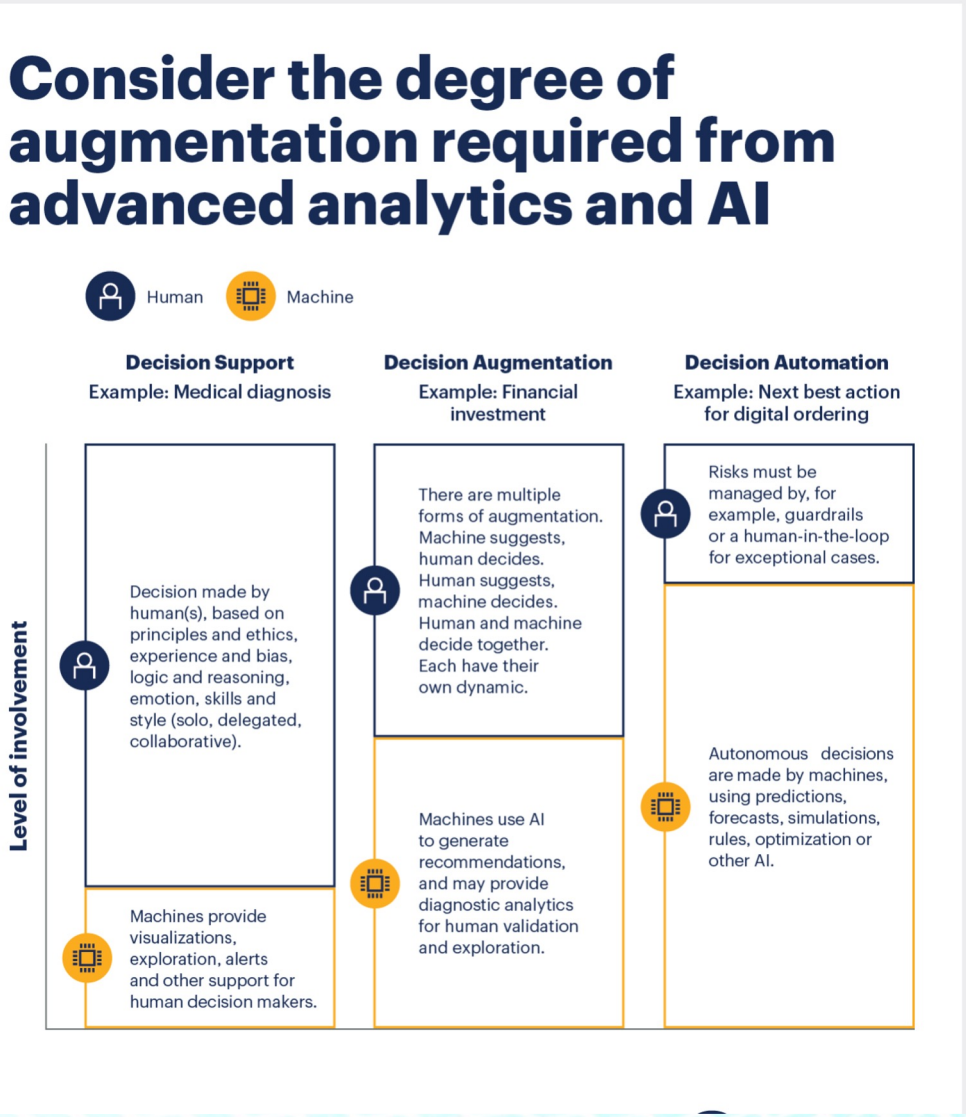
Medical Affairs and Artificial Intelligence

Degrees of AI in Deployment:

