

PS626: AI, Data and Policy Programming Assignment - 3 Report

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Topic Modeling on Health data

Introduction

A machine learning technique called topic modeling is used to identify the latent topics that are present in a big corpus of text data. Because it uses an unsupervised learning approach, the model can be trained without labeled training data.

The aim of topic modeling is to extract the most significant keywords or phrases related to each topic as well as to discover the underlying topics or themes that are present in a collection of documents or texts. Information retrieval, document clustering, recommendation systems, and content analysis are just a few applications where it is helpful.

Many techniques, including Latent Dirichlet Allocation (LDA), Non-negative Matrix Factorization (NMF), and Latent Semantic Analysis, are utilized for topic modeling (LSA). One of the most popular topic modeling methods is LDA, which depicts each text as a combination of many subjects and each topic as a distribution of words.

A topic modeling algorithm's output consists of a list of subjects and the words or phrases that define them. The underlying themes in the text corpus can be easily understood by visualizing these subjects as a word cloud or topic hierarchy.

Methodology

Health-related Data is collected from The Press Information Bureau (PIB). The link is provided in the references. The data is cleaned properly. After that, we run topic modeling on the above health data.

Results and Visualization

Figure 1 shows the topic words score, and figure 2 is the similarity matrix. Intertopic distance map is showing in figure 3.

The Topic is generated by model are - Topic 0 - Mental Health Topic 1 - Covid-19 Topic 2 - Exercise and Yoga Topic 3 - Effect of Traveling on Health Topic 4 - Budget

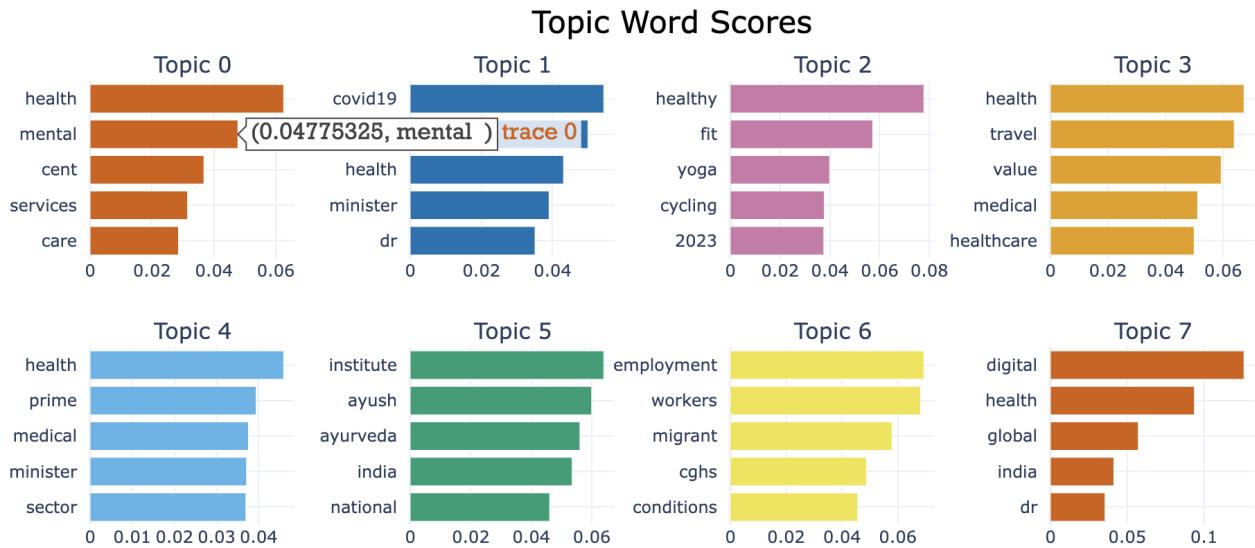


Figure 1: Topic Word Score

in Medical Sector Topic 5 - Ayurveda Topic 6 - Health of Employees Topic 7 - Digital Health: All results are shown in the figures.

