

The Analysis for IAEA Technology Activities and Prospects using Big Data

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1. Introduction

In the previous study, the IAEA policy was analyzed as the current IAEA director general is expected to be re-elected. The big data analysis was used to the analysis method. It was analyzed by extracting words that were frequently used in the statement and confirming the association of extracted words. The result of the analysis, the IAEA policy was largely confirmed in two ways. First, it is the nuclear non-proliferation and security policy represented by safety, security and safeguards. Second is the technology development policy.^[1]

It was analyzed to activities and prospects of the technology development among two main policies of the IAEA in this paper. The big data analysis is used like the previous study but the analysis target is changed to the press releases and the latest news.

2. Methods of the Analysis

The R is a tool for the big data analysis, and it is a programming language and software environment for statistical calculations and graphics. It is widely used in the statistical software development and the data or atypical data analysis because of supporting of the various algorithm packages.^[1]

The data by using the text mining algorithm is preprocessed to obtain meaningful words. The association analysis algorithm is used to analyze the association among words. The clustering algorithm is used to classify word clusters and find keyword of each word cluster. And then, all results of analysis are combined to draw conclusions.^[2]

The target of the analysis is 206 press releases and 1346 latest news from 2009 to 2016 on the IAEA website.^[3] The press release deals with official opinions and activities on the issue, and the latest news mainly focuses on the publicity about interests and activities of the IAEA.

3. Results of the Analysis

3.1 The analysis Results of the Press Release

Figure 1 shows the result of the association analysis for the press release. It is higher frequency of use, the larger word. It is higher the association to the closer the distance and the thicker the connection line. The summary of results is as follows:

- The words such as *safety*, *team*, *mission*, *power*, *review*, *plant*, *irrs*¹, *osart*², *expert* and etc are used frequently.
- The words such as *safety*, *mission*, *team*, *mission*, *regulatory*, *power* and *review* are a high association.

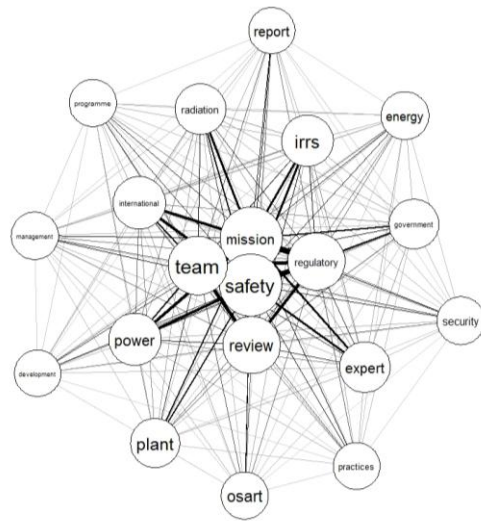


Fig. 1 The result of association analysis for the press release

The clustering analysis is carried out for confirm more detail associations, and figure 2 is the result. The each square is the word cluster and has keyword as table I. The cluster number begins from the left square and each cluster is classified as words that are a high association with the keyword.

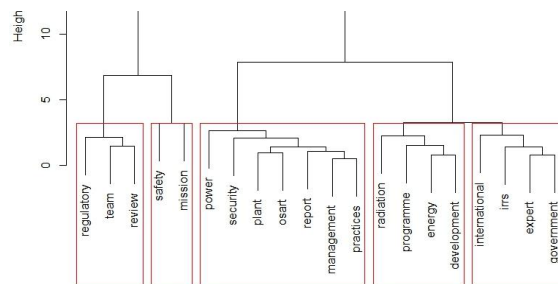


Fig. 2 The result of clustering analysis for the press release

Table I. The keyword of each cluster on Fig. 2

Cluster 1& 2	Cluster 3 & 5	Cluster 4
<i>safety</i> <i>mission</i>	<i>mission</i> <i>safety</i>	<i>safety</i> <i>regulatory</i>

¹ Integrated Regulatory Review Service

² Operational Safety Review Team

The summary of each cluster is as follows. And considering each cluster and keyword, the main content of the press release is related to the IAEA safety review service.

- *team review* for the safety *regulatory*
- *mission* related in *safety*
- *osart* for nuclear *power plant*
- *radiation* safety *programme*
- *expert* and *government* role for *irrs*

3.2 The Analysis Results of the Latest News

Figure 3 shows the result of the association analysis for the latest news. The summary of results is as follows:

- The words such as *food, health, water, new, power, energy, training, safety* and etc are used frequently.
- The words such as *technology, development, safety, project, cancer, programme* and etc are a high association.