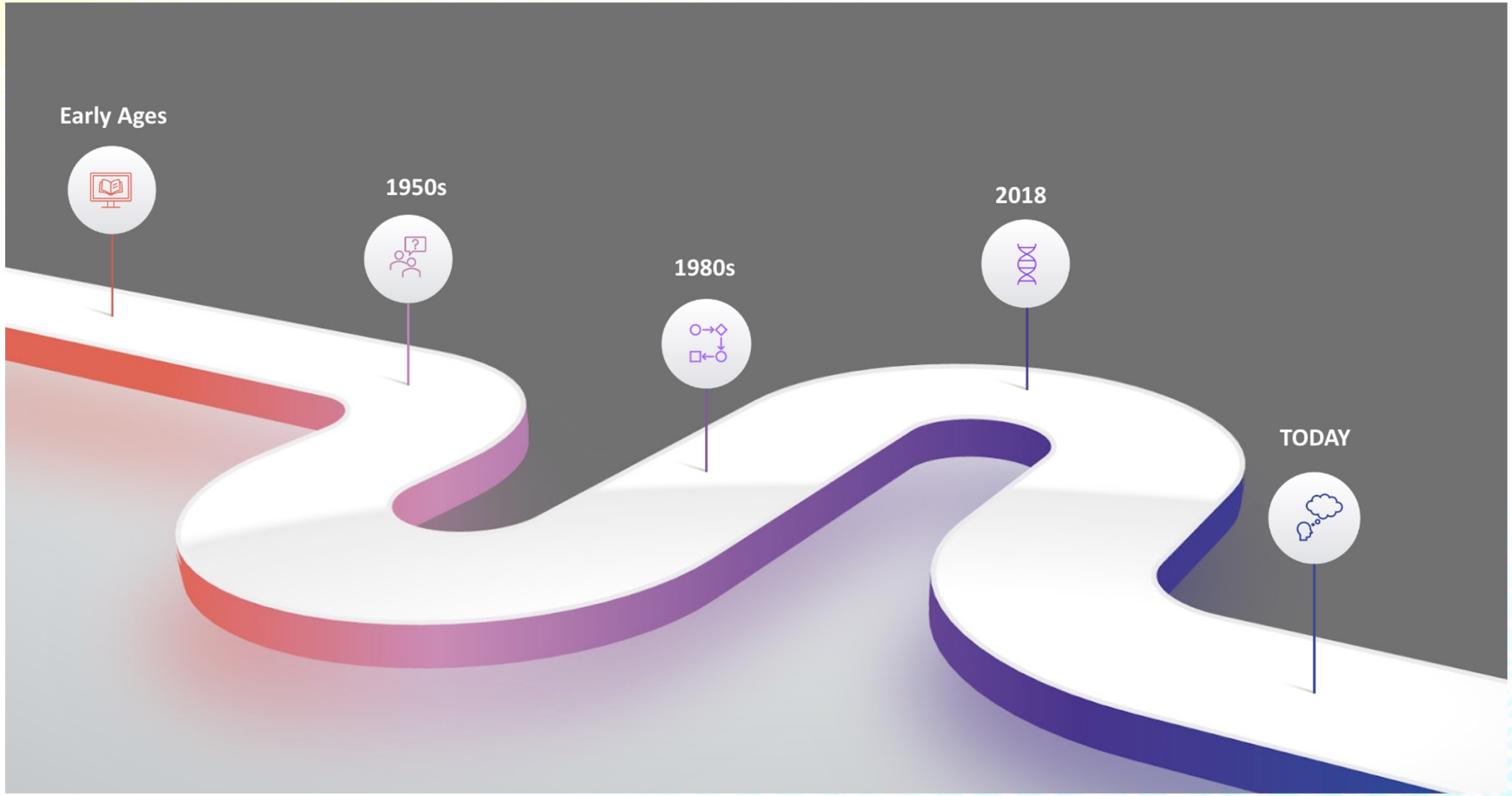
- Decision Automation
- Decision Augmentation
- Decision Support

The value of learning more about AI:

- Engage in deeper internal discussions
- Identify new Medical Affairs use cases and opportunities
- Patient outcomes - tracing back to why we're here



When did artificial intelligence get its start? How has it evolved?



