

# Detecting Engines In Audio Files

Blake Rayvid

Flatiron School 8/2/24

# Use Case #1

Detect illegal logging in protected forests.



[Source](#)

# Use Case #2

Detect unauthorized vehicles in restricted areas.



[Source](#)

# Use Case #3

Detect abnormal engine noise in industrial machinery.

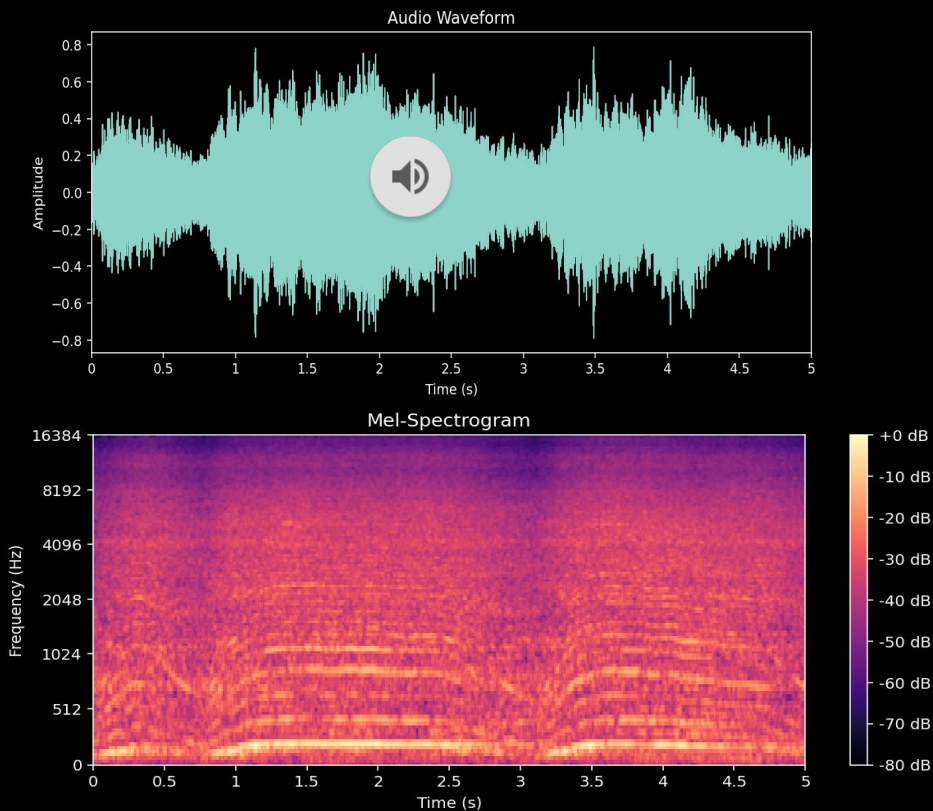


[Source](#)

