

Clustering Music by Genres Using Supervised and Unsupervised Algorithms

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Introduction



Goal

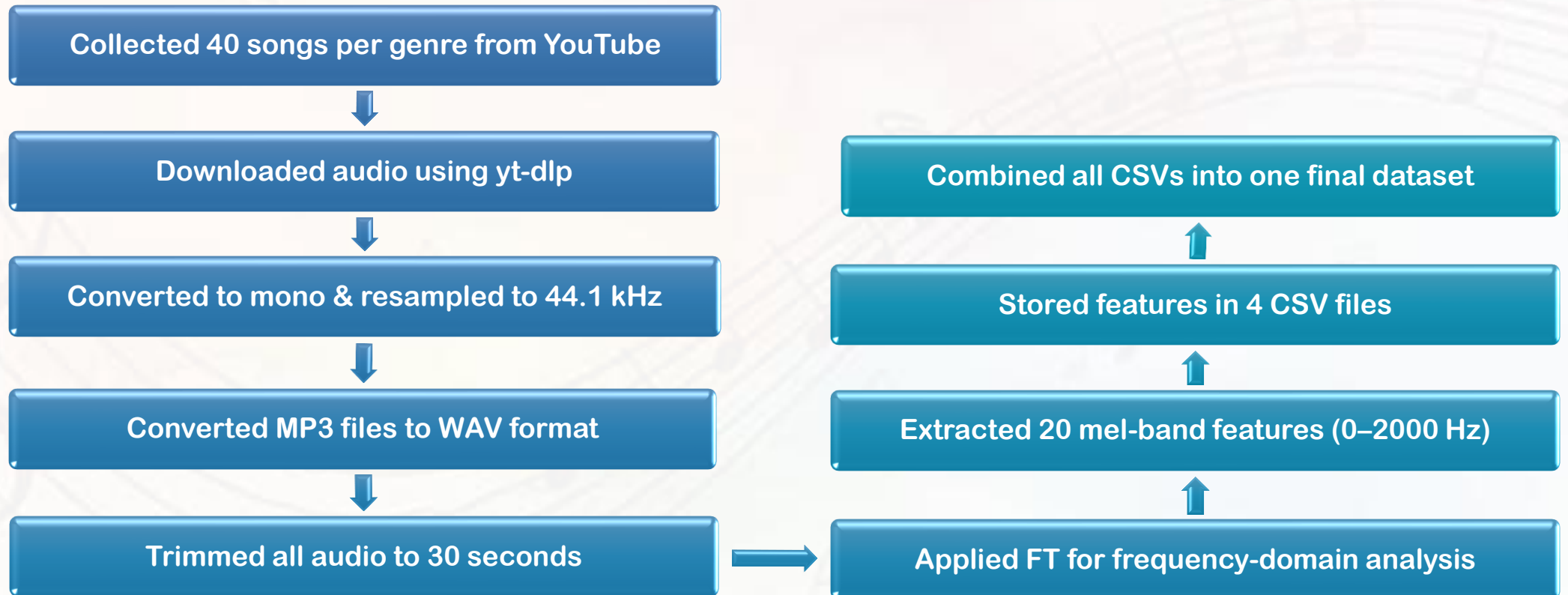
Automatically classify music genres using raw audio signals.