AI is a long-standing academic discipline with its own KOLs

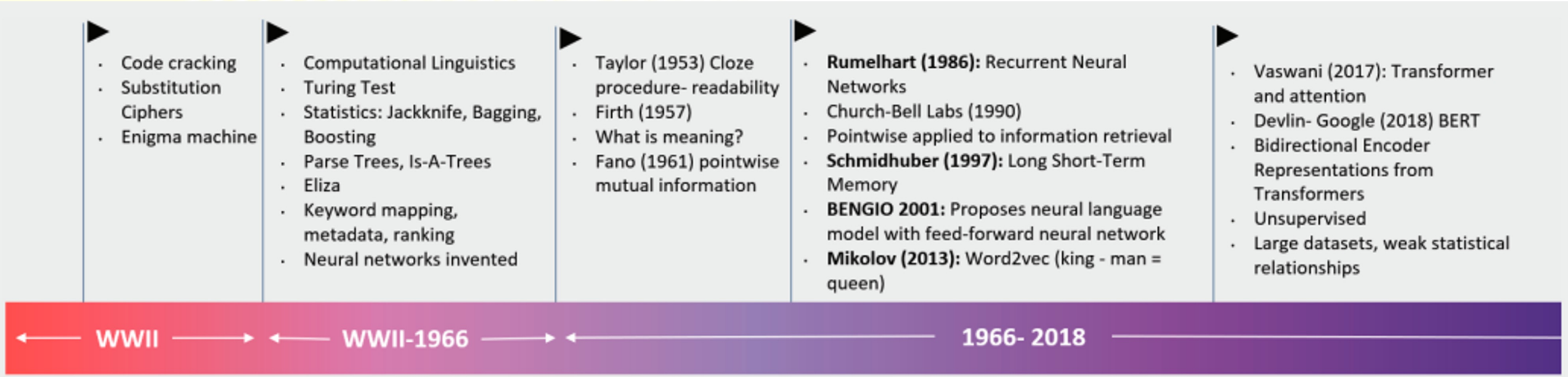
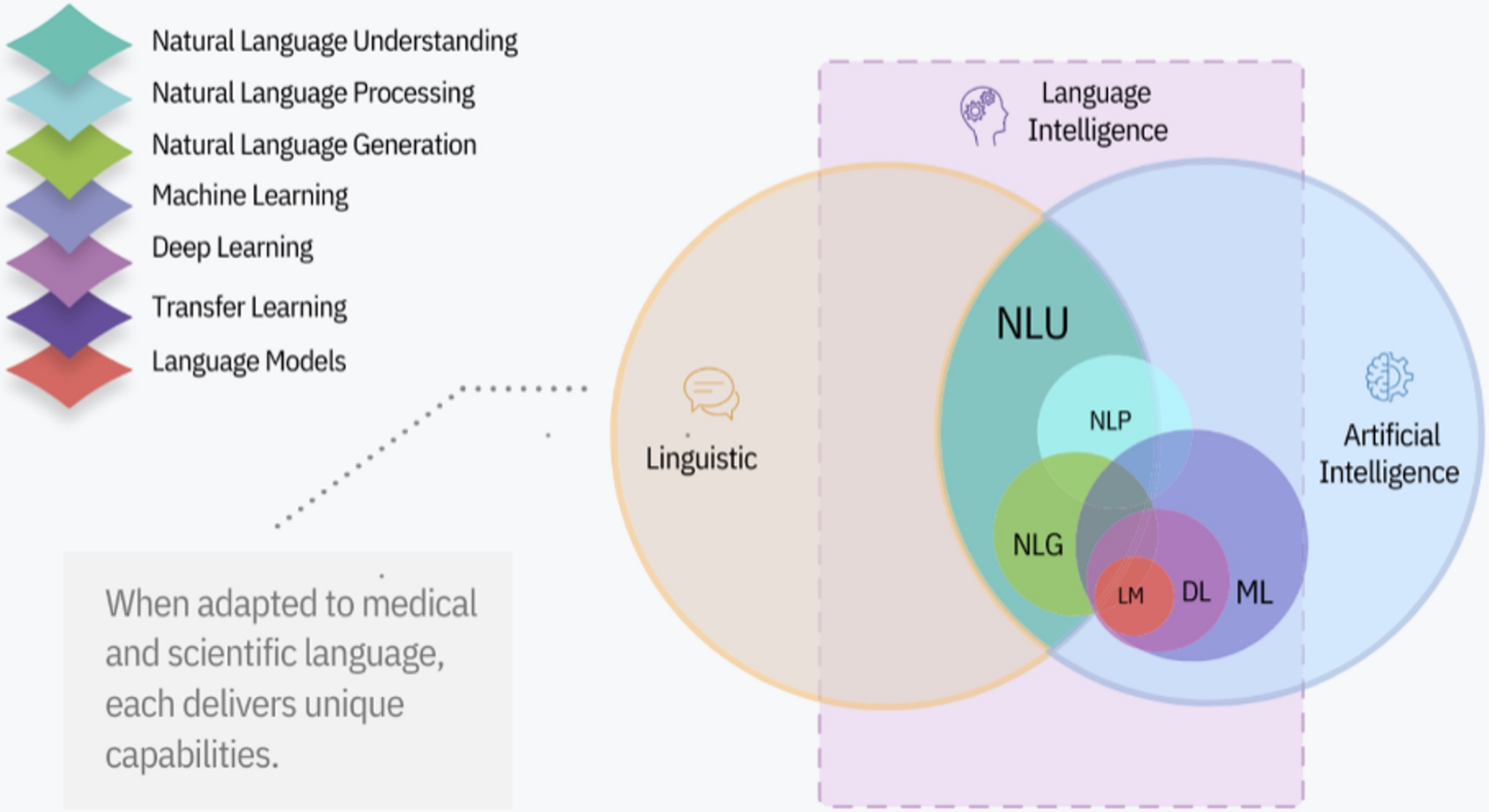


