# A Combination of Local Approaches for Hierarchical Music Genre Classification

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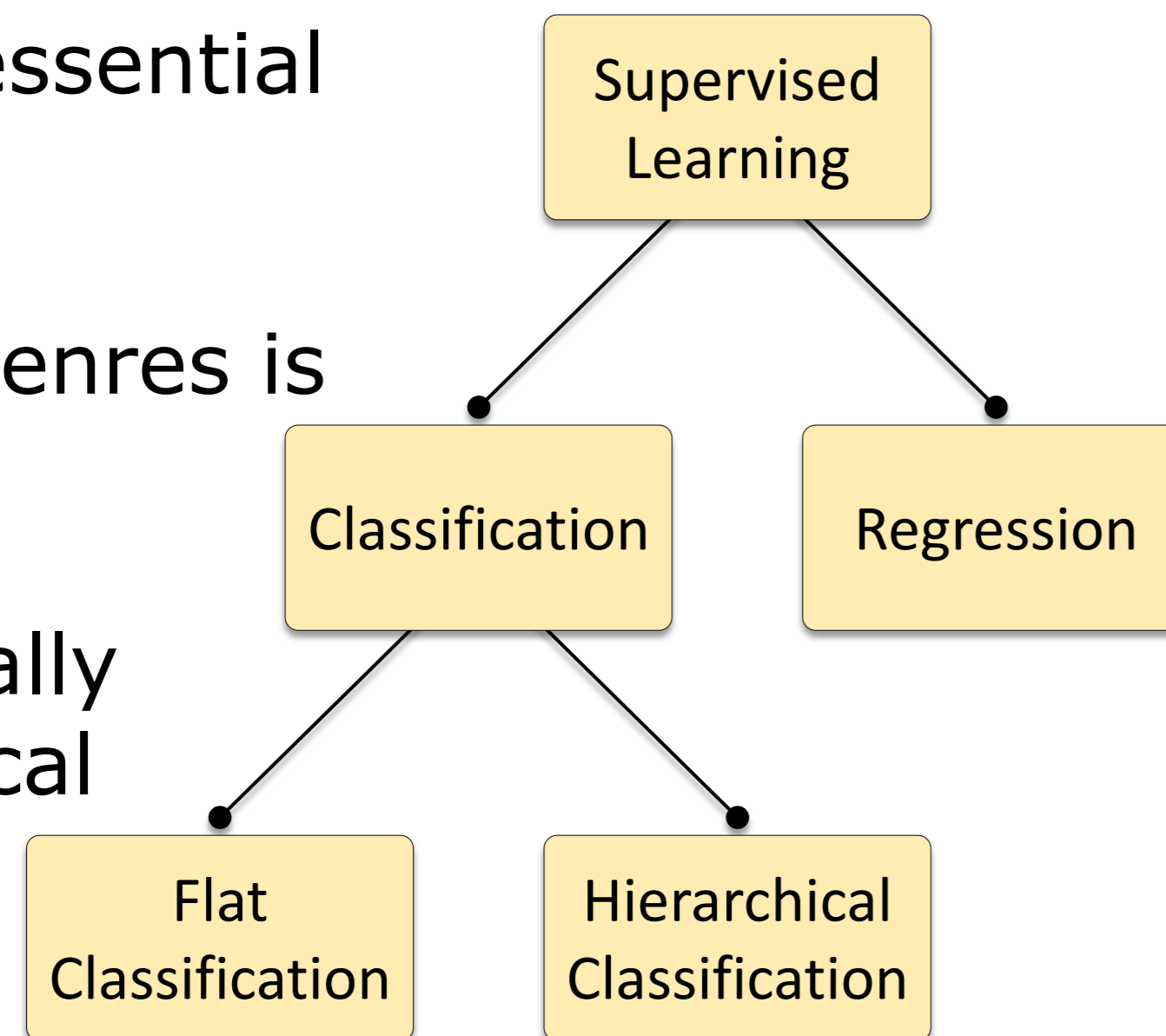[1]Institute of Mathematics and Computer Science – University of São Paulo, São Carlos, Brazil
