AI Summer School 2025
Medical Imaging Informatics

University of Pittsburgh

Liner.ai

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IEEE COMPUTER SOCIETY

Learning Objectives

After completing this lecture, you should be able to:

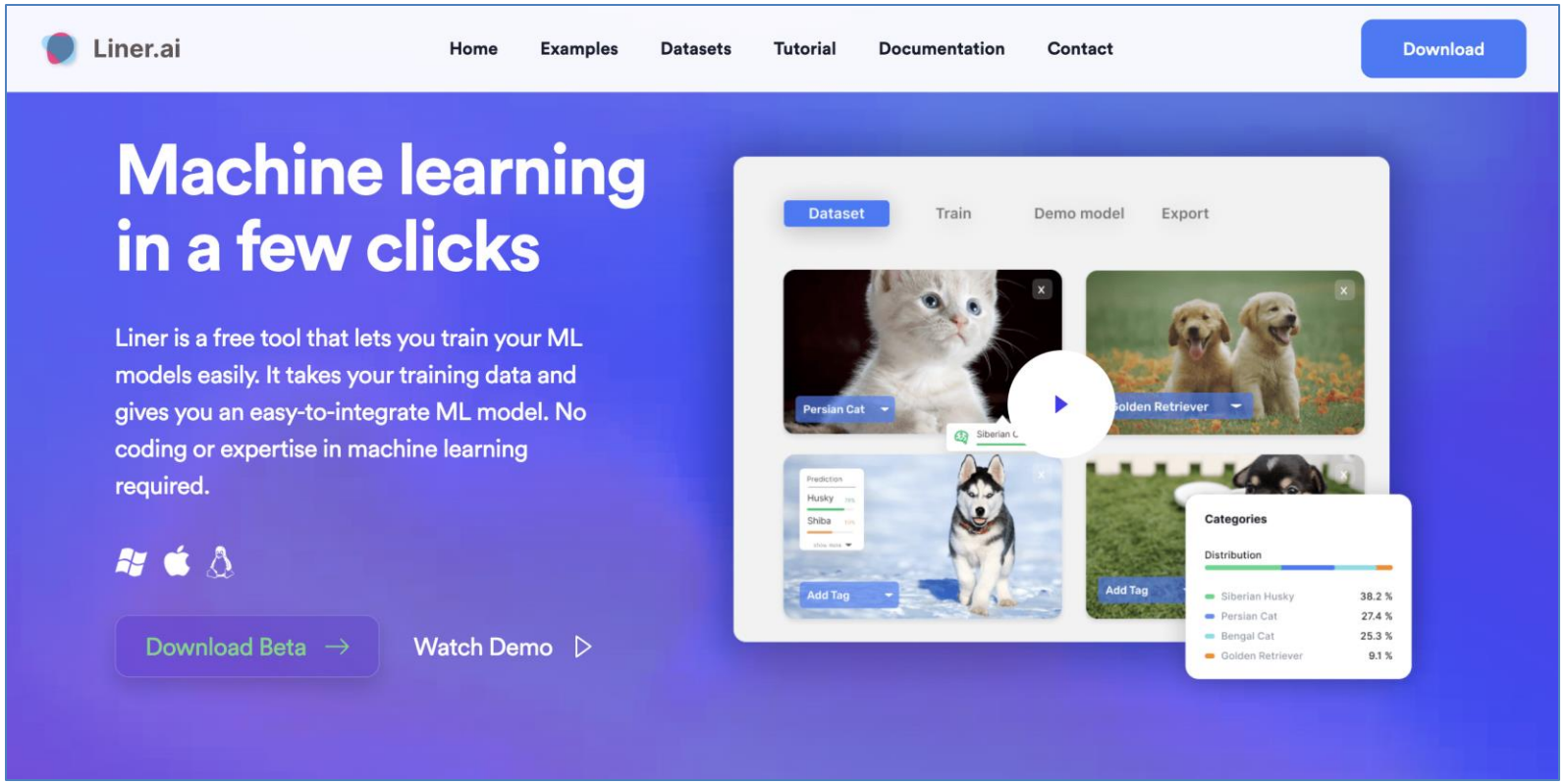
- Understand the capabilities and workflow of Liner.ai as a no-code ML platform.
- Identify the benefits of no-code machine learning tools.
- Gain practical experience in training image classifiers using Liner.ai.
- Known how to monitor model and evaluation results
- Learn how to export trained models.

