

NLP for Academic and Social Good

Despite the fact that many advances have been made that indirectly aid people with impairments, area of Natural Language Processing research has directly aimed at reassuring the impairment in close collaboration with medical research. With AI leading to significant improvements with assistive technologies such as braille displays and screen readers, NLP has played a major role in speech synthesis. This article presents an idea of application that helps people who suffer from Dyslexia or ADHD with difficulties in reading and maintaining focus for a long period of time. The art of taking notes can hardly be used by people with such difficulties and visual impairments. In this article, a propose a solution as an application to improve academic performance among students with short sightedness and difficulty reading or listening for longer period of time. This prototype, using information gathering, will compensate the extra time taken by such students to research a certain topic and make notes when compared to their peers. Aforesaid achievement would require processing of research articles, books and study material written or recited by humans in human language. It would not only summarise written data but also speech to text synthesis to eliminate all the barriers faced by ambitious students willing to publish their own research articles and getting their work acclaimed timely in academia.

The application takes both text (online articles, books, research papers) and speech (podcasts, audio books, videos), storing them as text documents. Second essential input would be the topic of interest mentioned by the user through speech or text. Central idea is to provide a collective summary of the data using extraction-based and abstraction-based summarization. The following can be achieved through further described steps. Here, the traditional method of indexing is used but with an inclination towards merited keyphrases (word sequences, part-of-speech tagging) from the source document. These phrases provide a direct access to the text referring and infering the same. Additionally, the positive-labeled keyphrases are used to gather text documents making sure of the compatibility of the extraction technique used. Next, a binary machine learning classifier is used to make the text summarisation. Lastly, all the keyphrases and sentences created are classified. In case detailed summary and in-depth knowledge is required, the keyphrases generated can be used to divide the text into vectorised paragraphs. These keyphrases then can be compared with the topic that the student wants to study using information retrieval, providing actual paragraphs from the all the input texts hence acting as a quick index.

The most crucial part that requires most attention is the user interface design and error tolerance. For students with no impairment the wrong recognition of the query can be a simple annoyance but can be misleading for a disabled person with no assistance. For instance, if the user provides the topic of search through speech, an error in recognising the speech might lead to an incorrect search of text which may or may not be related to the original idea. In case of text input but low accuracy, the most essential text might go unnoticed by the user. Lack of identification of synonyms and repeated indexing would also increase the size of summarised text leading to more time being spent eventually diverting from the agenda of the solution. The alternative solution and future work can be a data cross-verifier application identifying the accuracy and provide and additional check over the summarised data.