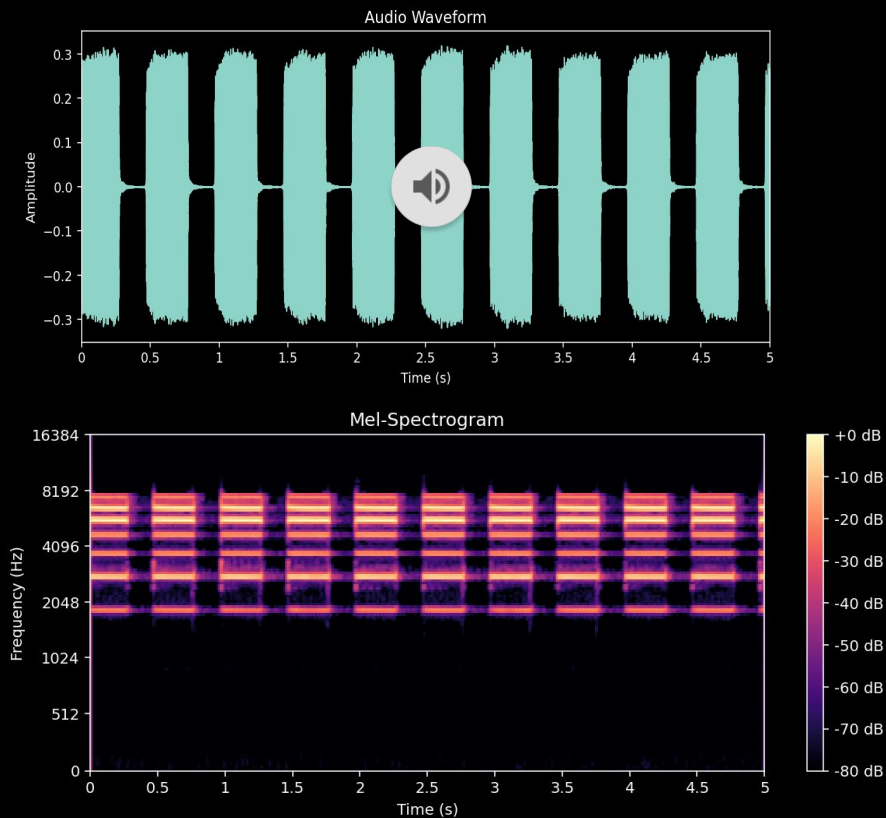


# Data examples

## Engine

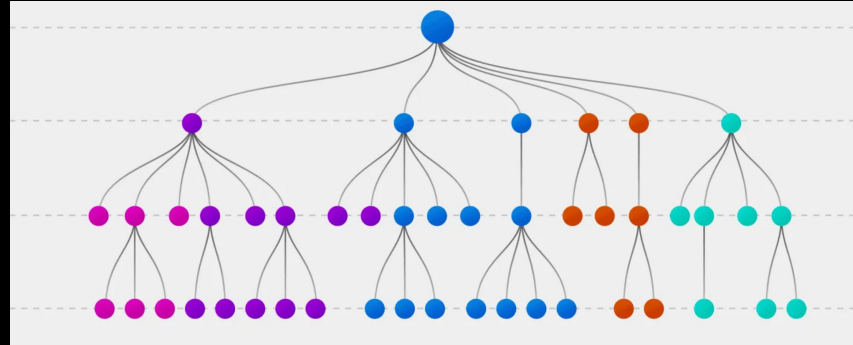


## Non-engine

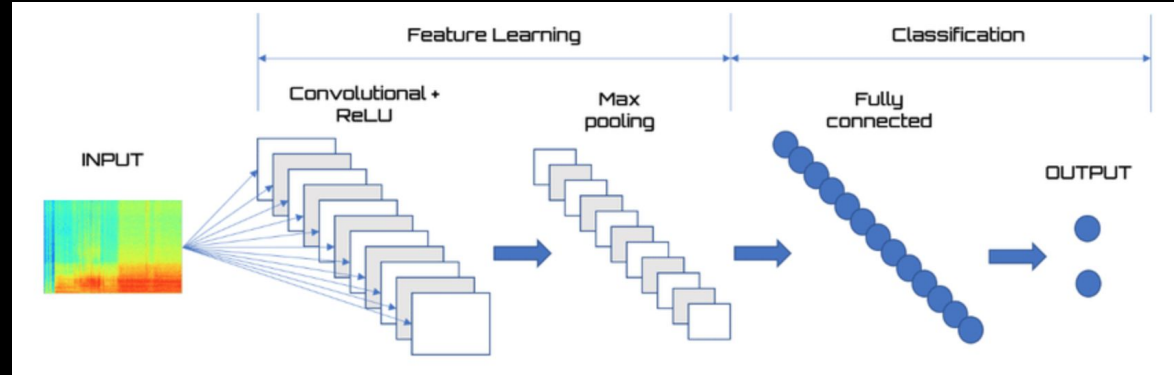


# Two modeling approaches

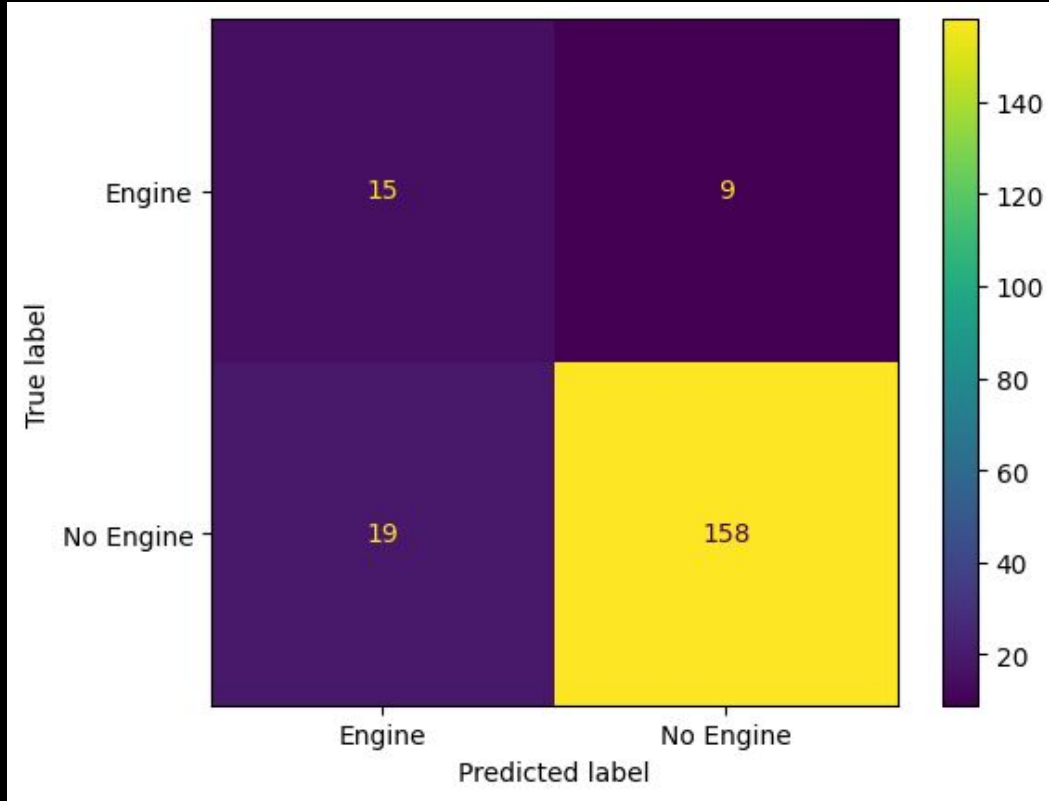
XGBoost →



2D CNN →



# Best model: CNN Classifier



(test set performance)

76% ROC-AUC

Engine class

Precision	44%
Recall	62%

# Next steps

- Gather more examples of engines.
- Try IMBlearn pipeline with SMOTE upsampling.
- Deploy to a cloud platform or use edge computing.