Outline

- Introduction to Liner.ai
- Why Use No-Code ML Tools
- Overview of Liner.ai Features
- ML Workflow in Liner.ai
- Evaluation model performance
- Monitor model
- Live Demo: Image Classification

What is Liner.ai?

- A no-code platform that allows you to train and deploy machine learning models without writing code.
- Supports image, text, audio, and video classification; also object detection and segmentation.



Why Use No-Code ML Tools?

- No need to write Python, manage environments, or set up GPUs.
- Makes machine learning accessible to non-programmers.
- Speeds up prototyping and testing ideas quickly.
- Reduces technical barriers, so teams can focus on solving problems.
- Allows rapid experimentation with different datasets and models.
- Lowers the cost of developing machine learning solutions.

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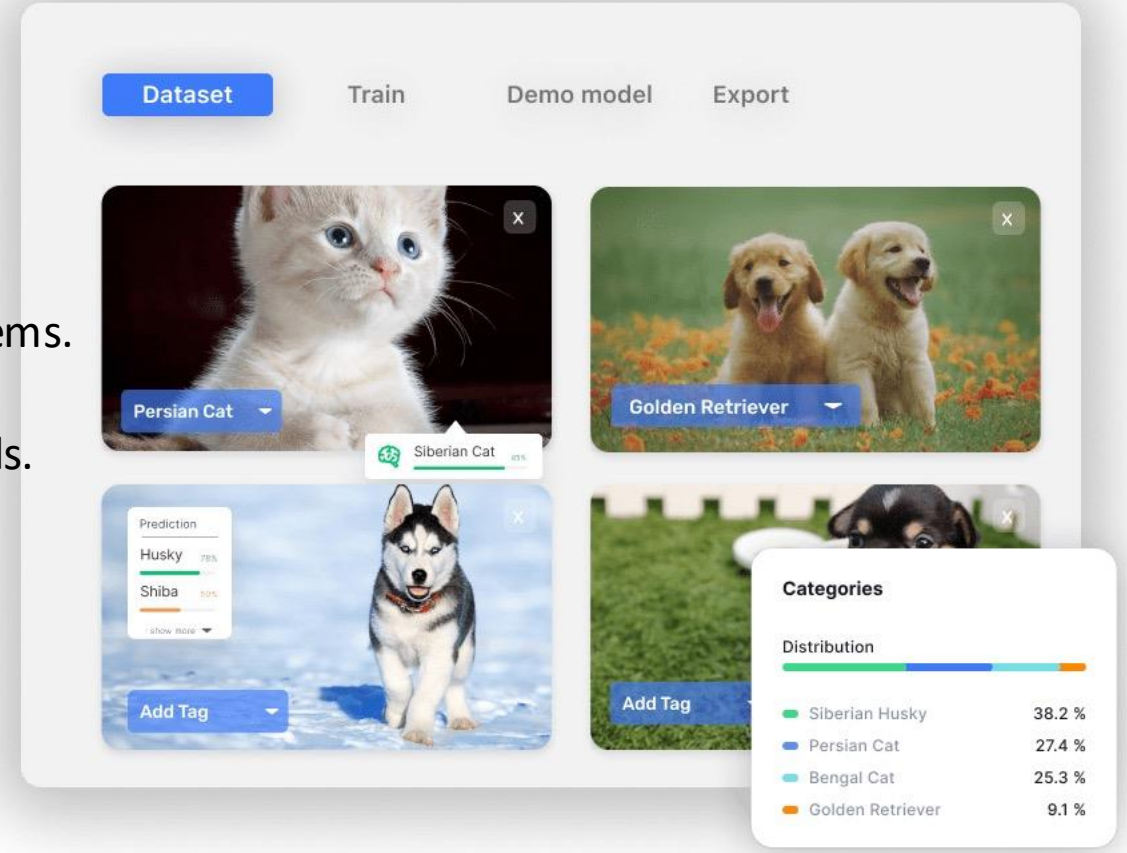
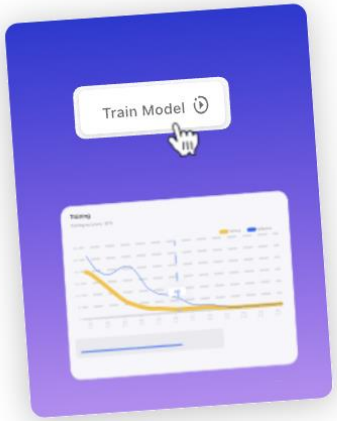


