

Using AI to solve business problems: should we abandon all taxonomies?

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Text Analytics Forum Washington 2018

UNSILO: solving business problems using AI



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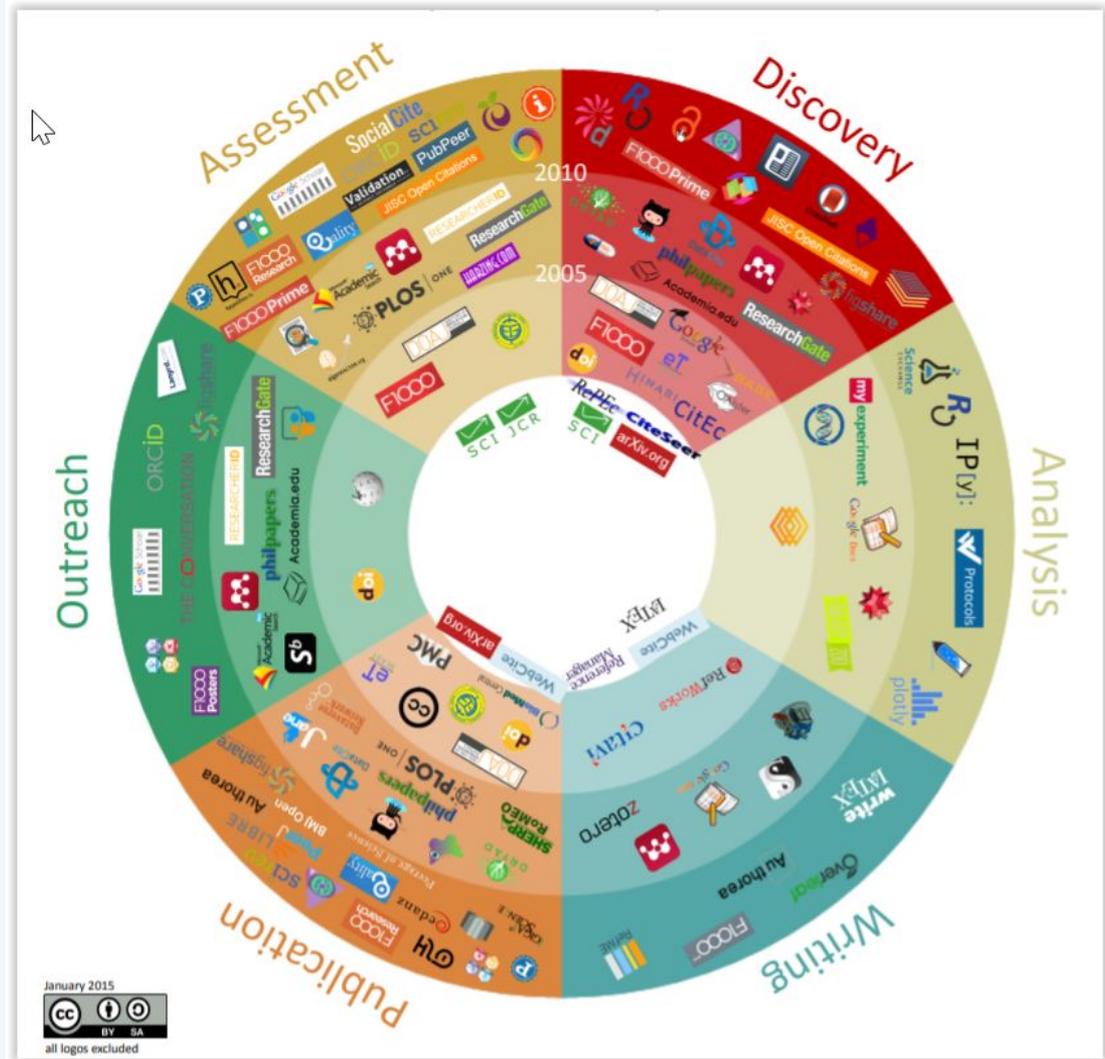
Outline

1. The academic publishing workflow
2. Where and why machine learning can be applied
3. Peer review methods
4. Recommendations for Human-machine interaction

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Academic Publishing Workflow

The scholarly workflow



Kramer and Boesman,
2015

Articles and journals

50m

Scholarly science articles (1665-2009)

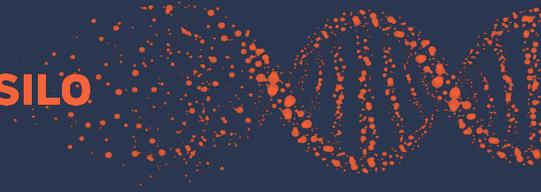
4,000

New science articles published per day

24,000

Science journals

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Finding reviewers, finding journals