[2]Department of Computing – Federal University of São Carlos, São Carlos, Brazil
[3]School of Computer Science and Engineering – University of New South Wales, Sydney, Australia
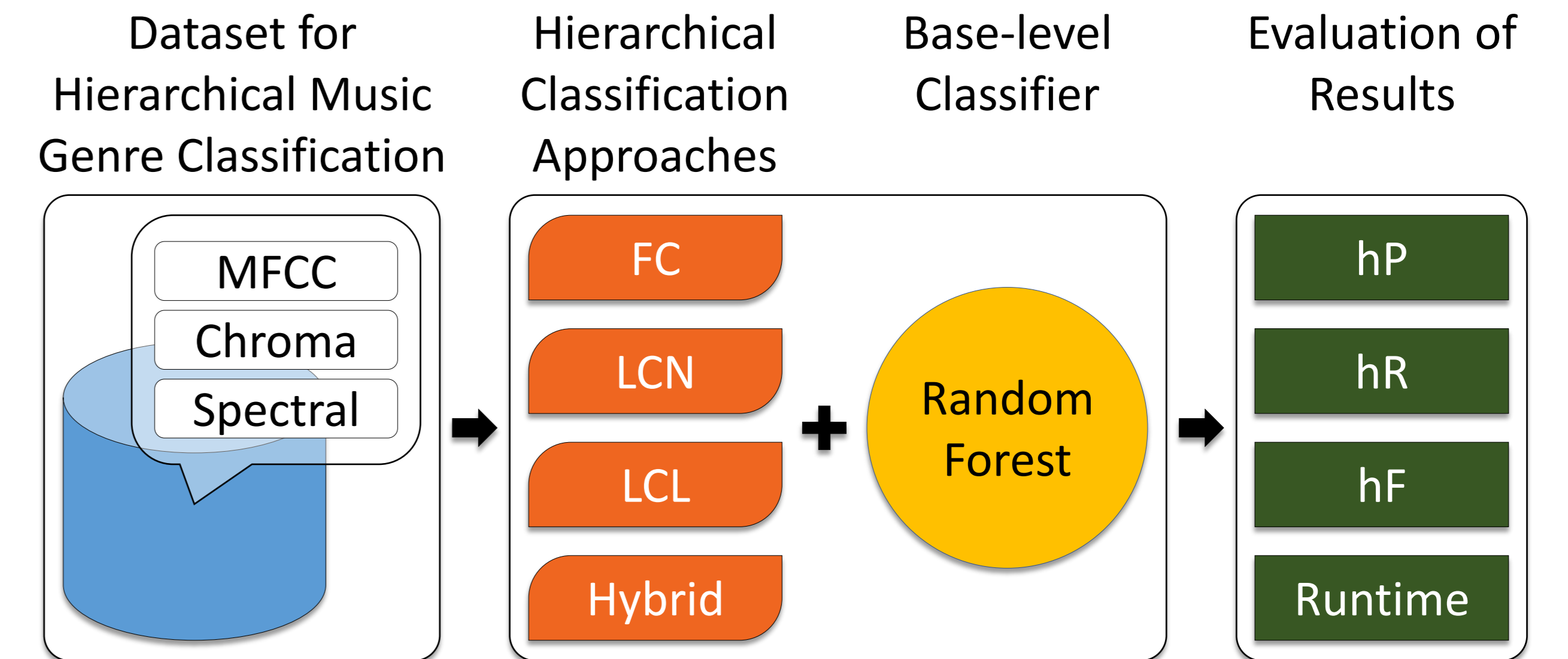
## Introduction