ML Workflow in Liner.ai

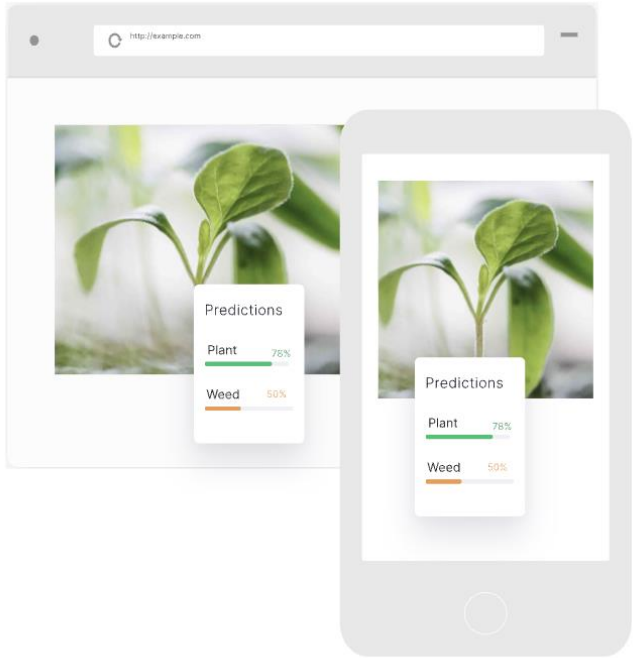
Prepare Dataset → Upload Dataset to Liner.ai → Train Model → Monitor Training → Evaluate Results → Export Model

1. Import data

2. Label data



3. Train model

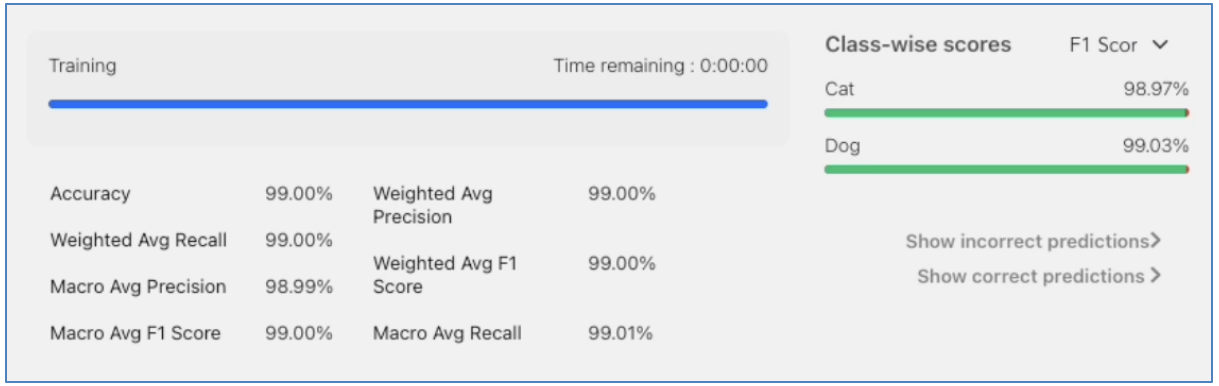


Evaluation Metrics

- Confusion matrix:

	Predicated Positive	Predicated Negative
Actual Positive	True Positive(TP)	False Negative(FN)
Actual Negative	False Positive(FP)	Ture Negative(TN)

- **Accuracy** = (TP + TN) / Total
- **Precision** = TP / (TP + FP)
- **Recall** = TP / (TP + FN)
- **F1 score** = 2 × (Precision × Recall) / (Precision + Recall)



Evaluation Metrics

- **Which is more important, recall or precision, when building a model to predict cancer?**

- **Precision** = TP / (TP + FP)
- **Recall** = TP / (TP + FN)

- **Why Recall Matters More?**

- **False negative** = Missed cancer case
- Patient might not receive treatment
- Risk of progression or death

- **False positive** = Wrongly flagged cancer
- May cause stress or follow-up tests
- But not as harmful as missing the disease