Topic 0 - Mental Health

The condition of a person's emotional, psychological, and social well-being is referred to as their mental health. It includes a variety of things, including as the capacity to control one's emotions, deal with stress, uphold healthy relationships, and make choices. A person's general well-being and quality of life depend on their mental health, so it is imperative that anyone experiencing mental health problems seek help and treatment. Anxiety disorders, depression, bipolar disorder, schizophrenia, and eating disorders are a few examples of common mental health conditions. Therapy, medication, lifestyle modifications, and support groups are all available as treatment options for mental health disorders.

Topic 1 - Covid-19

The SARS-CoV-2 virus, also known as COVID-19 or the novel coronavirus, is the source of this very contagious respiratory disease. With more than 230 million confirmed cases and more than 4.7 million fatalities globally as of April 2023, the pandemic started in late 2019 and has since spread across the planet.

Topic 2 - Exercise and Yoga

Frequent exercise has been found to strengthen the heart, boost flexibility and strength, and reduce the risk of developing chronic illnesses including diabetes, obesity, and some types of cancer. Moreover, it provides advantages for mental health, such as easing anxiety and depressive symptoms and enhancing general mood and cognitive performance. In general, individuals should strive for at least 150 minutes of moderate-intensity aerobic

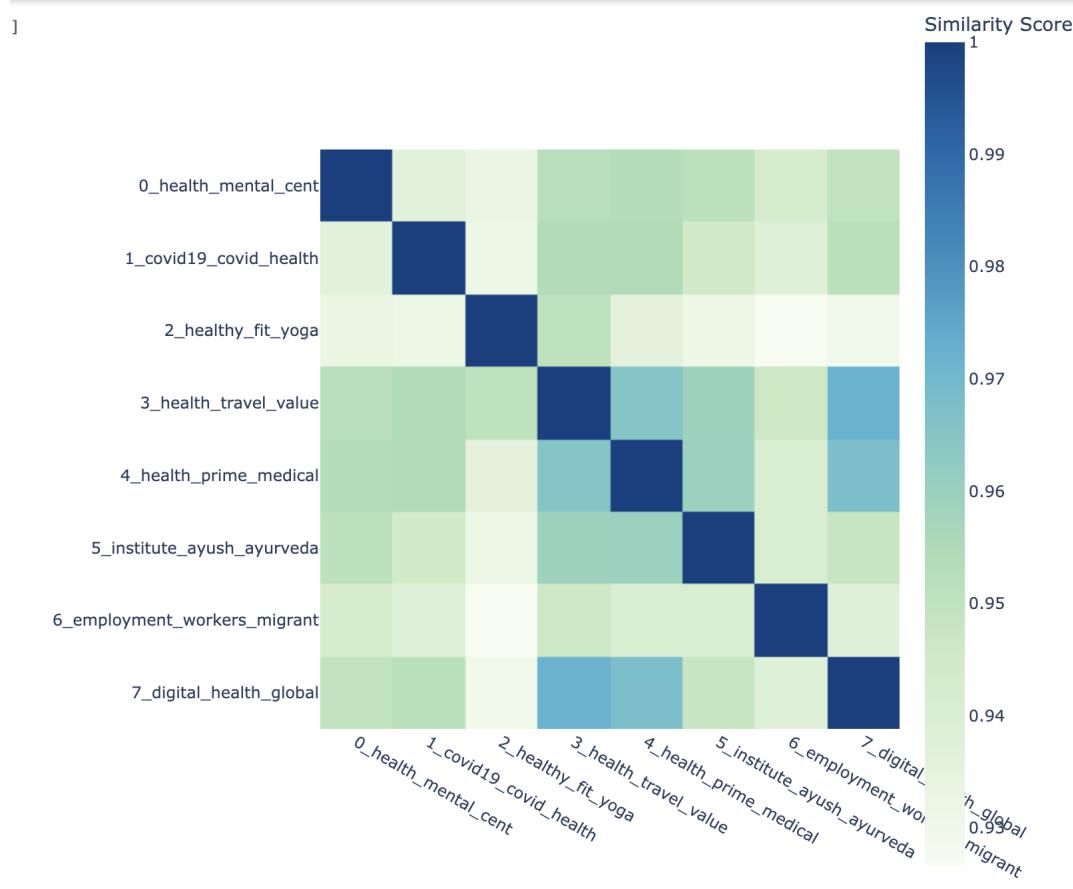


Figure 2: Similarity Matrix

exercise per week, along with strength training exercises at least two days a week. The amount of exercise advised varies based on age and fitness ability.

