AI-SUPPORTED METHODS FOR ANALYSIS OF UNSTRUCTURED TEXT RESPONSES IN PATIENT SURVEYS IN PRIMARY HEALTHCARE

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ABSTRACT

Health data is essential for the digital transformation in healthcare services to happen. Health data informs policymakers and practitioners and provide evidence for reform processes and organizational development. Even though our health systems produce large amount of data, usage is often limited by a lack of access to appropriate analytical tools or skills needed to appropriately assess and interpret complex health data. The national patient survey (NPE) in Sweden collects approximately 100 000 responses annually from patients visiting primary healthcare facilities. The last question in the survey is an open-ended free text question allowing patient to describe their experiences with the health services in their own words. Despite the fact that these unstructured text responses have been regularly collected since 2017 no systematic analysis has been conducted to explore and understand patterns of sentiments among the patients or the content of these responses at aggregate level. This lack of analysis is unfortunate, as these responses are likely to contain valuable feedback for understanding health care seeking behavior among the population and efficiency challenges in service delivery.

The overall goal with this research project is to use artificial intelligence (AI) technology to analyze the unstructured text responses from the free-text question in NPE. This data, provided by patients in primary healthcare over the course of the past seven years, has so far never systematically been analyzed. The aim is to test and develop a tool for analysis which can be used to improve service delivery and provide access to a large dataset for further research.

The research questions:

i. How can advanced AI-based analytical tools and techniques be leveraged to systematically analyze unstructured text responses from NPE data?

ii. What aspects and sentiments are identified in unstructured text responses in the NPE and how are these changing over time?

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Methods

Aspect-based sentiment analysis (ABSA) will be employed to analyze the data. Specifically, it involves (i) identifying the various aspects mentioned by patients in their responses (such as staff behavior, waiting time, etc.) and (ii) assessing the sentiments expressed towards these aspects. For example, expressing dissatisfaction with the waiting time or being happy about treatment by the staff. Unlike standard sentiment analysis, which only classifies overall sentiment, aspect-based sentiment analysis identifies sentiment directed toward specific entities, topics, or aspects within the text.

After completing the textual analysis, temporal changes in opinions regarding various aspects will be examined. To accomplish this, we will employ statistical methods and visual analytics. By harnessing advanced natural language processing techniques alongside statistical methods, we aim to understand patterns and changes in patients' experiences and perceptions of healthcare services.

Findings

So far in our project we have carried out two national surveys aimed at the users of the results from the NPE. The first group of users (n=18) is a sample of operational staff managing NPE and the results from NPE at the central level in each of the 21 Regions. The second group of users is a sample of managers at operational level for example a health center or a clinic (n=51) in five of the 21 Regions. The findings indicate a lack of appropriate tools to analyze the free-text responses, that there is no systematic analysis of the results, and 45 percent of the respondents report that they have never used the results from the free-text question for organizational development or improvement.

Research implication

By developing an AI tool for text analysis of open-ended free text patient responses, a systematic analysis of this data can be carried out benefiting both policymakers and practitioners in health care services. An AI tool could also create opportunities for additional research opening an important dataset for a larger group of researchers to look at. Areas of interest could for example include differences in patterns of sentiment depending on geographical area or socio-economic indicators among the respondents.

Keywords: AI technology, sentiment analysis, opinion mining, primary healthcare, service delivery