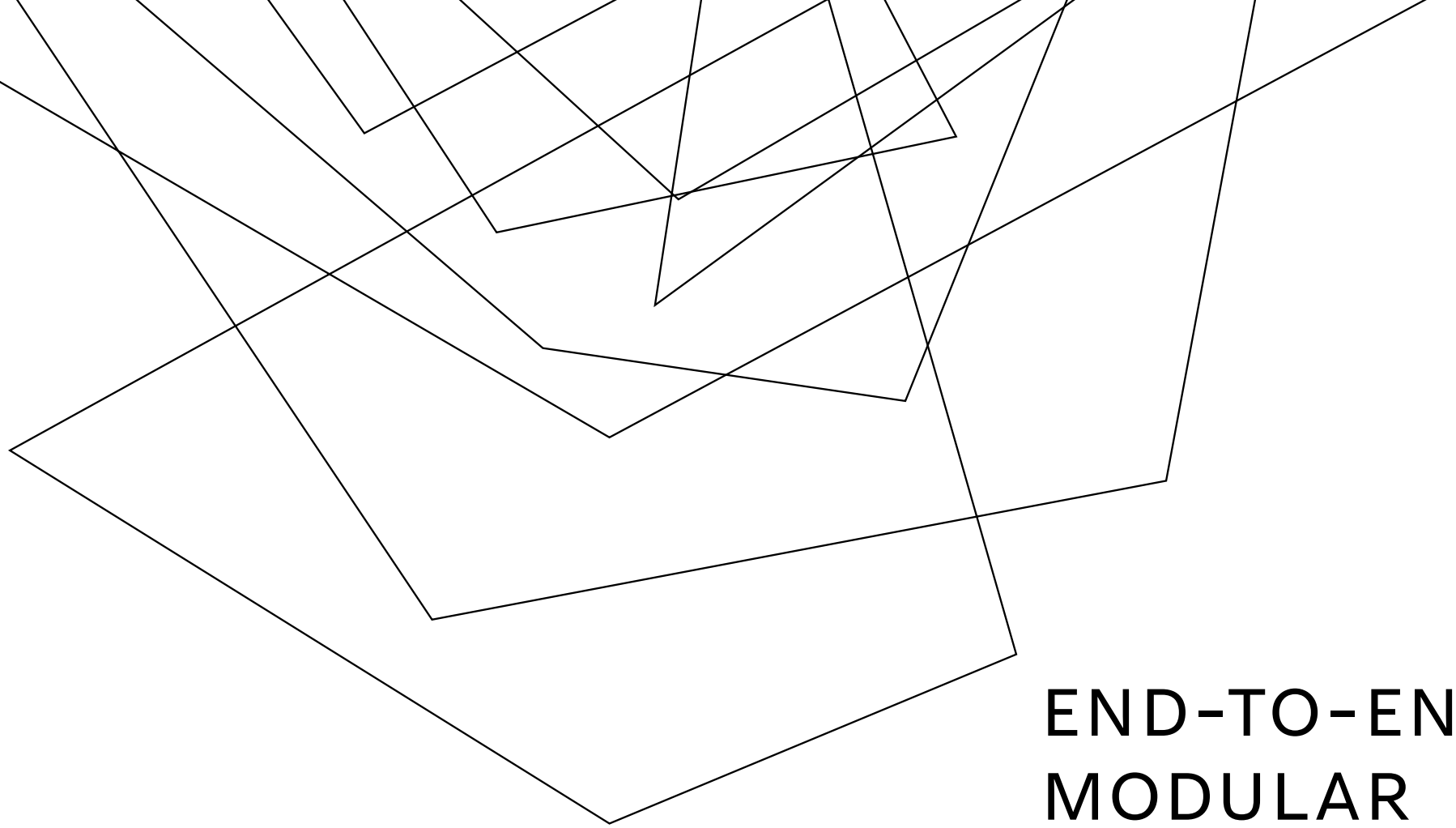


END-TO-END MODULAR MACHINE LEARNING PROJECT

OBJECTIVE

Create a modular solution for classifying a bird dataset, using Docker and RabbitMQ for communication between modules.

Key Components:

- **Producer:** ***Generates raw image data.***
- **Processor:** ***Transforms raw data into training-ready format.***
- **Uploader:** ***Stores processed data in MongoDB.***
- **Receiver: Retrieves** ***images for training from DB.***
- **Trainer:** ***Trains the model with new data.***
- **Predictor:** ***Uses the latest model for making predictions.***
- **Model Uploader:** ***Manages model upload in chunks.***
- **App:** ***Provides a web interface for interaction.***
- **RabbitMQ: Manages asynchronous messaging between components, ensuring reliable data flow.**
- **MongoDB: Uses GridFS for scalable storage of images and models.**

RABBITMQ INTEGRATION

Function: Manages communication between components through various queues.

Reason: Enables asynchronous, reliable message passing, allowing components to operate independently. (And requirements ☺)

Benefits

- Decoupling: Components can work independently and communicate via messages.