Topic 3 - Effect of traveling on Health (Travel Health)

Increased physical exercise, exposure to foreign surroundings and cultures, the possibility of lowered stress levels, and potential improvements in mental health are just a few of the positive effects of travel on health. For instance, visiting a new region could present opportunities for physically healthy outdoor pursuits like swimming or hiking. A person's horizons can be expanded as well as their mental health and overall wellbeing by being exposed to various foods and cultural customs.

Yet, flying can also have a negative impact on health, particularly if it requires prolonged sitting or exposes people to foreign diseases. Particularly when travelling by air, there may be risks of dehydration, jet lag, and illness because of the close quarters.

Topic 4 - Budget in Medical Sector

The financial resources given to the healthcare sector to address patient demands, provide medical services, and promote medical research are referred to as the medical sector budget.

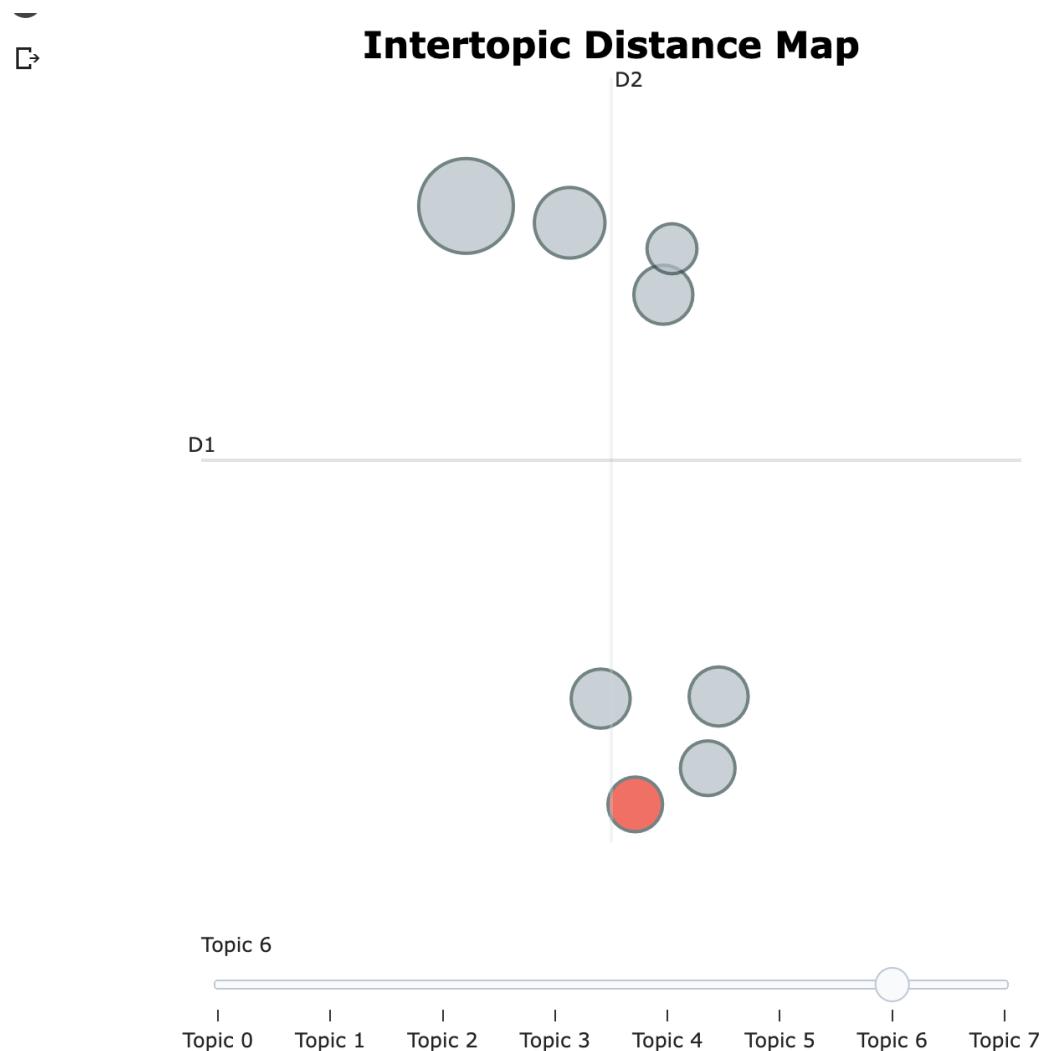


Figure 3: Caption



Figure 4: Topic 0 - Mental Health

Topic 5 - Ayurveda

The traditional medicinal practise known as Ayurveda has its roots in India and dates back over 5,000 years. It is predicated on the idea that mental, physical, and spiritual wellness are interdependent and require careful balance. Ayurveda offers a holistic approach to healthcare that focuses on preventing illness and promoting wellness through lifestyle changes, natural remedies, and personalized treatment plans.

Topic 6 - Health of Employees

An essential component of a company's success and general performance is its workforce's health. Healthy workers are more engaged, productive, and less likely to miss work due to illness or injury.

Topic 7 - Digital Health

The term "digital health" describes the use of digital tools and technologies to manage and enhance healthcare. It includes a variety of technological advancements, such as wearables, telemedicine, electronic health records (EHRs), wearable health (mHealth), and artificial intelligence (AI).