Figure 5. The Evolution of AI and Language Intelligence

Families of Artificial Intelligence

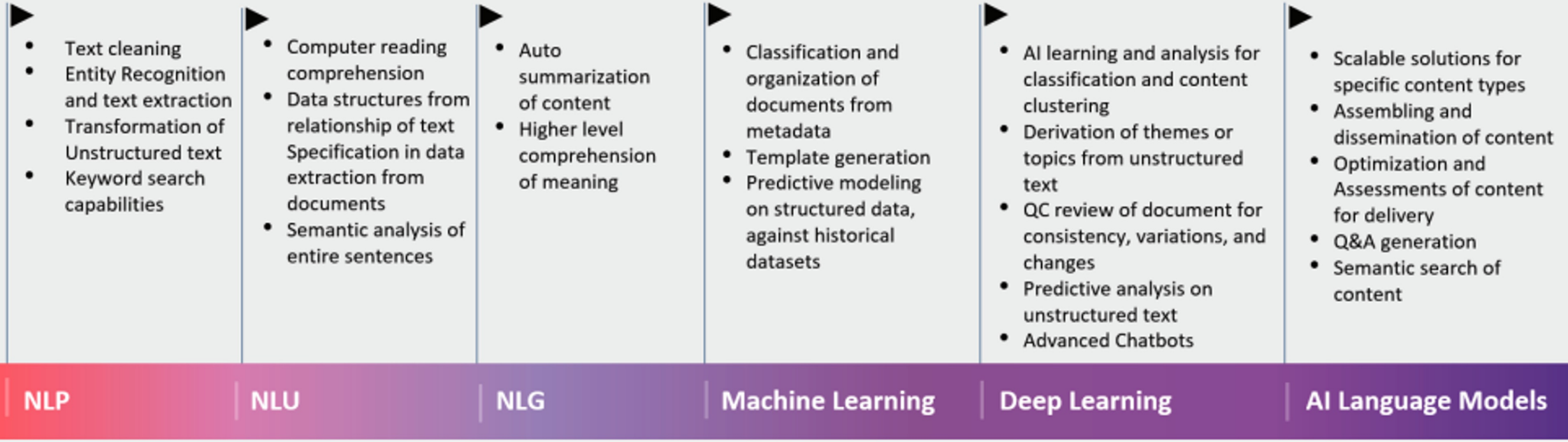
AI consists of fields of computer science focused on data and language.

Families of AI applicable to publications:



When adapted to medical and scientific language, each delivers unique capabilities.

Capabilities of Artificial Intelligence Technologies



Each Application of Artificial Intelligence Solves Different Needs

- Novel data with different facets are continuously published across peer reviewed journals, clinical trials, congresses, and medical guidelines.

- Each family of AI provides a key layer to solving the knowledge extraction challenge for novel use cases.
  - NLP to annotate medical text and identify themes
  - Deep Learning to automate ingestion of unstructured text
  - NLU to drive deeper concept understanding

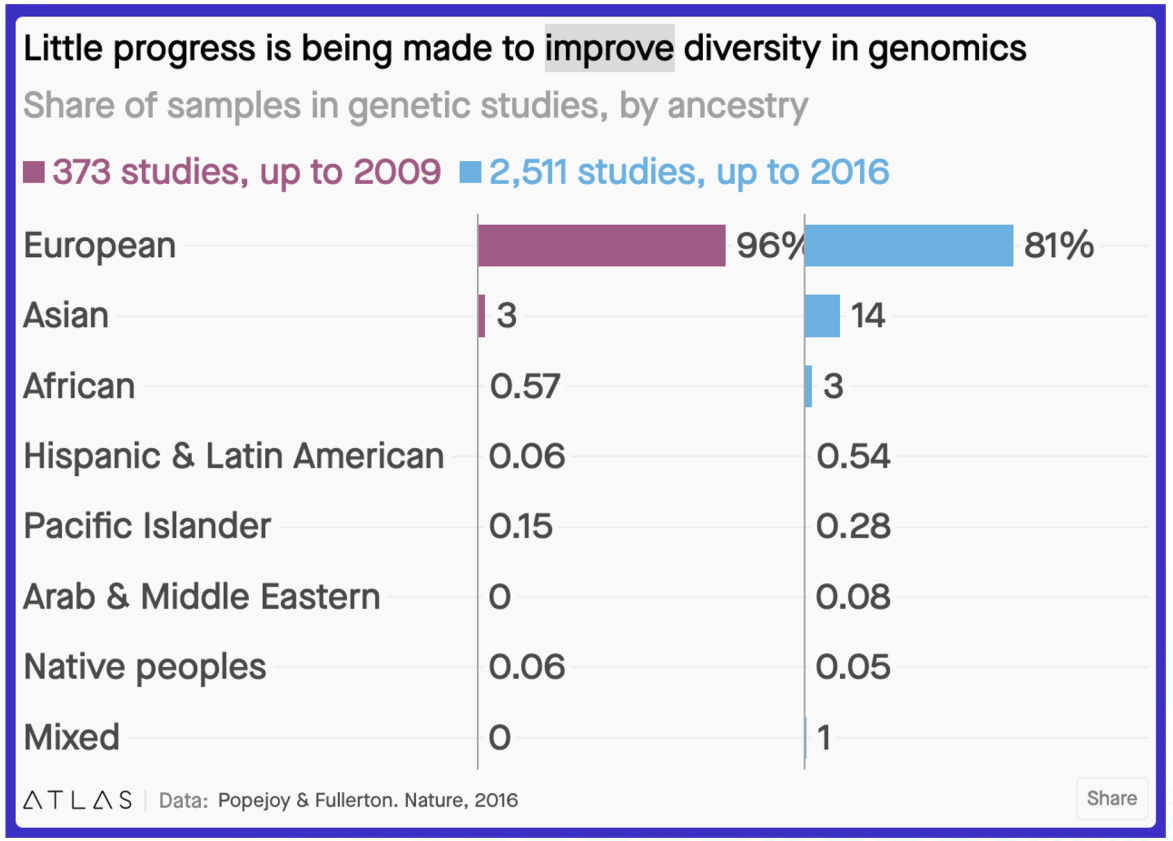
- Layering AI solutions can unlock new possibilities, but it is limited by the ideas and needs of medical professionals

Medical Affairs can apply AI towards Health Equity

An “expert in the loop” approach can identify key needs, like health equity data gaps

In a highly technical industry like Life Sciences, it’s important to train models with **domain-specific language** to **understand biomedical language**.