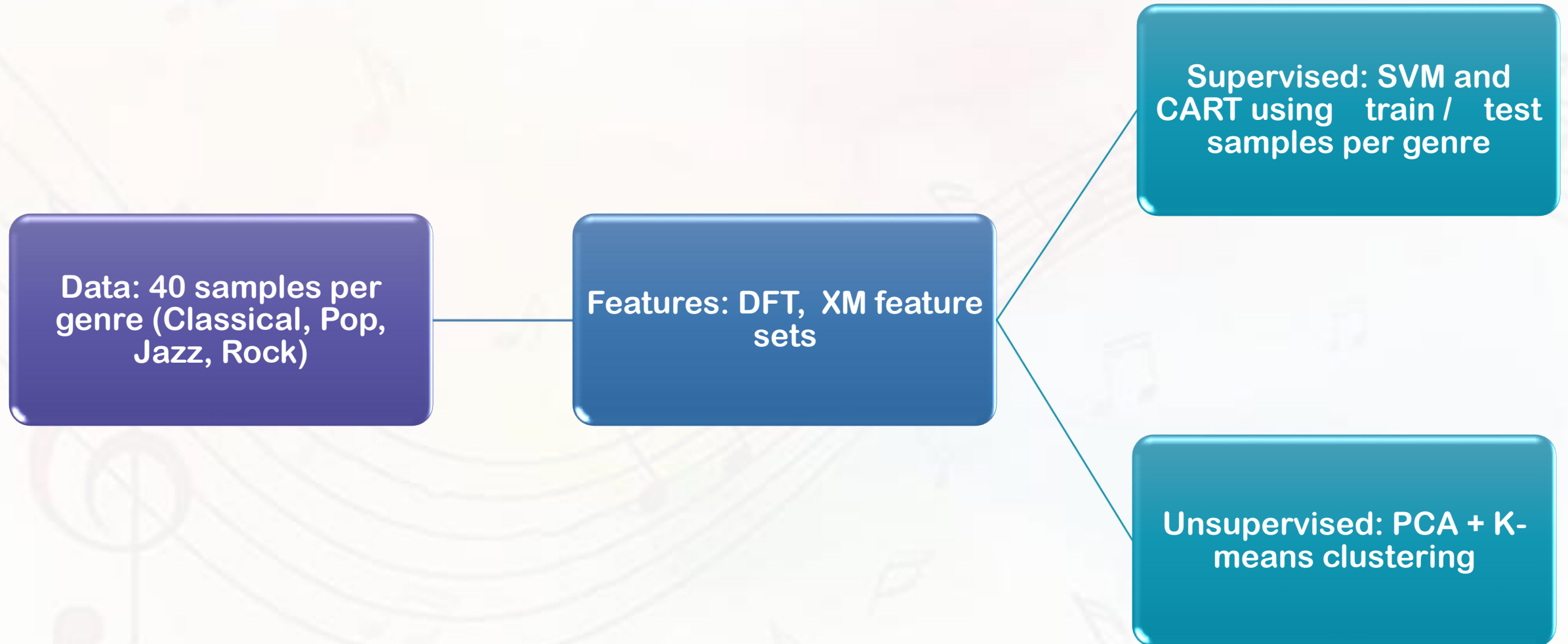
Approach

Apply DFT-based features with SVM and CART (supervised) and K-means (unsupervised).