References

<https://pib.gov.in/AdvanceSearch.aspx>

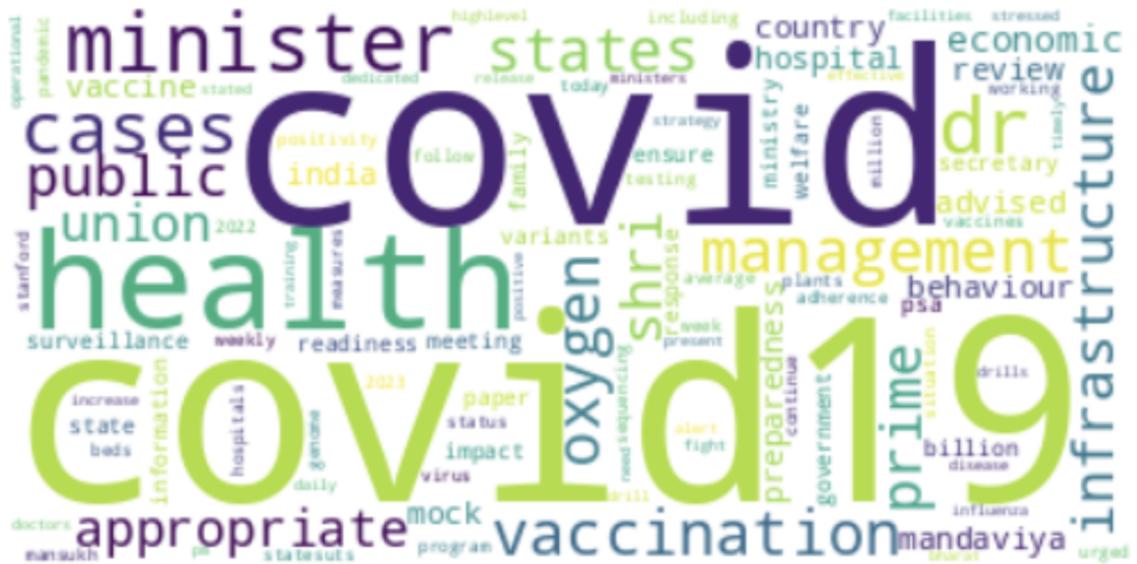


Figure 5: Topic 1 - Covid-19



Figure 6: Topic 2 - Exercise and Yoga

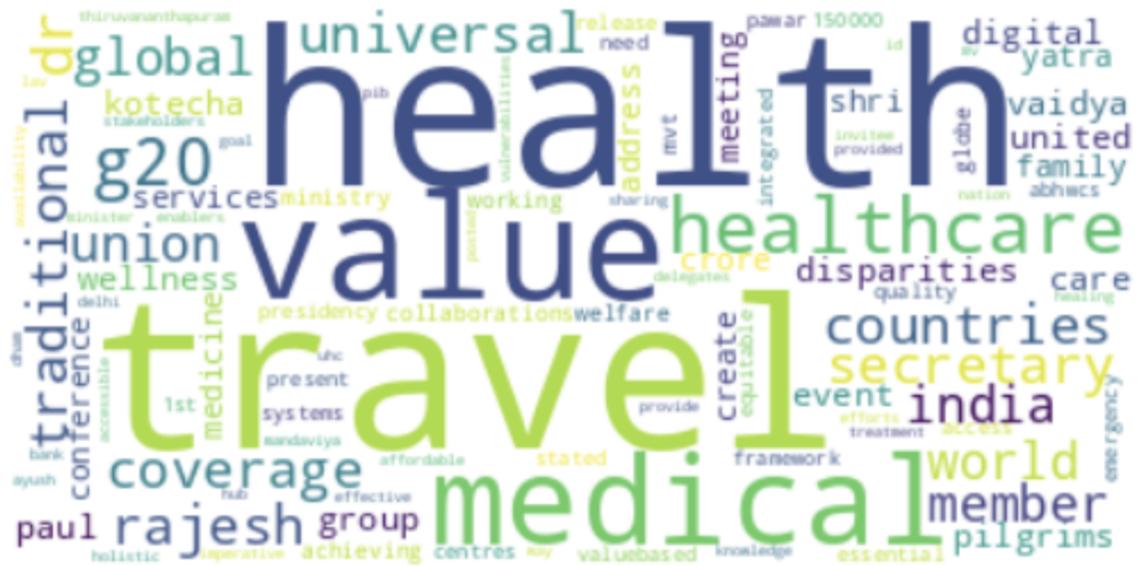


