ICT20-096 - A Digital Well-Being Index for Vienna - Extracting Regional Indicators of Subjective Well-Being from Digital Content Streams

Abstract

Background

Traditional Subjective Well-Being (SWB) rankings rely on surveys, which are time-consuming and expensive to conduct and offer limited regional granularity. The Vienna Digital Well-Being Index (DWBI) project explores the potential of natural language processing (NLP) to gain insights into stakeholder communication and user-generated content streams as a complementary approach to measure SWB indicators in a timely and region-specific manner. The extracted indicators can enhance existing SWB indicators and contribute to informed policy decisions.

Methods

To extract well-being indicators from user-generated content, the DWBI project adopted a hybrid approach that combines lexical sentiment analysis with machine learning techniques. The main advantage of this method is its explainability and the ability to pinpoint and remove biases and related problems. The extracted indicators include seven well-being domains, which were validated against the Linguistic Inquiry and Word Count (LIWC) toolset through quantitative methods, including correlation and regression analysis and qualitative thematic analysis of user-generated content. The validation process focused on domain satisfaction as the cognitive component of SWB, as well as positive and negative emotions as the affective component.

Main Findings

The study found a strong correlation between the DWBI and LIWC scores across various well-being domains, including housing, education, and transportation, indicating that the DWBI is reliable for assessing well-being trends. Regression analysis further revealed the significant predictive power of DWBI components in explaining the variance in LIWC scores, particularly in domains like transportation, housing, and work. The analysis also highlighted some NLP challenges, like irony detection and the differentiation of self-reported emotions and emotions attributed to others.

Conclusions

The findings suggest that DWBI indicators extracted from user-generated content offer a promising approach to expand and enrich traditional SWB assessments. By providing timely, region-specific insights, the DWBI can contribute to a more nuanced understanding of recent well-being trends. Revealing events and perceptions that impact these trends can support policy decisions and improve societal well-being.

Open Access Publications

Weichselbraun, A.; Süsstrunk, N.; Waldvogel, R.; Glatzl, A.; Braşoveanu, A.M.P.; Scharl, A. Anticipating Job Market Demands—A Deep Learning Approach to Determining the Future Readiness of Professional Skills. Future Internet 2024, 16, 144. https://doi.org/10.3390/fi16050144

Scientific disciplines:
Data science (40%) | Social statistics (30%) | Social psychology (15%) | Regional geography (15%)

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Further links to the persons involved and to the project can be found under
https://www.wwtf.at/funding/programmes/ict/ICT20-096/