PRAIGg Presentation

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Overview:


- The methods estimate the quality of a prototype based on the probability of participating in a correct classification using 1-NN.

- Apply two heuristic criteria to estimate compared with other prototype selection methods. In practice, this incremental version is very efficient in terms of time cost and number of calculations to suit new prototypes.
Overview:

- The idea is **to change the feature space using weak classifiers**. The original features are replaced by posterior probability values –provided by several weak classifiers– of belonging to each class.
- The accuracy obtained using this representation is, in most cases, significantly better or, at worst, the same as when using the original features (statistical significance tests with multiple datasets and several meta-classifiers).
Recognition of Pen-Based Music Notation

Recognizing a music score at the time it is being written
Recognition of Pen-Based Music Notation

Work done:
- Collection of samples of isolated music symbols
  - Isolated symbol recognition

In progress:
- Database of pen-based music scores
- Segmentation-free recognition of pen-based music notation
Example

- An image of a postal code is received as input
- The goal is to guess the region of the code
- The region is indicated by the prefix of the postal code
- Many postal codes denote the same region
- A list of valid postal codes is available
The problem

- Given an explanation (postal code), the true label (region) is known
- The input is a set of features describing, but not telling, a single explanation
- Which strategy should be used?
  - The most probable hypothesis (MPH)
  - The label of the most probable explanation (MPE)
Labels with Multiple Explanations

Why would not be the optimum strategy (MPH) the best one?

- Inaccurate estimation of the likelihood of the explanations
Some preliminary experiments

NN estimation with synthetic data

NN estimation with real data
Open work lines:

- Symbolic music classification
- Automatic music analysis
- Music similarity metrics
- Paleomusicology and cultural heritage
- Interactive multimodal transcription of digital audio
- Transcription of on-line handwritten scores
Symbolic music classification

Objective:
- Design and implement systems able to classify a digital score in a category.

Tasks:
- Genre, mood, author (etc.) recognition.
- Track selection (melody, bass, etc.) in multi-track files.
- Bird song species recognition using micro-tonal transcription and dynamic time-warping.
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.

Tasks:
- Expert systems.
- Induced rules using inductive learning (RIPPER algorithm).
- Learning from expert user corrections.

Applications:
- abstraction: pattern extraction, recognition, reductions, comparison.
Music similarity metrics

Making our perception of musical likeness computable.

Tasks:

- Geometric distances between profiles.
- Tree and string edit distances.
- Probabilistic edit distances.
Paleomusicology and cultural heritage

Objective:
- To design and develope an interactive environment for ancient Spanish music representation.

Tasks:
- Spanish music writing of 17th and 18th centuries.
- Coding using the Music Encode Initiative (MEI).
- Grammar to extend the Plaine and Easie Code standard.
- Exporting the contents to the RISM database.
Interactive multimodal transcription of digital audio

Objective:
- To exploit human feedback in the task of extracting a score from the digitized music sound.

Tasks:
- Interactive onset detection.
- Harmony (chords) extraction.
- Tempo and rhythm detection and tracking.
- Statistical models of melody and harmony.
- Developing a platform for testing in real use by musicians and music teachers.