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
Music similarity metrics

Making our perception of musical likeness computable

**Tasks:**
- Geometric distances between profiles
- Tree and string edit distances
- Probabilistic edit distances

**Applications:**
- Copyright management, audio to score alignment, teaching environments, musicology, database search, digital libraries, etc.
Paleomusicology and cultural heritage

Objective:
- To design and develop an interactive environment for ancient Spanish music representation (project in co-operation with CSIC)

Tasks:
- Coding Spanish music writing of 16th and 18th centuries
- A prototype for a digital score editor specialized in ancient (Spanish mensural) fonts
- A translator system from ancient notation to modern western

Data:

Processed:

PRAIGg (gRFIA) | Music information retrieval | July 11, 2014
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 real use testing by musicians
Recognition of Pen-Based Music Writing

Objective:
- To recognize hand-written music scores drawn using an electronic pen on a tablet screen.

Tasks:
- User interactivity and on-line learning
- Shape segmentation and recognition
Analysis of retina images for diagnosis

Overview:
- Project in co-operation with the Hospital de Torrevieja
- Development of a prototype for helping the primary care doctor to detect/discard diabetic retinopathy

- Manually annotation by a ophthalmologist. Interactive approach
A multimodal image retrieval app for iOS

- App users can train the system to recognize objects
- 43 metadata such as angle and location are stored
- Result: Annotated image dataset with metadata
- Currently, about 15000 images and 3000 users
Augmented reality app for *Villa Romana del Albir* (Alfaz del Pi)

- 3D digital reconstruction with Blender
- Unity iOS app to project the models over the archaeologists markers
- Project from the University of Alicante (IP: Javier Esclapés) and *Ayuntamiento del Alfaz del Pi*
- People: Technicians, architects, archaeologists, actors
- Available for visitors with 3 iPads on site