Data Preparation Workflow

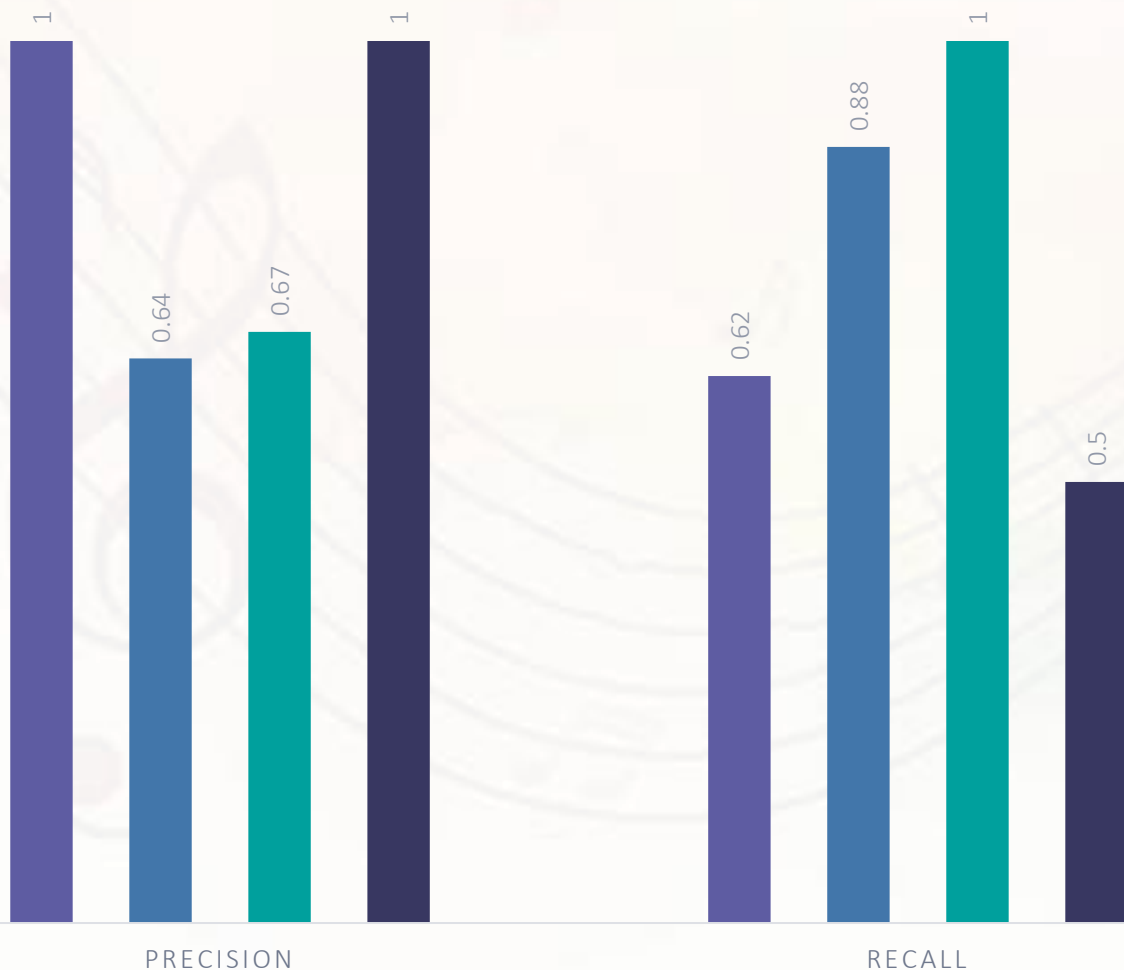


Methodology



CART Classification

■ classical ■ jazz ■ pop ■ rock



Input: Combined
normalized Mel-
features.

80/20 train-test