- Scalability: System can handle increased load by managing message queues effectively.

MONGODB USAGE

Benefits

- **Scalability**: Handles large datasets efficiently.
- **Flexibility**: Easily stores and retrieves large files.

GridFS

Function: Stores images and models using GridFS for handling large files.

Reason: Traditional BSON document storage limits are overcome by GridFS, which is designed for large data.

DEPLOYMENT IN DOCKER

Benefits

- **Flexibility**: Easily deployable in various environments.
- **Efficiency**: Can scale components as needed to handle increased workload.

Scalability

- **Load Handling**: Designed to handle large volumes of data and scale out for more compute resources.
- **Modular Design**: Each component can be scaled independently based on load.

CHALLENGES

- **Data Volume**: Handling and processing large volumes of image data efficiently. Especially in RabbitMQ
- **Model Integrity**: Ensuring the accuracy and completeness of model uploads and downloads.
- **Birds and clouds**: You will see 😊 (We still hate frontend)

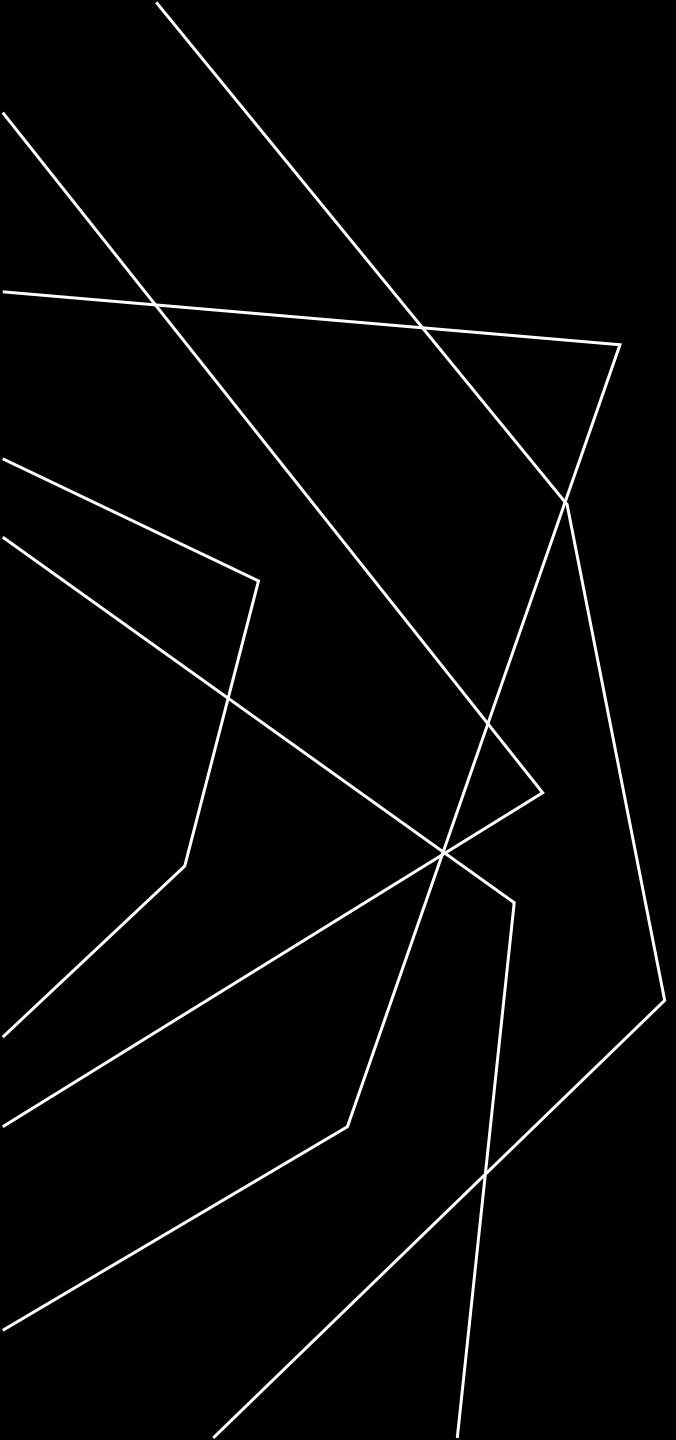
WHY INCEPTIONV3?

Practice makes perfect

- **Architecture:** InceptionV3 is a deep convolutional neural network known for its efficiency and accuracy.
- **Pre-trained Weights**: Provides a strong starting point for transfer learning, leveraging pre-trained weights from ImageNet.
- **Suitability**: Effective for image classification tasks, making it ideal for the bird species classification in this project.

Benefits

- **Efficiency**: Reduces training time and computational resources.
- **Accuracy**: Achieves high performance in image classification tasks.
- **Flexibility**: Adaptable to various image-related tasks through transfer learning.



WORKFLOW AND DEMO