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Full article

Automating SDG Monitoring: The text2sdg R Package for Text-Based Impact Analysis

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Existing approaches to monitoring the United Nations Sustainable Development Goals (SDGs) have mainly focused on specific data types; namely, publications listed in proprietary research databases. The growing demand for data-driven monitoring of the SDGs has highlighted the need for scalable, transparent tools.

The authors present the "*text2sdg package*" for R language, a user-friendly, open-source package that detects SDG-relevant in any kind of text data using different existing or custom-made query systems and an ensemble model. The text2sdg package facilitates the monitoring of SDGs for a wide array of text sources and provides a basis for validating and improving methods to detect SDGs.

This open-source R package will improve efficiency in monitoring the SDGs among different sectors while accounting for linguistic bias and improving on practical flexibility coupled with bridging SDG data gaps.

#SDGs #TextAnalytics #OpenSource #ImpactInvesting #Efficiency

Background & Context

- **Data Scarcity:** According to a UN 2022 report, **only 47% of SDG indicators have reliable data**. The *text2sdg* R package leverages ubiquitous text data e.g., academic abstracts, published literature, news articles, websites, corporate reports, and social media posts among others to fill this gap.
- Through systematic comparison using various text sources and performance metrics, the tool has shown that **existing SDG labeling systems differ considerably in their sensitivity (true-positive rate) and specificity (true-negative rate)**. Some systems are more "liberal," detecting many SDGs but producing more false positives, while others are more "conservative," detecting fewer SDGs but with higher precision.
- The open-source nature of SDG classification packages - such as *text2sdg,* enables researchers, governments, NGOs, and multilateral agencies to **collaboratively improve methodologies and enhance reproducibility** in sustainability analytics. Open systems also encourage co-creation, crowd-sourced training data, and peer-reviewed improvements—consistent with FAIR (Findable, Accessible, Interoperable, Reusable) data principles.
- This **tools' diversity** implements six query systems, each with unique trade-offs e.g., Elsevier's precision vs. SDSN's breadth. **The ensemble model optimizes accuracy by weighting system outputs. Tested in 26,949 Swiss National Science Foundation (SNSF) project abstracts, revealing SDG 3 (Health) and 9 (Innovation) as most prevalent**. An ensemble model combining multiple labeling systems substantially outperforms any individual system.

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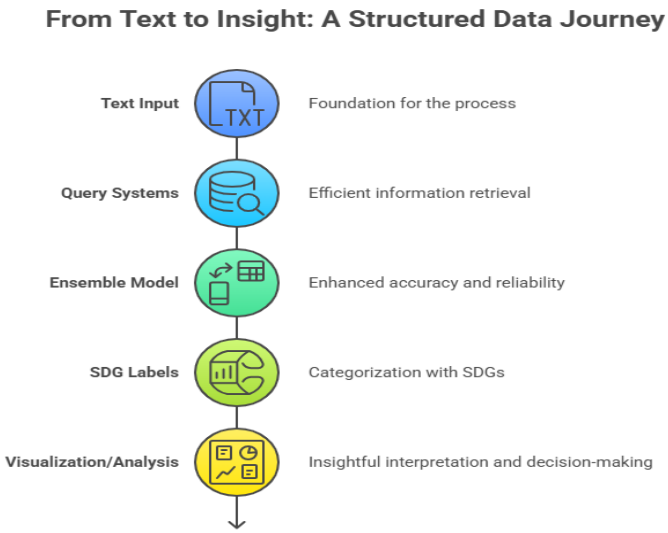
Take aways & Learnings

- **Tools like *text2sdg* offer a novel approach to assessing how well written content aligns with the Sustainable Development Goals (SDGs).** By extracting SDG-relevant language from research abstracts, policy documents, and reports, these tools provide a scalable and systematic method for quantifying alignment. These findings can inform **targeted resource allocation**, policy advocacy, and strategic reprogramming, especially for underfunded or cross-cutting goals like SDG 13 (Climate Action) or SDG 16 (Peace, Justice and Strong Institutions).
- The ability to **customize queries to reflect local or institutional priorities** - a shift from top-down global standards to more adaptive, context-sensitive approaches helps in **redefining governance through customization**. However, such flexibility must be managed responsibly. There's growing concern about **"SDG washing"**— where organizations artificially boost their alignment metrics without real-world impact.
- Automated SDG classification tools are only as good as their underlying algorithms and training data. Bias can emerge in two ways: through **over-sensitivity to common sustainability terms** or through **rigid keyword matching** that lacks semantic nuance. To optimize the balance between sensitivity and specificity, integrate multiple NLP systems to also account for linguistic bias.
- A **validation study** compared multiple SDG labeling systems across diverse text types, revealing systematic biases, variable accuracy, and a tendency for false positives to increase with text length. An **ensemble model integrating several systems achieved substantially better-balanced accuracy and lower false positive rates** than any single approach - now implemented in *text2sdg* to provide more reliable SDG detection.



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