split.

Best Recall: Pop
(1.00), Jazz (0.88)
(high recall) model
identifies them
very well.

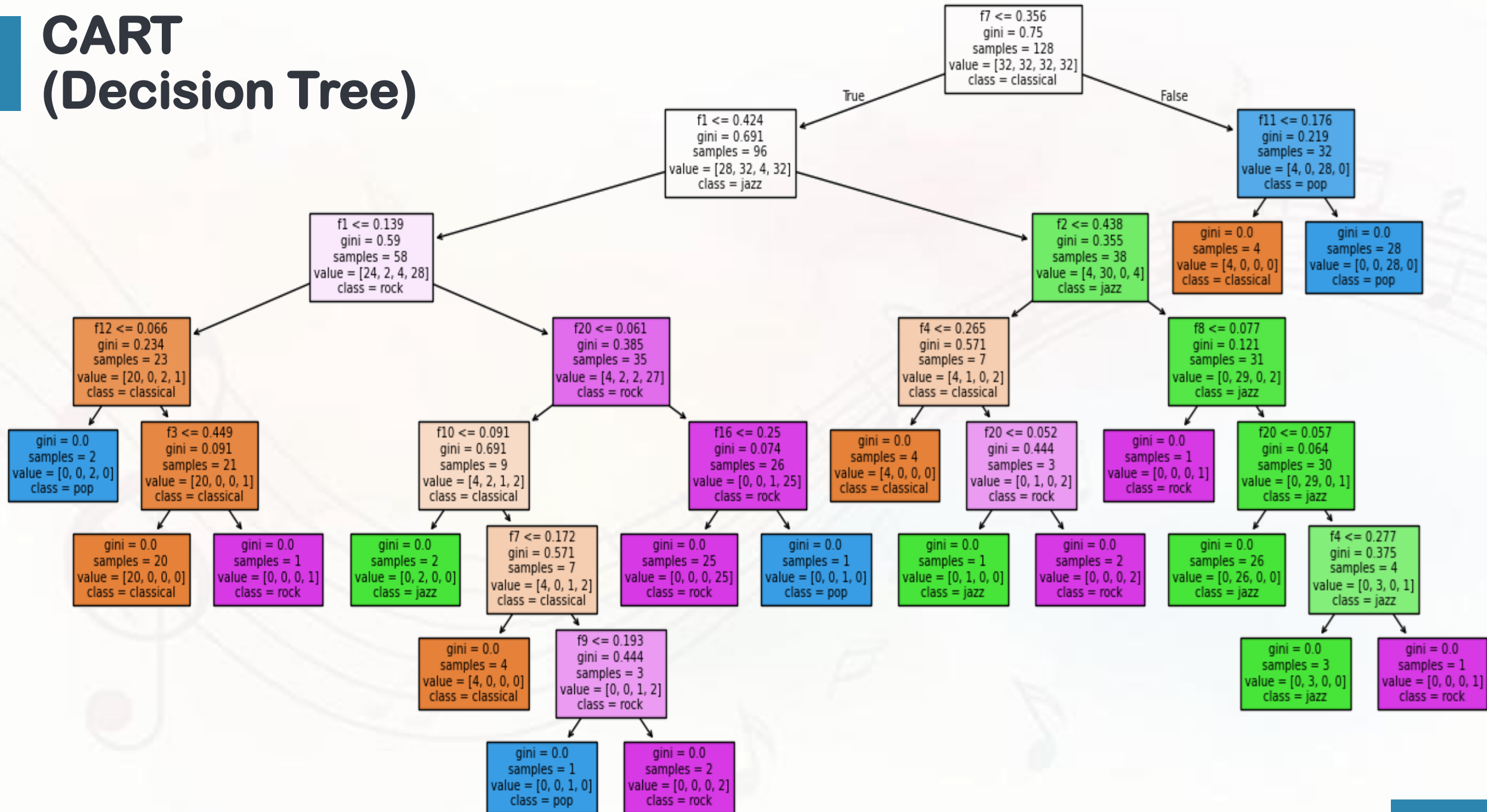
Lower Recall:
Classical (0.62),
Rock (0.50) - more
misclassifications

