

# Team Sparkling

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# Baseline classifier

## Random classifier:

- For each class a **random binary array** is created
- **lower bound** for the model
- Classifier cost: **1086.55**
- Cost for balanced dataset: **1085.94**

## All-zero / all-one classifier:

- All zeros implies silence in the whole frame
- All-zero cost: **294.05**
- All-one cost: **1091.19**

# Cost at Baseline

Is the total cost for predicting only ones lower than predicting only zeros, since the cost for false negatives is much higher than for false positives?

→ No, the dataset has **much more zeros** than ones, which means that the dataset is **skewed towards negatives**. Therefore, the cost for predicting only ones is more than **3 times higher** than predicting only zeros.

# General architecture of our system

10 binary classifiers using Logistic Regression:

- Outputs **probabilities** for each sound class **per frame**
- Probabilities into **binary decisions**
  - Threshold = 0.17
- **Onsets** (0 to 1) and **offsets** (1 to 0) are detected
- Post-processing: **median filtering** with kernel size 3 to smoothen predictions

# Threshold Optimization

- Initially: **0.17**
- Using grid search, optimal threshold: **0.14**
- Better balance for **recall** and **precision**, especially for frequent classes
- **7.5%** reduction in total cost

# Cost-Specific Tunning

- Tunned per class thresholds by running **local grid search** and **minimizing** class specific **cost contributions**
- **5.3%** decrease in total cost compared to using a global threshold
- Significant improvements for **asymmetric classes**
- More transparent and class specific **decision rule**