- Music genre is an essential metadata

- Classifying music genres is a challenging task

- Music genres typically respect a hierarchical structure



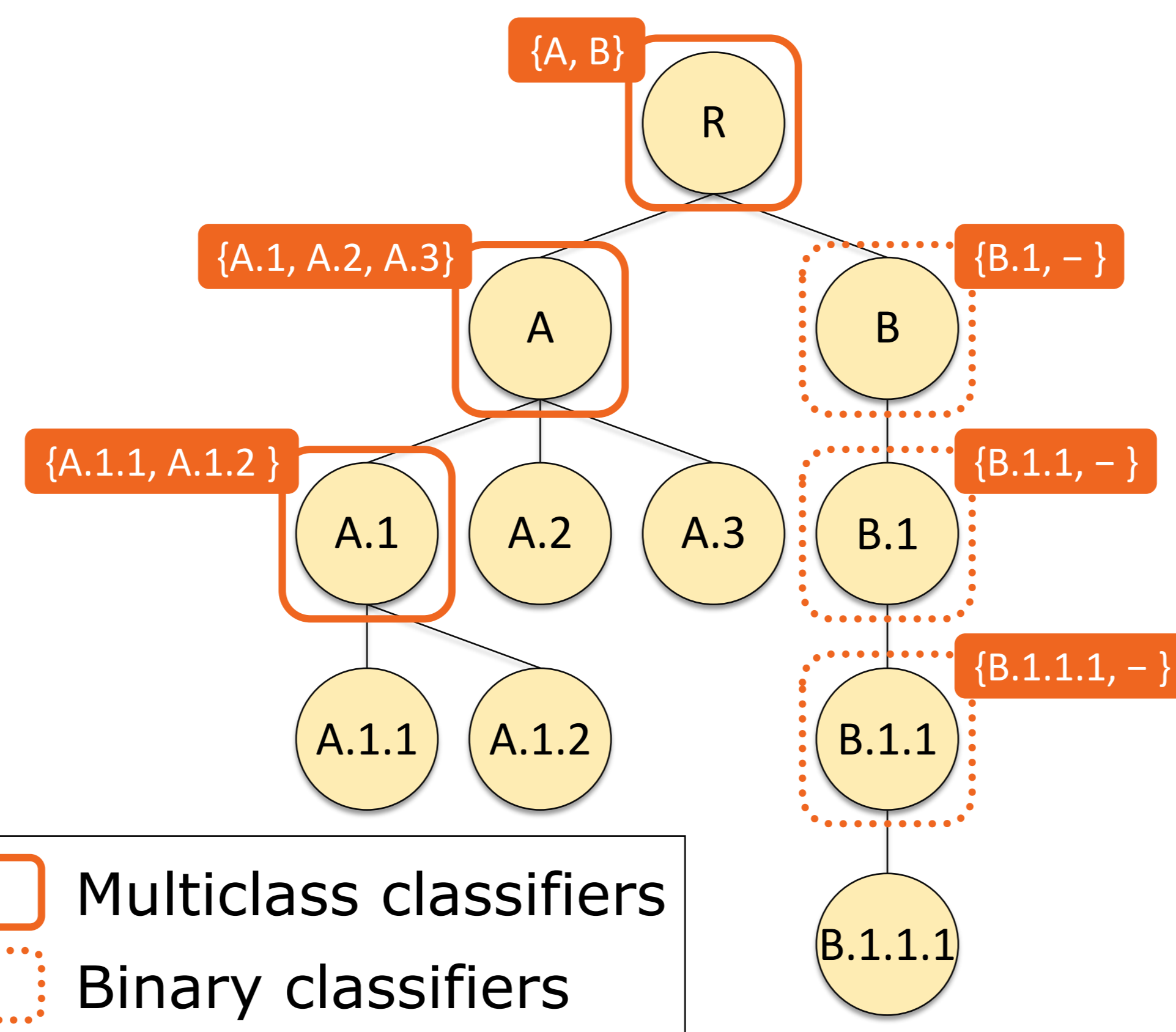| Examples | Attributes | | | | | Class ($Y$) |
|---|---|---|---|---|---|---|
| | $X_1$ | $X_2$ | $X_3$ | ... | $X_M$ | |
| $E_1$ | $x_{11}$ | $x_{12}$ | $x_{13}$ | ... | $x_{1M}$ | L→L.1→L.1.1 |
| $E_2$ | $x_{21}$ | $x_{22}$ | $x_{23}$ | ... | $x_{2M}$ | L→L.1→L.1.2 |
| $E_3$ | $x_{31}$ | $x_{32}$ | $x_{33}$ | ... | $x_{3M}$ | L→L.2→L.2.2 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋱ | ⋮ | ⋮ |
| $E_N$ | $x_{N1}$ | $x_{N2}$ | $x_{N3}$ | ... | $x_{NM}$ | L→L.1→L.1.1 |



Hypothetical class hierarchy

## Major Contributions

- We combine the per node and per parent node hierarchical classification approaches

- Our approach is more robust and faithful to the music genre classification scenario