Can be used to also **identify when there is insufficient data** for key populations and unmet needs.



Medical Affairs Use Case: Literature Monitoring

Decision Automation: Medical Tagging in Literature

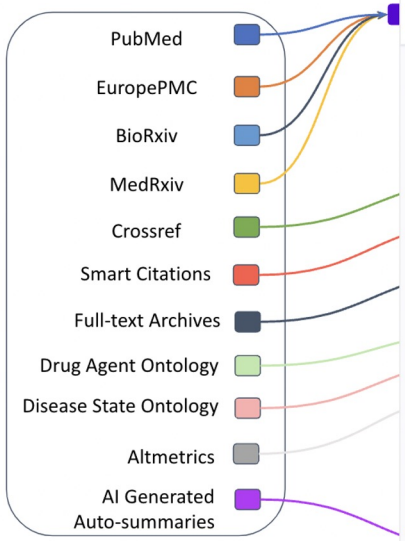
Unification of Citation Indices, Ontologies, Full-text sources

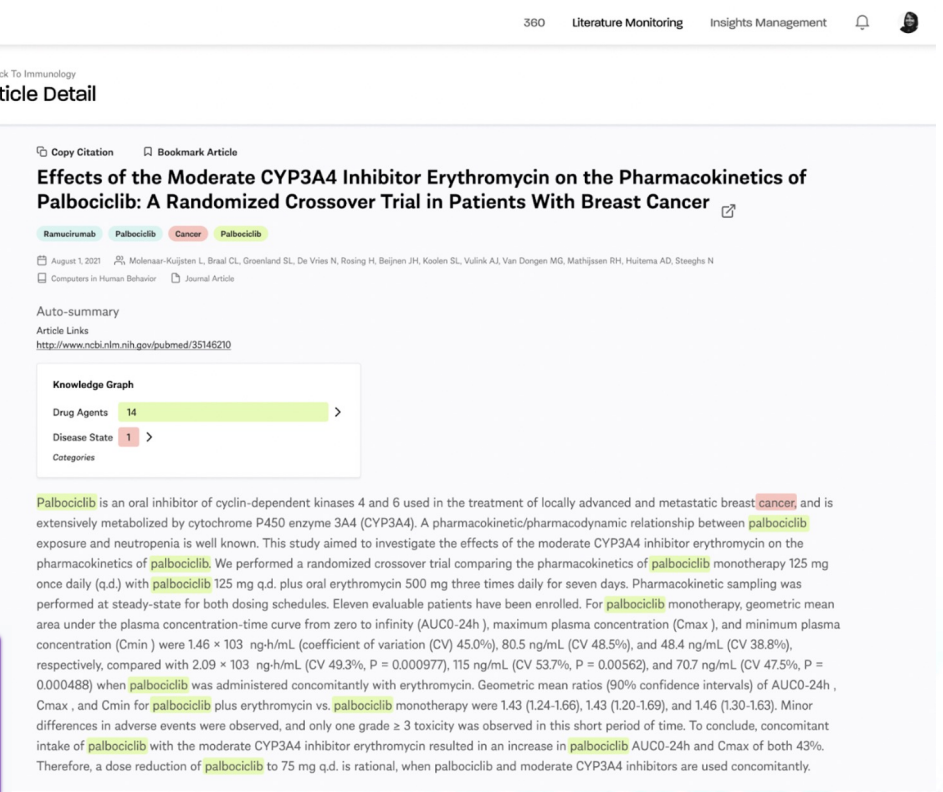
Decision Augmentation: Identification of Trending Themes

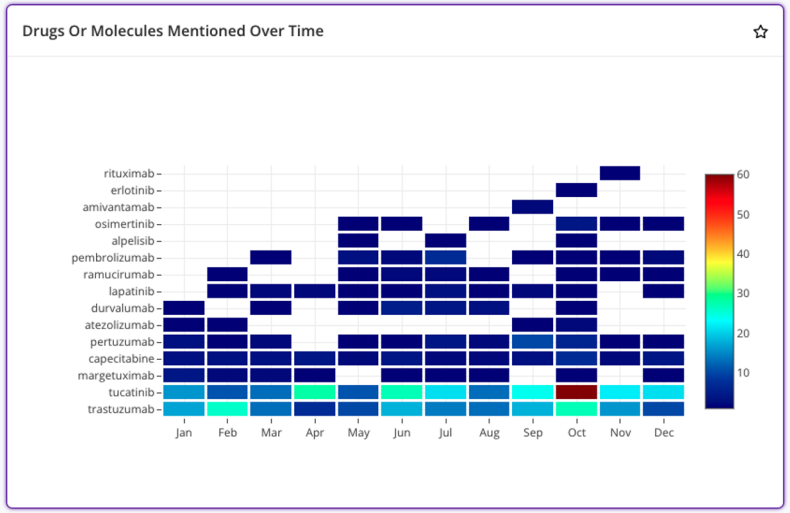
Auto-summaries of articles to support full-text selection

