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An analysis on types of strategic commodities and technologies

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1. Introduction

The international community strengthened the export control regime. Accordingly, Korea also needs to fully comply with the export control obligations.
Despite International export control regimes are strengthened, the current system to control exports of strategic commodities relies on limited human resource and experience to the situation. Especially, exports of nuclear power plants are related to one thousand kinds more material. Thus, the burden of the government, relevant institutes and enterprises has increased a lot.
It is necessary to enhance the ease and efficiency of export control business processes in order to cope with such export control issues.
NSSC operates the NEPS system for export control of nuclear items. Technical reviewers can search past cases of strategic commodity classification on NEPS system. However, searching function of NEPS system has limitations because exports to UAE and Jordan increased sharply, but characteristics of classification requests are not systematized. To provide more efficient ways to their decisions, development of the advanced export control system, IXCS (Intelligent eXport Control System) is considered. IXCS will adopt various methods including data mining.
Data mining is the computational process of discovering patterns in large data sets. It is an efficient way to find out hidden consideration patterns. However, it needs many kinds of features which documents have. NEPS system has only a few kinds of feature data.
In the study, Reconsideration of classification cases was carried out and a database was built based on Information of classification requests as features which are necessary for data mining.

2. Methods and Results

Strategic items (including technologies) are determined by the consensus of several experts after primary examination of the reviewer in charge. Reviewers perform judgment tasks of strategic commodities, according to the past results of classification cases. Unstructured data in the form of a document are not helpful to retrieve necessary requests and to apply data mining skills.
In the study, a database of document features was organized systematically to improve efficiency of data analysis and data mining.

2.1 Classification by document types

The kinds of classification requests are divided into goods and technology. Export controls of goods and technology are different in many respects. 1582 classification requests of technology have much more cases compared to 63 cases of goods. Goods have many characteristics such as size or price, features, which help reviewers clarify the strategic materials easily. In contrast, technologies have free and diverse formats and some of them contain too much information to review quickly.
Technologies were categorized into six groups based on the form of documentation. Category is shown in the following Table 1.

Table 1 the category for technical documents

Category	Description
Drawings	Containing drawings only
Design Data	Data required for the design of the nuclear items
Procedures	Operating procedures of reactor, nuclear fuel processing procedures or a variety of technical procedures
Technical Services	Technical services through the person
Reports	Knowledge of the technicians, and verification algorithms or results
Etc	Not included to above 5 cases

2.2 Classification by control number

Nuclear items have a unique control number from 0A001 to 0E001. These numbers are called Export Control Classification Number (ECCN). Nuclear technology corresponds to 0E001 (technology), but the most of technology is related to specific nuclear items which have their own ECCN. There were 138 Strategic technologies among 1582 cases. 129 cases correspond to 0A001 ("Nuclear reactors" and specially designed or prepared equipment and components therefor) and 3 cases to 0B005 (Plants for the fabrication of nuclear reactor fuel elements, and equipment especially designed or prepared therefor), 6 cases to 0D001 (software). The strategic goods excluding technologies were 12 cases among 63 cases. They were 6 cases of 0A001, 5 cases of 0B005 and one case of 0D001.

The above analysis showed that most of nuclear items exported from Korea are associated with 0A001. Strategic commodities related to 0A001 can usually be divided by detailed control number.
One hundred eight cases among a total of 135 cases associated with 0A001 were classified in detail, while the remaining 27 cases related to complex strategic items were excluded from detail classification.

Table 2 Distribution of strategic items (0A001)

ECCN	Controlled Items	#
0A001.a	Nuclear reactor	34
0A001.b	Nuclear reactor vessel	10
0A001.c	Nuclear reactor fuel charging and discharging machines	0
0A001.d	Nuclear reactor control rods and equipment	22
0A001.e	Nuclear reactor pressure tubes	2
0A001.f	Zirconium tube	3
0A001.g	Primary coolant pumps	3
0A001.h	Nuclear reactor internals	20
0A001.i	Heat exchanger	12
0A001.j	Neutron detection and measuring instruments	2

Above two kinds of classification results were added to Strategic Commodity Classification DB of NEPS system. Technical reviewers can search similar classification cases efficiently filtering the document type and ECCN

Table 3 Improvement of NEPS DB

Strategic Commodity Classification DB(NEPS)	Modified DB
ID	ID
Date	Date
Name	Name
Item	Item
…	…
-	ECCN
-	Document Type

3. Conclusion

In this study, two main features of classified documents were organized systematically to apply data mining skills. It will be helpful to discover association rules between documents and to classify documents as they are key factors of strategic commodity classification.
In addition, the classification scheme presented in the study helps step-by-step search by adding the auxiliary search criteria. Therefore, desirable cases can be found more easily.

REFERENCES

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