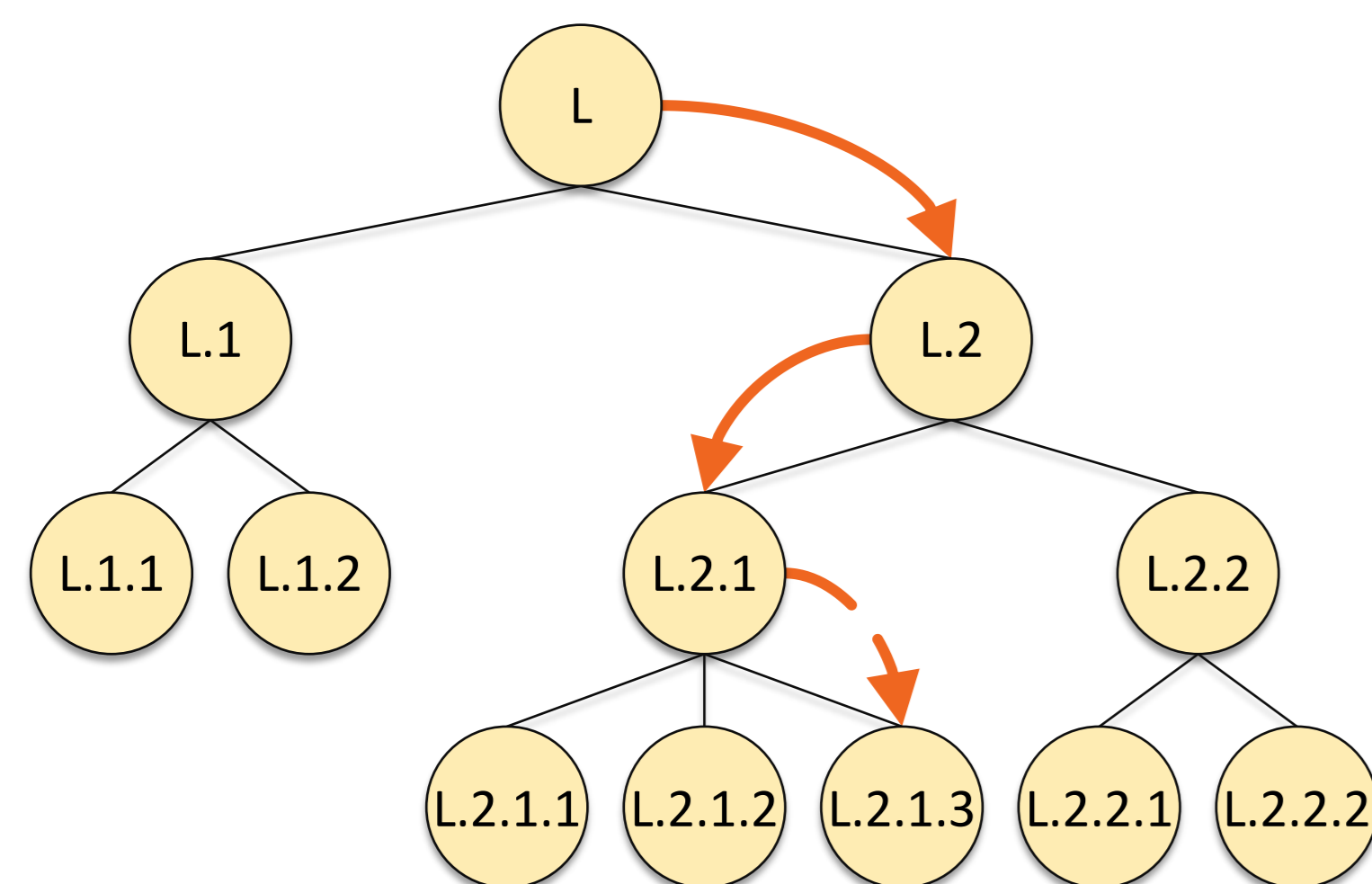- We advocate using decision trees as base-level classifiers

## Proposed Approach



☐ Multiclass classifiers
⊡ Binary classifiers

## Experimental Evaluation



## Results Overview

| Evaluation measure | Hierarchical approaches | | | |
|---|---|---|---|---|
| | **FC** | **LCN** | **LCL** | **Hybrid** |
| hP(%) | 67.62 | 72.36 | 69.86 | 75.79 |
| hR(%) | 66.10 | 71.96 | 69.46 | 77.38 |
| hF(%) | 66.88 | 72.16 | 69.66 | 76.57 |
| Runtime | 48 min | 92.44 h | 4.41 h | 3.53 h |

## Conclusion

- Our results showed that the designed approach is better than the traditional ones

- The hierarchical performance measures were not very high due to the tough nature of the problem. In other words, it is not easy to classify among 120 genres