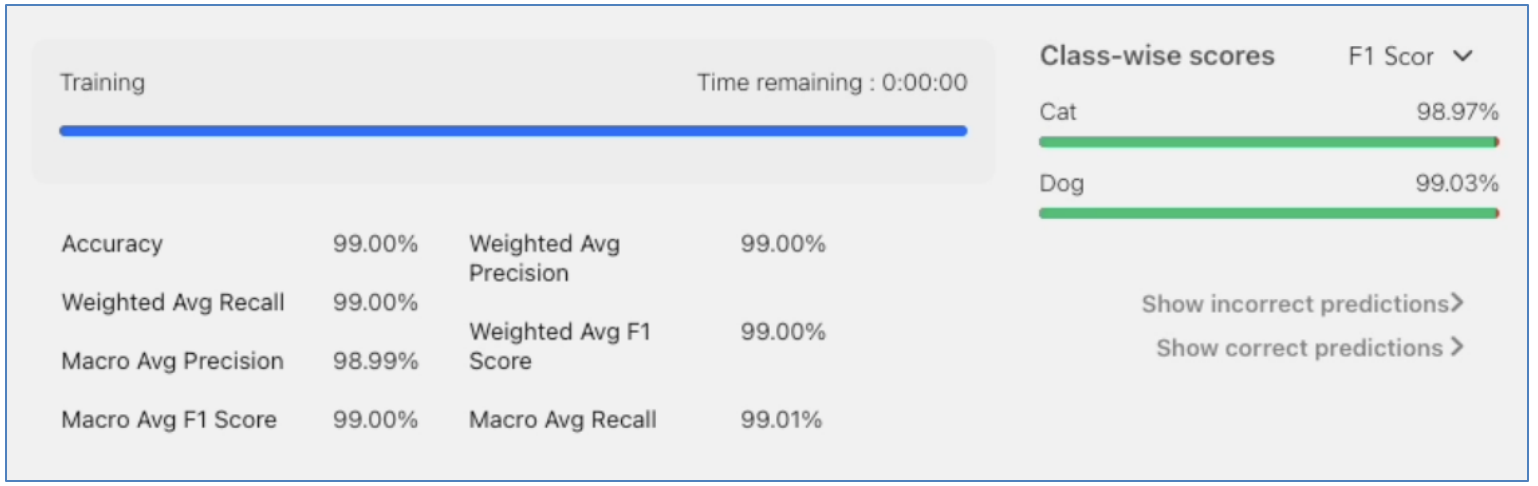
	Predicated Positive	Predicated Negative
Actual Positive	True Positive(TP)	False Negative(FN)
Actual Negative	False Positive(FP)	Ture Negative(TN)

Evaluation Metrics

- **Macro Average vs Weighted Average**

- **Macro Average:**
- Treats all classes equally
- Simple average of scores across classes

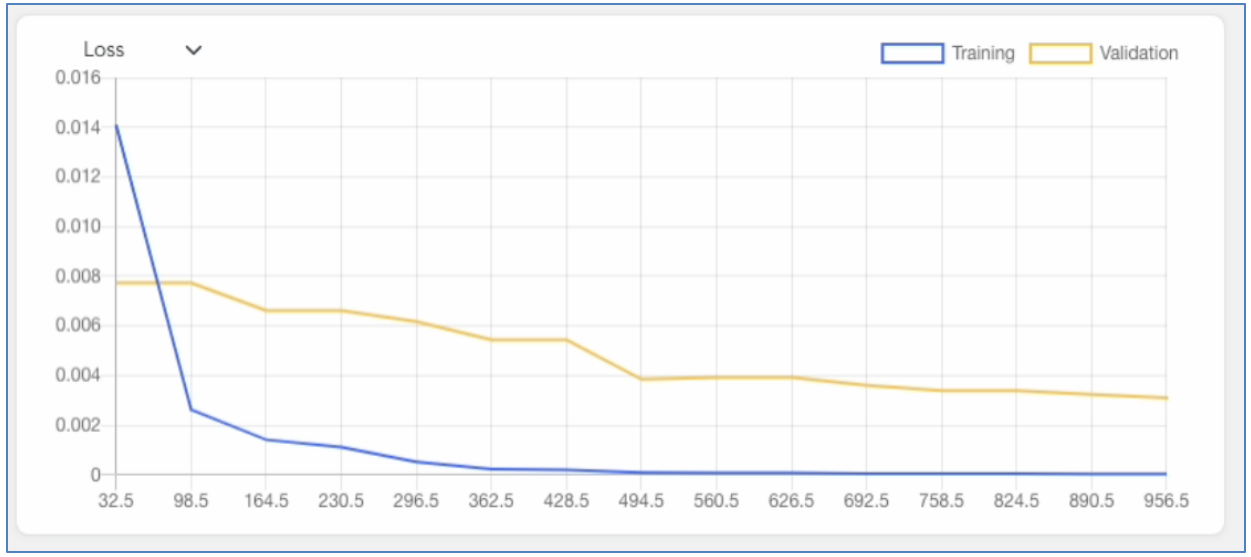
- **Weighted Average:**
- Weights each class score by its number of samples
- Reflects the class distribution in the dataset



Monitor Model

- **Train Loss**
- Measures the model's error on the training data.
- Should generally decrease as the model learns patterns.