Decision Support: Relevancy Scoring for Evidence Review

Analytics of drug relevancy and trending disease states to inform gap analyses and integrated evidence generation





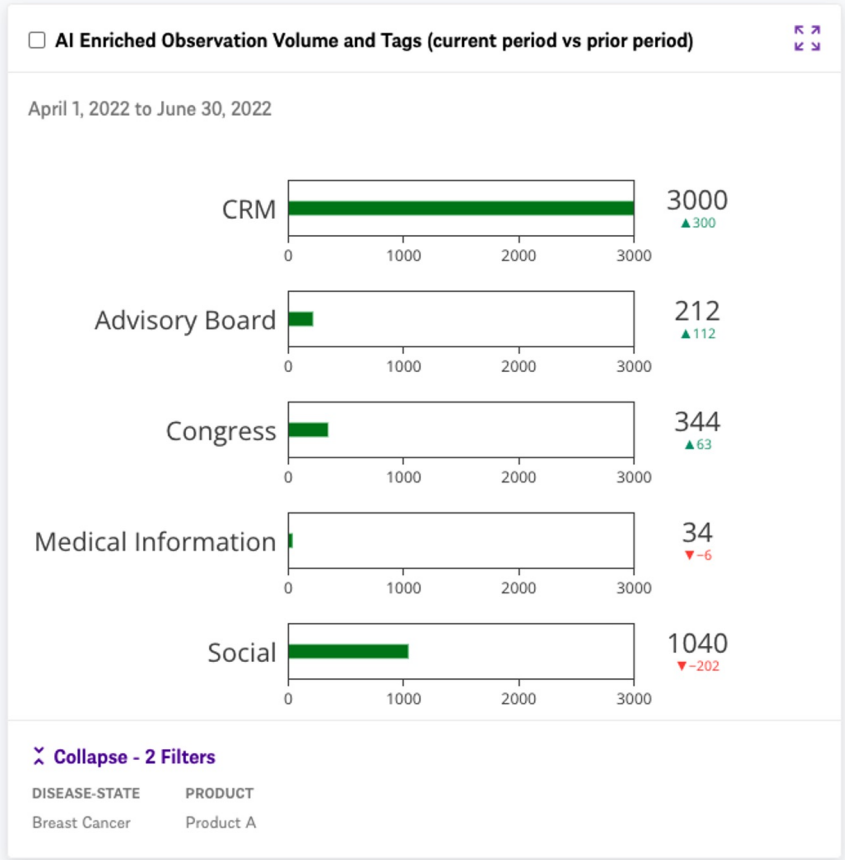


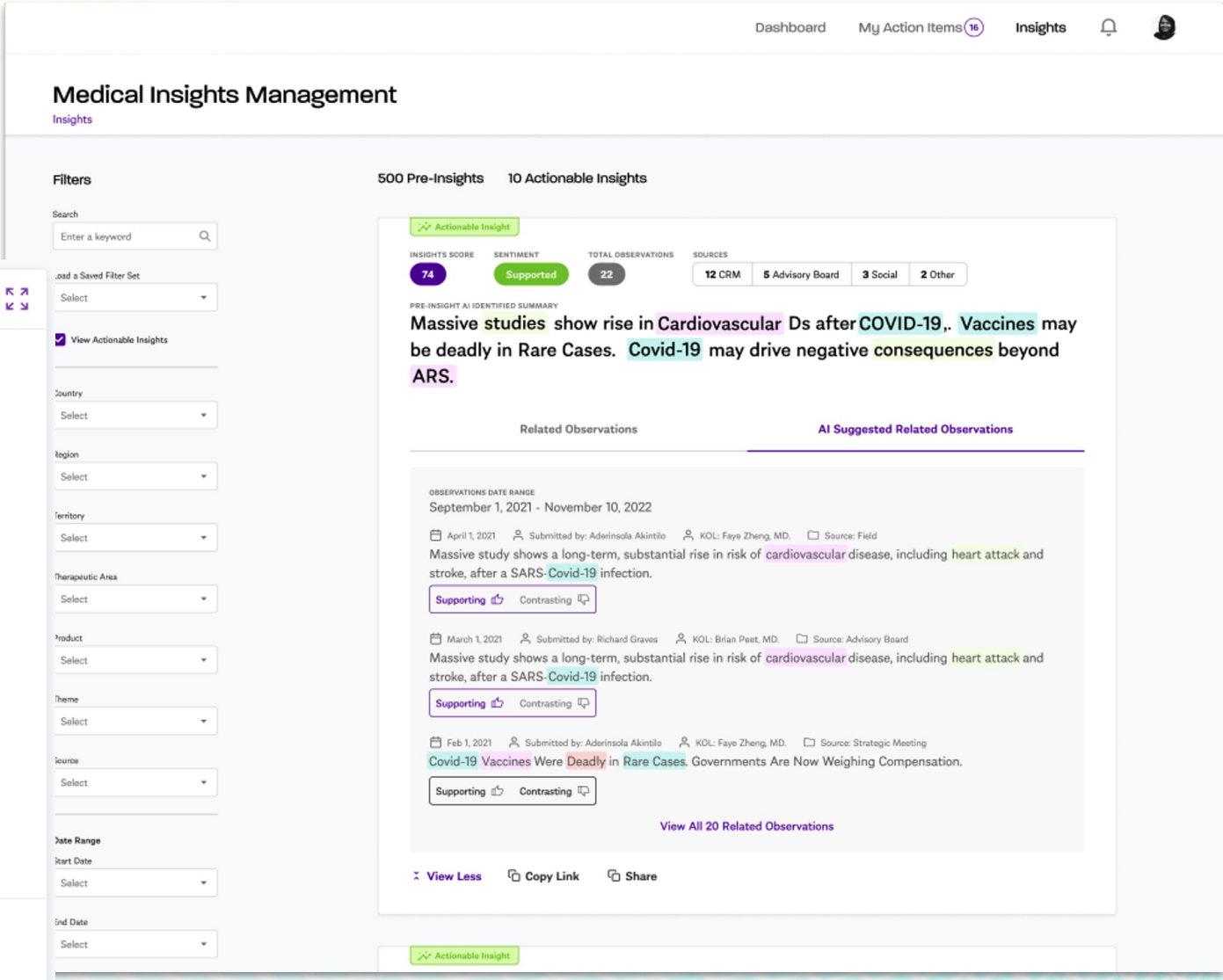
Medical Affairs Use Case: Insights Management

