

## TITLE : To Prepare a Hierarchy of Export Control Classes (Regulation Category)

Members:- Dhrubo Bhattacharjee, Bhavya Dashottar, Harshit Jain, Heet Miyani

Guide Name:- Dr.Nilkanth Deshpande

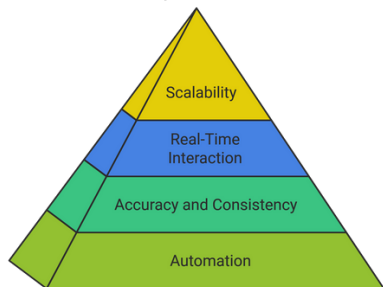
### INTRODUCTION

The USML categorizes defense items under strict export controls. Manual classification for compliance is complex and time-intensive. This project automates classification using NLP, enhancing accuracy and efficiency. It minimizes manual effort while ensuring compliance.

### OBJECTIVES & AIMS

The project aims to:

- Automate the USML Classification: Provide a system that accurately matches user-submitted queries with appropriate USML categories.
- Enhance Accuracy and Consistency: Use a semantic NLP model to improve classification reliability.
- Deliver Real-Time Interaction: Enable immediate feedback on user queries via a user-friendly interface.
- Ensure Scalability: Develop a model adaptable to other regulatory frameworks beyond the USML.



### METHODOLOGY

#### 1. Data Creation and Preprocessing:

- Data was extracted from the USML document, cleaned, and structured into categories and subcategories.
- Preprocessed in Python to standardize and index entries by descriptions and codes.

#### 2. Embedding Generation:

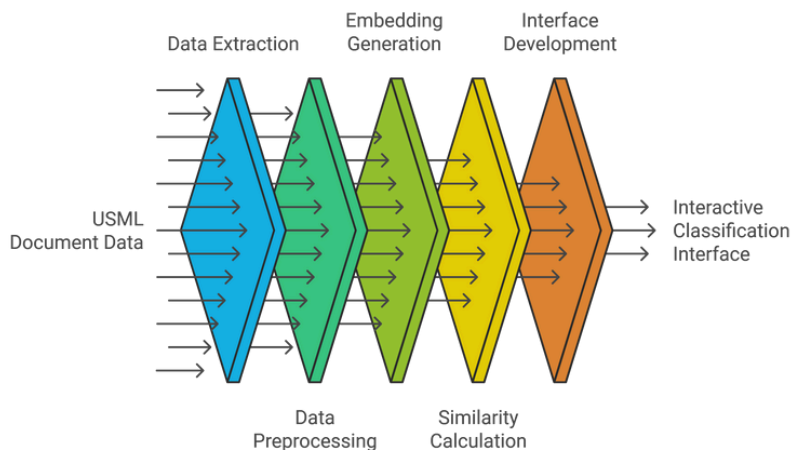
- Utilized 'stsb-roberta-large', a Sentence Transformer model, to create vector embeddings for each description, capturing the text's semantic meaning.

#### 3. Similarity Calculation:

- Calculated cosine similarity between query and description embeddings, ranking USML categories based on similarity scores.

#### 4. Interface Development:

- Built an interactive, real-time interface using Streamlit, allowing users to input queries and receive relevant classifications.



### RESULTS/CONCLUSION

The USML Classification System automates item classification, improving accuracy and consistency over manual methods. Using NLP and cosine similarity, it interprets user queries for precise, real-time classifications. This project shows the effectiveness of NLP in compliance and its potential for broader regulatory applications.



### REFERENCES

- 1] Ryu, M.-Y., Kim, H., Kim, I., Han, S., & Korea Atomic Energy Research Institute (KAERI). (2021). A study on development of Deep-Learning based Strategic Item Classification System for nuclear Export Control. In Korea Atomic Energy Research Institute (KAERI) [Journal-article]. [https://resources.inmm.org/sites/default/files/2023-07/finalpaper\\_150\\_0506010536.pdf](https://resources.inmm.org/sites/default/files/2023-07/finalpaper_150_0506010536.pdf)
- 2] Zhang, X., Du, H., Zhao, Z., Wu, Y., Cao, Z., Zhou, Y., & Sun, Y. (2023). Risk Assessment Model System for Aquatic Animal Introduction Based on Analytic Hierarchy Process (AHP). Animals, 13(12), 2035. <https://doi.org/10.3390/ani13122035>
- 3] Export Control Regulations in Research | Research. (n.d.). <https://research.njit.edu/export-control-regulations-research>

### ACKNOWLEDGEMENT

We extend our gratitude to our guide, Dr. Nilkanth Deshpande, for his invaluable guidance. Thanks to the Dassault Team for their collaboration and assistance. Lastly, we appreciate Symbiosis Institute of Technology Pune for providing this valuable opportunity.

### PROJECT OUTCOME :



Automated  
Classification



High  
Accuracy



User-Friendly  
Interface



Scalability