接地型學術與永續發展目標的連結

The Connection between Engaged Scholarship and Sustainable Development Goals

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After receiving the assistance from the library and the Office of Research and Development, we collected data from faculty research, Scopus, and TSSCI (Taiwan Citation Index - Humanities and Social Sciences) as the sources of data. Meanwhile, we elicited the keywords from these papers and the MDPI Sustainability Journal (https://www.mdpi.com/journal/sustainability) to build the SDGs keyword embedded word model using an unsupervised learning method. Then, according to the calculation of tf*idf (term frequency * inverted term frequency) as a vector representing each sustainability goal. The research results (research projects, papers, etc.) of each teacher are compared with the representative vectors of each goal, and we labeled each individual publication with corresponding SDGs based on the similarity score exceeding a threshold value. In the first year of the plan, we asked school teachers to validate their papers' labeled SDGs. After comparing the real data with the predicted data, the accuracy rate is 44%. (The teacher's actual label is used as the real data, and the labeling result of the machine learning model is the predicted data).

In the second year of the plan, we used the research results labeled by the professors as training data for machine learning, and redesigned the AI model architecture. Take the Word2vec model as the input of the LSTM (Long Short-Term Memory) embedding layer, and then train the multi-label classifier in a 10-foldedcross validation method. The accuracy rate is 91%. Therefore, this project uses the two-stage cold start and combines the professors' professional knowledge to form the source of training data to achieve more accurate labeling.

Based on this cycle, the SDGs automatic labeling system established by this project can achieve accurate labeling which can be used for adapting to the evolution of research topics. The SDGs labeling system established in this project has the following three benefits:
1. Reduce the labor cost for teachers to mark research results and SDGs.
2. Increase the professor's willingness to review the results of automatic labeling (due to the improvement of prediction accuracy, professors do not need to take many changes).
3. Improve the information update responding to the SDGs of the university's integrated professor research as a reference for R&D policies and resource distribution.

According to the classification of the automatic labeling system and the teacher's confirmed results, we count and present the research results of various institutes in different SDGs. Furthermore, display the SDGs practice report on the SDGs website (https://sdgs.nthu.edu.tw/our-response/research-distribution) and sustainable development annual report established by this project.
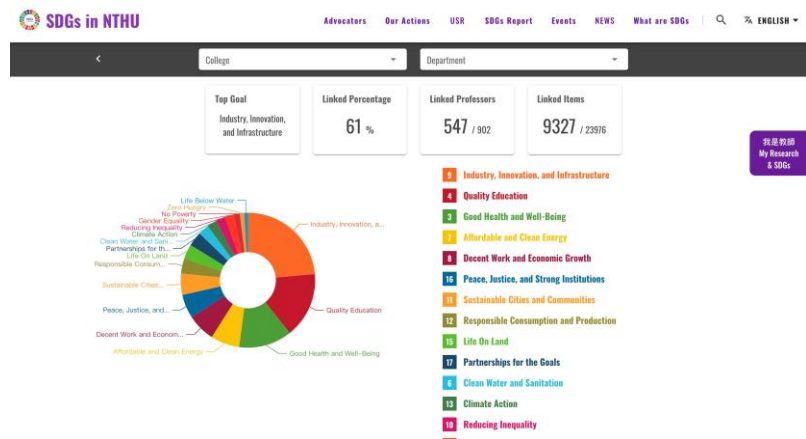
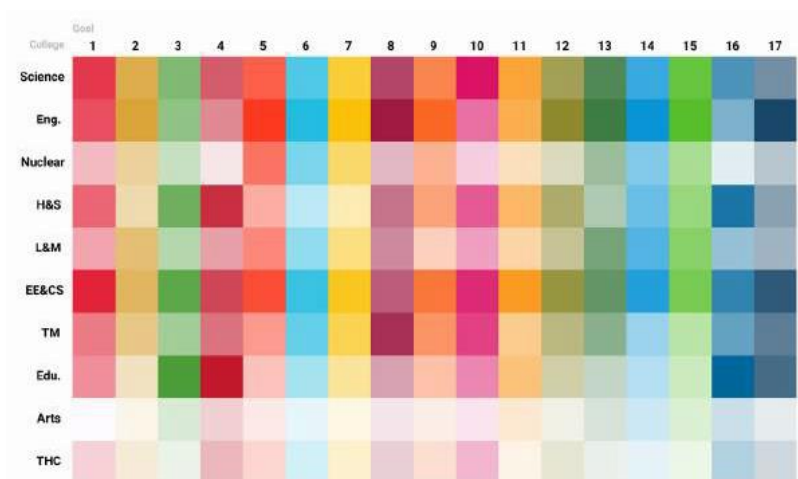**Figure 1.** Research results of various institutes in different SDGs

Figure 2. The spectrogram of responding to the 17 SDGs of the research results of our university.

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