Decision Automation: Medical Tagging in Observations

Decision Augmentation: Identification of Medical Themes

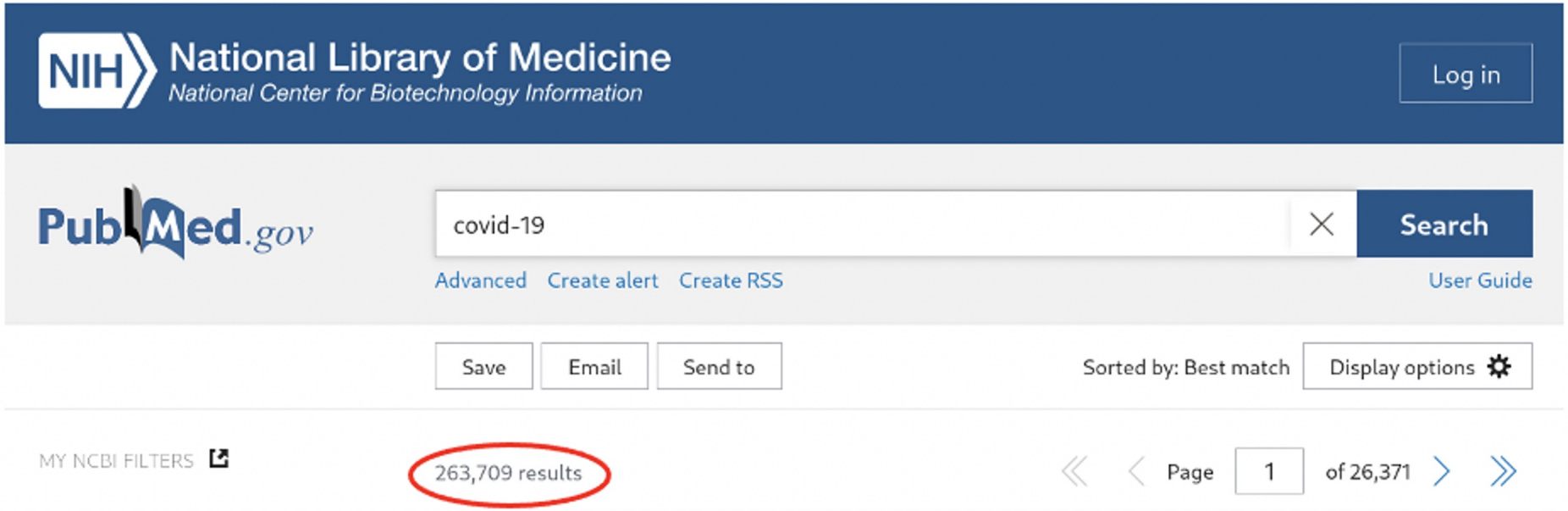
Decision Support: Clustering Data for Pre-Insight Review





Medical Affairs Use Case: Medical Writing

What is Auto-Summarization and why do we need it?