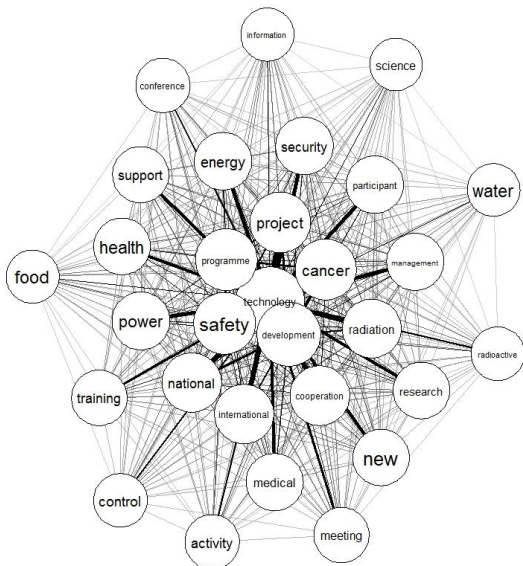


Fig. 3 The result of association analysis for the latest news

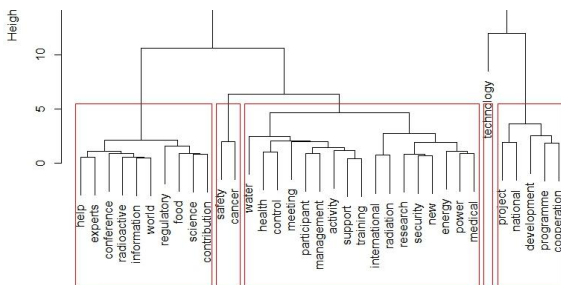


Fig. 4 The result of clustering analysis for the latest news

Table II. The keyword of each cluster on Fig. 4

Cluster 1, 2, 4 & 5	Cluster 3
<i>technology development</i>	<i>technology programme</i>

Figure 4 shows the result of the clustering analysis and the keyword for each cluster is as table II. The main content of the latest news is technology activities of the IAEA. The summary of each cluster related in the technology is as follows:

- *help* of *experts* for *regulatory* and *food* production
- *safety & cancer* treatment
- *water, health, new, energy, medical* and etc.
- *radiation security* and *training support*
- *cooperation programme*

3.3 The Analysis Results of Trend

The IAEA interest in technology fields is analyzed via the number of articles for each media type. Figure 5 shows that the number of the latest news has been sharply rising since 2009. The IAEA is more and more strengthening publicity campaigns in the technology development and cooperation.

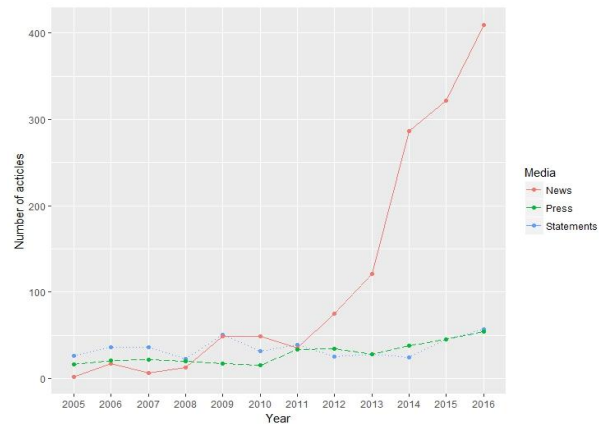


Fig. 5 The number of articles for each media per year

4. Conclusions

The IAEA focuses on the nuclear safety and contribution to the international community in the technology development field.

The expertise and role are emphasized for the field of nuclear safety. It is continued to the technology development and cooperation in the areas of health, food, water, energy, medical and etc in order to contribute to the international community. In addition, the policy for the technology development and cooperation will be expected continuously to strengthen.

REFERENCES

- [1] The Analysis for IAEA Policy using Big Data, Byungmarn Koh, Sunyoung Chang, KNS Spring Meeting, May 18-19, 2017
- [2] Modeling Techniques in Predictive Analytics, Thomas W Miller, 2014
- [3] IAEA website, statements, press release and latest news, <https://www.iaea.org>