Figure 7: Topic 3 - Effect of traveling on Health



Figure 8: Topic 4 - Budget in Medical Sector

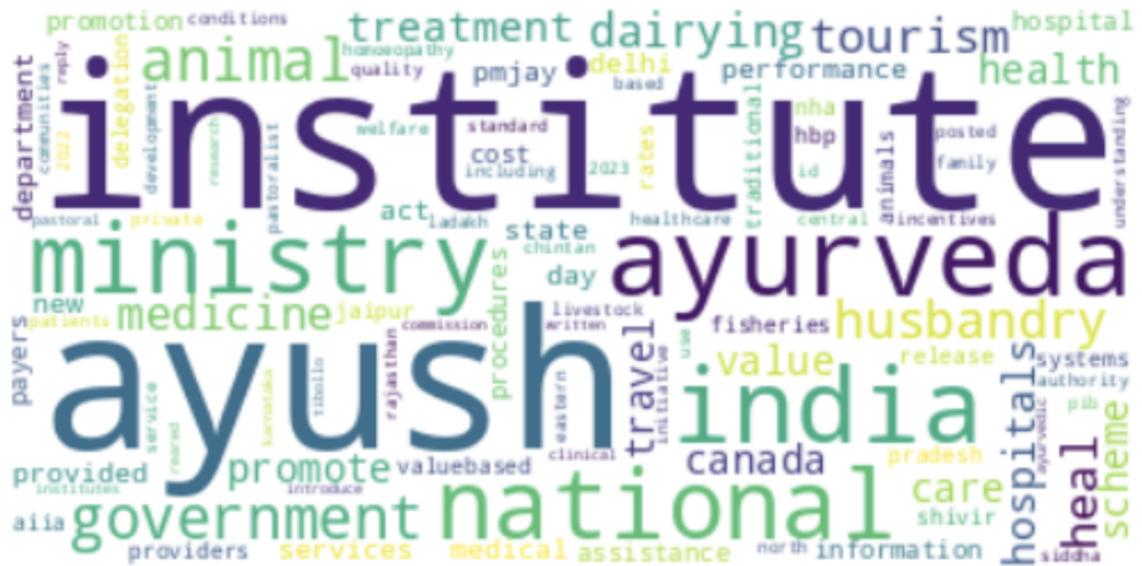


Figure 9: Topic 5 - Ayurveda



Figure 10: Topic 6 - Health of Employees



Figure 11: Topic 7 - Digital Health