Traditional peer reviewer finder

1. Create a taxonomy
2. Tag an article by subject
3. Tag reviewers by subject.
4. Match articles and reviewers using the tags

Business use cases

Article to article



Article to person



Article to journal



Finding a peer reviewer

26% of US academics contacted for peer review in 2016 declined because the paper was outside their subject area

[Wiley, presentation to the ALPSP Annual Conference 2017]

AI-based peer reviewer finder

1. ~~Create a taxonomy~~
2. Tag an article by subject - automated
3. Tag reviewers by subject - automated
4. Match articles and reviewers using the tag -automatic

UNSILO Concept Extraction

Pseudohyponatremia: Does It Matter in Current Clinical Practice?

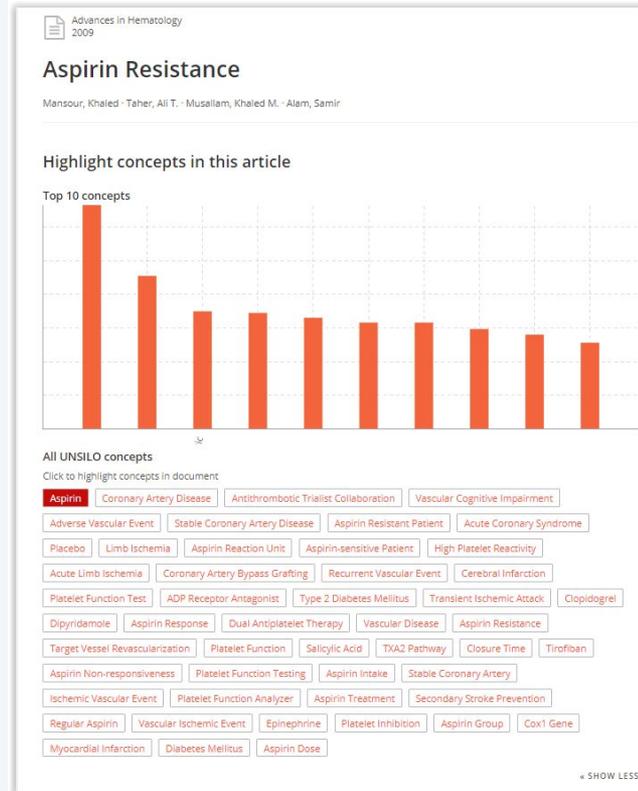
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3894530/>

doi: 10.5049/EBP.2006.4.2.77

Key: **Chemical** **Anatomy** **Disease** **Species**

Serum consists of water (93% of serum volume) and nonaqueous components, mainly lipids and proteins (7% of serum volume). Sodium is restricted to serum water. In states of hyperproteinemia or hyperlipidemia, there is an increased mass of the nonaqueous components of serum and a concomitant decrease in the proportion of serum composed of water. Thus, pseudohyponatremia results because the flame photometry method measures sodium concentration in whole plasma. A sodium-selective electrode gives the true, physiologically pertinent sodium concentration because it measures sodium activity in serum water. Whereas the serum sample is diluted in indirect potentiometry, the sample is not diluted in direct potentiometry. Because only direct reading gives an accurate concentration, we suspect that indirect potentiometry which many hospital laboratories are now using may mislead us to confusion in interpreting the serum sodium data. However, it seems that indirect potentiometry very rarely gives us discernibly low serum sodium levels in cases with hyperproteinemia and hyperlipidemia. As long as small margins of errors are kept in mind of clinicians when serum sodium is measured from the patients with hyperproteinemia or hyperlipidemia, the present methods for measuring sodium concentration in serum by indirect sodium-selective electrode potentiometry could be maintained in the clinical practice.

UNSILO Concept Extraction



Selecting a peer reviewer

Reviewer Finder

5 suitable reviewers found

Key concepts in manuscript matched to concepts by authors of related papers.