High precision for
Classical & Rock -
when predicted,
they are correct.

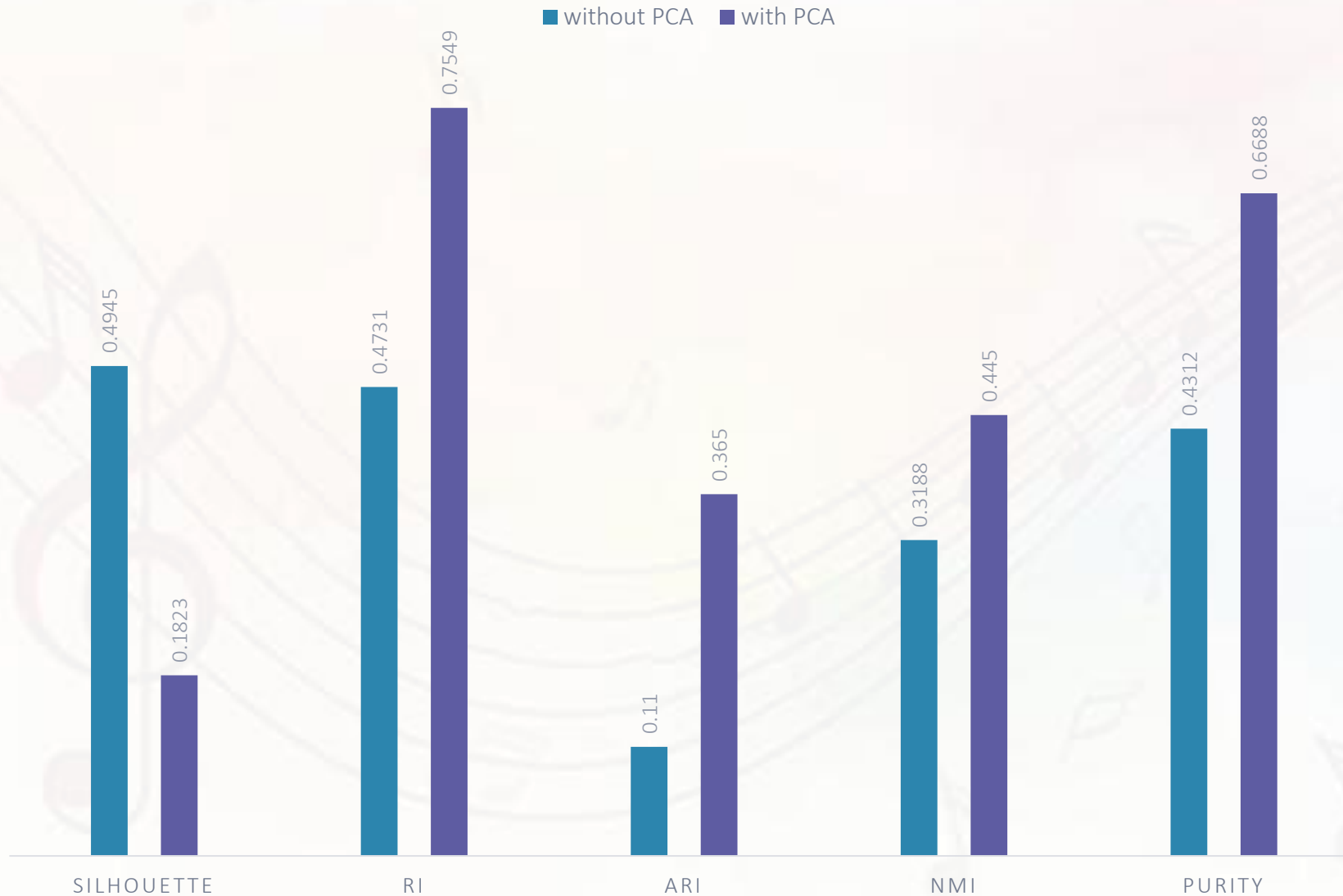
Accuracy: 0.75
Most important
features: f1, f7, f20,
f11

