

**Project Design Phase-II**  
**Data Flow Diagram**

Date: 19 October 2023
Team ID: Team-592965
Project Name: Ship Classification Using Deep Learning
Maximum Marks: 4 Marks

**Data Flow:**

**Data Collection:** This process involves collecting ship images from various sources, which can include web scraping, data purchase, or other methods. The collected data is then stored in a raw data repository.

**Data Preprocessing:** The raw ship image data is preprocessed to prepare it for model training. This preprocessing may include resizing images, normalizing pixel values, and augmenting the data to increase diversity.

**Model Training:** In this process, the preprocessed data is used to train the machine learning model. The trained model is then saved for later use.

**Model Evaluation:** The trained model is evaluated using a separate set of data to assess its accuracy and performance.

**Model Deployment:** This process involves deploying the trained model to make it available for real-world ship classification applications.

**User Interaction:** Users interact with the deployed model through an application or API to submit ship images for classification.

**Flow in the model:**

Data flows from the Data Repository to the Data Preprocessing process, where it is transformed into preprocessed data.

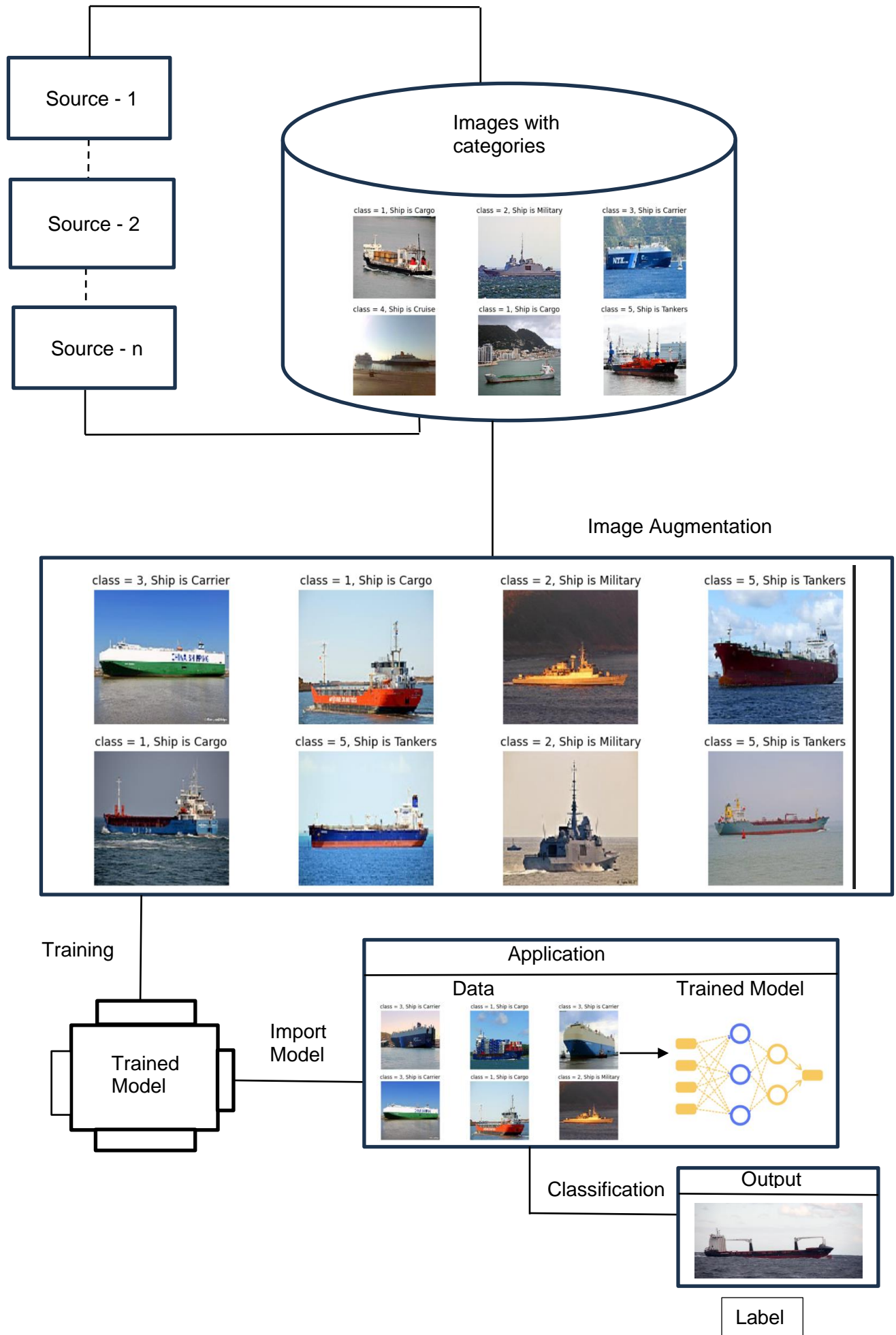
The preprocessed data flows to the Model Training process, where the model is trained using this data.

The trained model can be used for classification. Separate evaluation data is used in the Model Evaluation process, and the results are used for assessing the model's accuracy.

Once the model is ready, it can be deployed from the Trained Model Repository, making it accessible to users.

Users interact with the deployed model through the User Interaction process, submitting ship images for classification.

## Data Flow Diagram:



## User Stories

User Type	Functional Requirement	User Story Number	User Story/Task	Acceptance criteria	Priority	Release
Maritime Security	Project setup and infrastructure	User – 1	To set up the development of the ship classification with the required tools and frameworks.	Successful Configuration	High	Sprint 1
Coastal Guards	Development environment	User - 2	Gather a diverse dataset of images containing different types of ships (Carrier, Cargo, Cruise, Tanker, Military) for the training of the deep learning model.	Gathered a diverse dataset of images depicting various types of ships	High	Sprint 1
Individuals	Data collection	User – 3	Preprocess the collected dataset by resizing the images, normalizing the pixel values and splitting it into training and test sets.	Preprocessing and the splitting of the ship dataset	High	Sprint 2
Researchers and Academics	Data Preprocessing	User – 4	Explore and evaluate various deep learning architectures (Eg: CNN) to select the most suitable model for ship classification.	Exploring the different deep learning models	High	Sprint 2
Organizations	Model Development	User – 5	Train the selected deep learning model using the preprocessed dataset and monitor its performance on the validation set.	Validation using the test part of the dataset	High	Sprint 3
Institutions	Training	User – 6	Implement data augmentation techniques to improve the robustness and accuracy of the model.	Test it with the augmented dataset	Medium	Sprint 4
	Model Deployment	User – 7	Deploy the trained deep learning model as an API or web service and make it accessible for ship classification.	Check the scalability of the model	Medium	Sprint 4
	Testing and Quality Assurance	User – 8	Conduct a thorough testing of the model and web interface to identify and report any issues of bugs, finetune the parameters and optimize the performance according to the user performance.	Creating the web application	Medium	Sprint 6