Alessandro Moretta

82% match

Match between reviewer top concepts and manuscript

human leukocyte antigens Class

natural killer cell alloreactivity

haploidentical hematopoietic stem cell transplantation

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Gianfranco Pittari

82% match

Match between reviewer top concepts and manuscript

natural killer cell alloreactivity

Killer immunoglobulin-like receptors ligand mismatches

human leukocyte antigens Class

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unknown. Only very recently, Garcia - Beltran et al. demonstrate KIR3DS1 binds to HLA - F, a result which they confirmed biochemically and functionally. Other factors capable of influencing KIR - mediated licensing and inhibition are variations in KIR - ligand interactions and affinities. For example, it has been shown that some antigens of KIR2DL3 are also capable of interacting with HLA - C2 ligands. Heavily expressing normal HLA Class I molecules are spared by inhibition on the NK cell surface. However, cells damaged by viral infection and transformation may lose HLA Class I expression and be eliminated. Because HLA and KIR ligands are highly polymorphic, inhibitory ligands expressed by NK cells of solid organ transplant recipients with donor mismatched for HLA KIR ligands, may not recognize HLA Class I receptors on donor cells and generate NK cell alloreactivity against the transplant. A similar reaction in the opposite direction has been described in hematopoietic stem cell transplantation. Moreover, certain KIR groups together with their specific HLA Class I ligands could also influence transplantation outcome by interfering with the efficacy of immunosuppressive therapies. Interference of KIR - ligand interactions with drug effectiveness has already been described in allogeneic transplant hematopoietic stem cells and onco - hematological disorders such

Selecting a journal

Journal Analysis

Journal Finder

2 suitable journals found

Key concepts in manuscript matched to key concepts in journal.

PLoS ONE

96% match

Match between manuscript and journal top concepts

human leukocyte antigens Class

natural killer cell alloreactivity

Killer immunoglobulin-like receptors ligand mismatches

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Frontiers in Immunology

92% match

Match between manuscript and journal top concepts

human leukocyte antigens Class

natural killer cell alloreactivity

haploidentical hematopoietic stem cell transplantation

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both humoral and cell - mediated immunity. Rejection of the allo is largely dependent upon T cell response to HLA incompatibility. A cells recognize major and minor HLA histocompatibility antigens specific T cell receptors (TCR) and thereby trigger multiple and co effector functions. On the other hand, evidence continues to em alloreactive natural killer (NK) cells also have a key role in immun mechanisms elicited by the allograft. It has been shown that NK kidney allograftsand that increased numbers of NK cells are four peripheral blood of patients acutely rejecting kidney graft. More increased cytotoxicity of recipient NK cells against donor periph cells has been described in vitro. Human NK cells express multip that interact with HLA class I molecules. These receptors pertain immunoglobulin - like superfamily or the C - type - lectin - like re superfamily. Killer immunoglobulin - like receptors (KIRs) are key NK cell activity and predominantly recognize classical HLA class I. Historical nomenclature distinguishes two groups of KIR haploty haplotypes contain a fixed set of 7 KIR genes (the KIR3DL3, KIR2L KIR2DL4, KIR3DL1 and KIR3DL2 inhibitory KIR genes and the KIR2 activating KIR gene) whereas Group B haplotypes embrace all ot haplotypes with different combinations of activating and inhibi

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Role of the Publisher

Taxonomy

+ Anatomy

+ Organisms

+ Diseases

+ Chemicals and Drugs

+ Analytical, Diagnostic and Therapeutic...

+ Psychiatry and Psychology

+ Phenomena and Processes

+ Disciplines and Occupations

+ Humanities

Setup new class

1

Select starting point

2

Add input

3

Add filters

Paste paragraph

Developmental dyslexia affects almost 10 % of school-aged children and represents a significant public health problem. Its etiology is unknown. The consistent presence of phonological difficulties combined with an inability to manipulate language sounds and the grapheme - phoneme conversion is widely acknowledged. Numerous scientific studies have also documented the presence of eye movement anomalies and deficits of perception of low contrast, low spatial frequency, and high frequency temporal visual information in dyslexics. Anomalies of visual attention with short visual attention spans have also been demonstrated in a large number of cases. Spatial orientation is also affected in dyslexics who manifest a preference for spatial attention to the right. This asymmetry may be so pronounced that it leads to a veritable neglect of space on the left side. The evaluation of treatments proposed to dyslexics whether speech or oriented towards the visual anomalies remains fragmentary. The advent of new explanatory theories, notably cerebellar, magnocellular, or proprioceptive, is an incentive for ophthalmologists to enter the world of multimodal cognition given the importance of the eye's visual input.

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The right tool for the job

Levels of granularity

20,000

Discrete terms in INSPEC

200,000

Discrete concepts held by MeSH

1.5m

Discrete concepts identified by UNSILO from PubMed Central (1.7m articles)

Give advice

“The more recent content analysis approaches (in semantic enrichment and AI) use more statistical and grammatical analysis, rather than analysis against a taxonomy or ontology ... There are cases where the use of a taxonomy or ontology are still appropriate, but this should no longer be the assumed starting point.”

STM Association Overview of Scientific and Scholarly Publishing 2018 Report

https://www.stm-assoc.org/2018_10_04_STM_Report_2018.pdf

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Take-aways

Solving business problems with AI tools

- Look for a business use case
- Choose the most appropriate tool
 - Understand what machines can or cannot do well
 - Combine human and machine tools wherever possible
- Advise on how to use and evaluate
 - Avoid multiple point solutions



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Using AI to transform publishing

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