Interpretation:
Many genres share
frequency patterns
- moderate
separability

CART (Decision Tree)



K-Means Clustering



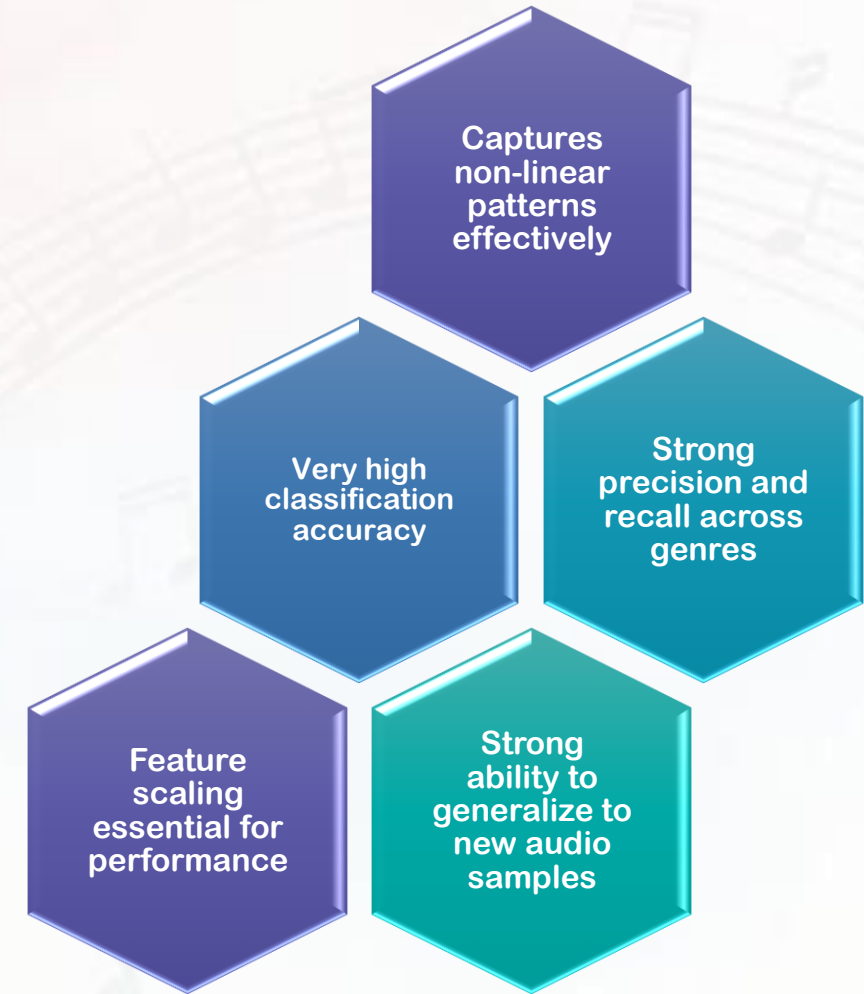
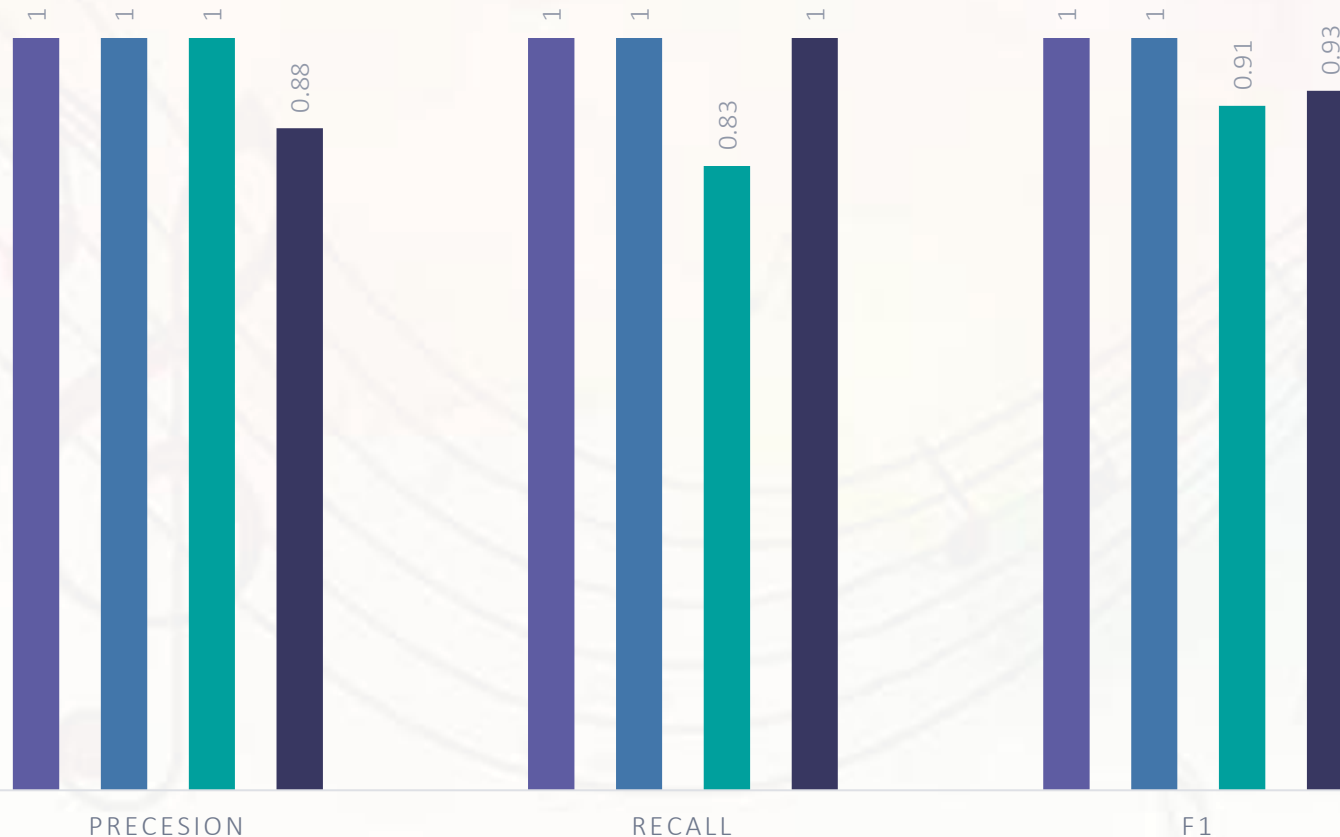
Input:
Standardized
20-D Mel
features (before
PCA)

Insights
(Without PCA):
Many samples
collapsed into
one cluster;
Classical
separated best,
others
overlapped

Insights (With
PCA): Better
structure than
without PCA but
clusters still
overlap

Support Vector Machine (SVM) Classification

■ classical ■ jazz ■ pop ■ rock



Conclusion

The results confirm that supervised learning—particularly SVM—captures genre-specific patterns far more effectively than CART or unsupervised clustering methods

SVM performs best →
highest accuracy &
strongest genre
separation

CART is moderate →
works but limited by
overlapping feature
patterns

K-Means struggles →
unsupervised clustering
insufficient with current
features

References

- K. Kim, W. Yun, and R. Kim, “Clustering Music by Genres Using Supervised and Unsupervised Algorithms,” 2024



The background features a light, warm-toned gradient with faint, curved musical staves and scattered musical notes in various colors (yellow, red, blue, green). A large, stylized treble clef is visible on the left side. The text "Thank You" is centered in a bold, blue font with a reflection effect below it. Three small, colorful musical notes (yellow, red, and blue) are positioned to the right of the text.

Thank You