PRAIGg (gRFIA)

Pattern recognition and Artificial Intelligence group

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The PRAI-UA Group

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Main research lines:

- Fundamental research on machine learning and pattern recognition
- Music information retrieval
- Image retrieval
Objective:
- Given a database of labeled objects $D$, a dissimilarity measure $d(\cdot, \cdot)$ and a test object $t$, find “similar” objects to $t$ in $D$.

Tasks:
- Develop structures to speed up the searches
- Develop techniques to speed up the building of these structures (essential in interactive tasks)
Basic research

- Artificial Intelligence / Pattern recognition
  - Grammatical inference
    - learning multiplicity automata
    - transduction vs. expression learning
  - Interactivity
    - optimum parsing algorithm
    - multimodality
  - Classification
    - most probable string
    - minimizing the Word Error Rate
    - Robust algorithms
Objective:
- Design and implement systems able to classify musical data (sounds, metadata or digital scores) in a category

Tasks:
- Genre, mood, author (etc.) recognition
- Track selection (melody, bass, etc.) in multi-track files
- Bird song species recognition
Automatic music analysis

Equivalent to syntax and semantic analysis in natural language processing

Objectives:
- Monophonic: to recognize the melodic role of each note
- Polyphonic: chord sequences, harmonic analysis and tonal functions

Applications:
- abstraction: pattern extraction, recognition, reductions, comparison
- synthesis: performance rendering, algorithmic composition
- teaching

Figure 1: A prototype for interactive music chordal analysis