Medical Affairs Use Case: Medical Writing

Discovery of a Novel Src Homology-2 Domain Containing Protein Tyrosine Phosphatase-2 (SHP2) and Cyclin-Dependent Kinase 4 (CDK4) Dual Inhibitor for the Treatment of Triple-Negative Breast Cancer

Xiaoyu Chen, Chengxia Shu, Wenqiang Li, Qiangqiang Hou, Guangmei Luo, Kexin Yang, Xiaoxing Wu

The treatment of triple-negative breast cancer (TNBC) remains a huge clinical challenge and dual-targeted small-molecule drugs might provide new therapeutic options for this type of breast cancer. In this work, we discovered a series of SHP2 and CDK4 dual inhibitors through a fused pharmacophore strategy and structural optimization. Notably, lead compound 10 with excellent SHP2 (IC50 = 4.3 nM) and CDK4 (IC50 = 18.2 nM) inhibitory activities effectively induced G0/G1 arrest to prevent the proliferation of TNBC cell lines. Furthermore, compound 10 showed great in vivo pharmacokinetic properties (F = 45.8%) and exerted significant antitumor efficacy in the EMT6 syngeneic mouse model. Western blotting and immunohistochemical analysis confirmed that 10 effectively targeted on both SHP2 and CDK4 and activated the immune response in tumors. These results indicate that lead compound 10, as the first SHP2 and CDK4 dual inhibitor, merits further development for treating TNBC.

J Med Chem. 2022 May 12;65(9):6729-6747.
doi: 10.1021/acs.jmedchem.2c00063.

Turing Test: Which was written by the AI?

A

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B

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C

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How can Medical Affairs improve AI performance?

An "out of vocabulary" problem

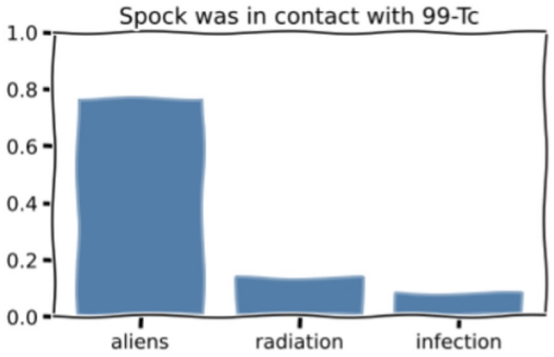
- Linguistically, Life Sciences move very fast. Research codes, new products names, new treatments, and new variants are coined at an incredible rate.
- Large language models, like GPT-3, and BERT—including BioBert and SciBert—and their predecessors, such as GloVe and Word2Vec, cannot keep pace with rapid linguistic evolution in the Life Sciences.
- There will always be words that they have never been exposed to, and, as such, are unable to meaningfully represent. When faced with unknown concepts, LLMs fail in unpredictable ways, which undermines trust.

A neurosymbolic approach, which combines rules-based approaches with deep-learning techniques, can improve the resilience of any over off-the-shelf models, regardless of their size and complexity.

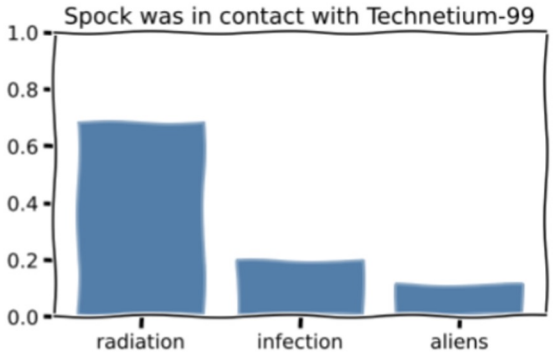
– W. Saba and A. Tomkins 2022

What role can Medical Affairs play when it comes to using AI?

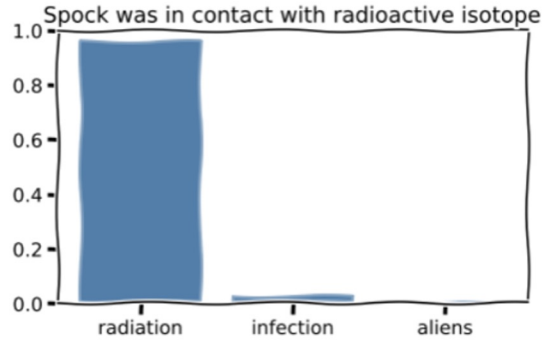
An “out of context” problem



Raw Text Performance



Preferred-Term Resolution



Ontological Type Resolution

What is AI and why does it matter?

Let's review

- Define key terminology and capabilities of artificial intelligence
- What are the types of AI
- Examine ways AI can enhance Medical Affairs workflows
- Build a partnership between AI and Medical Affairs