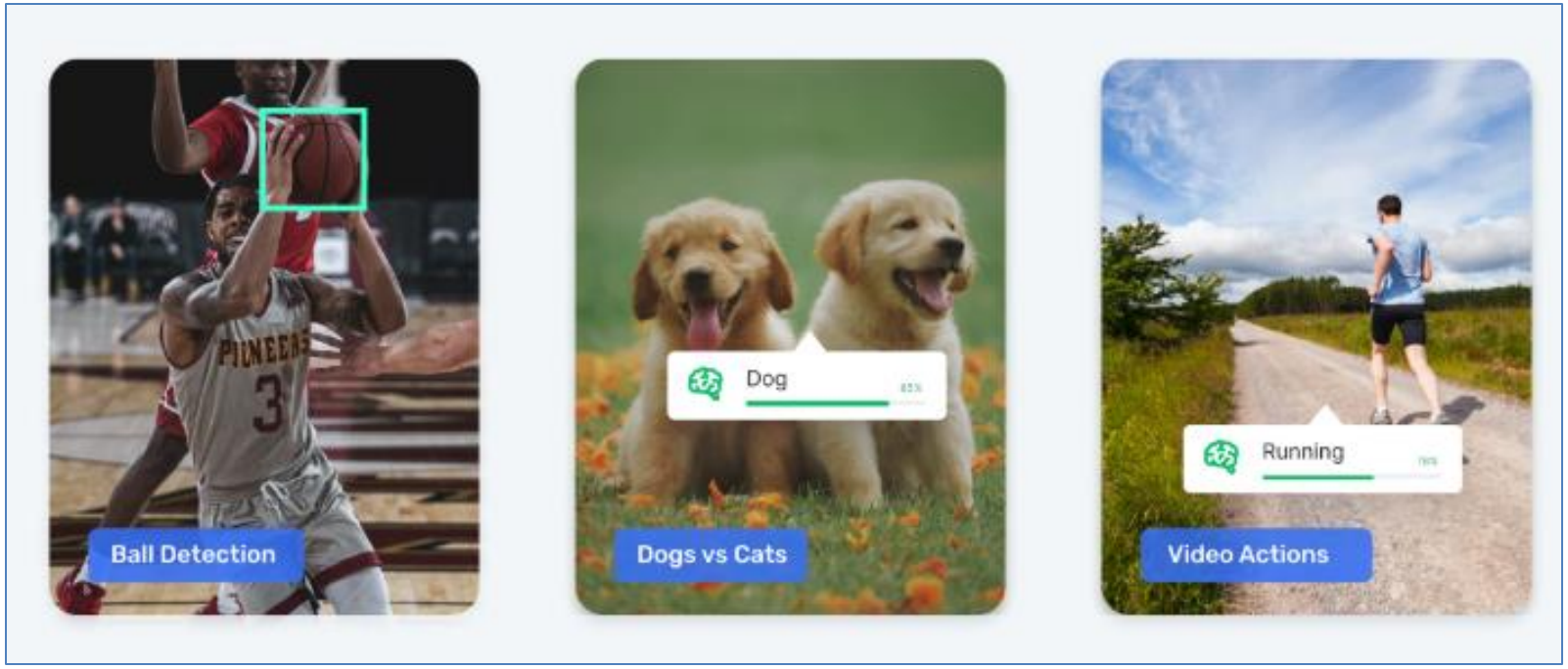
- **Validation Loss**
- Measures the model's error on unseen validation data.
- Should also decrease but can behave differently from train loss.



- **Ideal Case (Good Training):**
- Train loss ↓
  Validation loss ↓
  The model is learning and generalizing well.

Live Demo - Image Classification

- Here is a live demonstration of image classification
- https://liner.ai/



Thank you!

Questions!