

RAA is a system for a new, very fast and robust methodology for automatic audio recognition and analysis. Opposed to the commonly known watermarking technology the RAA approach is based on our so called AudioDNA, which is derived from an incoming audio signal and compared with the AudioDNA of known music titles stored in a special purpose database. It works in analogy to the human fingerprints, which are used to uniquely identify persons by comparing found fingerprints against a database of well known fingerprints.



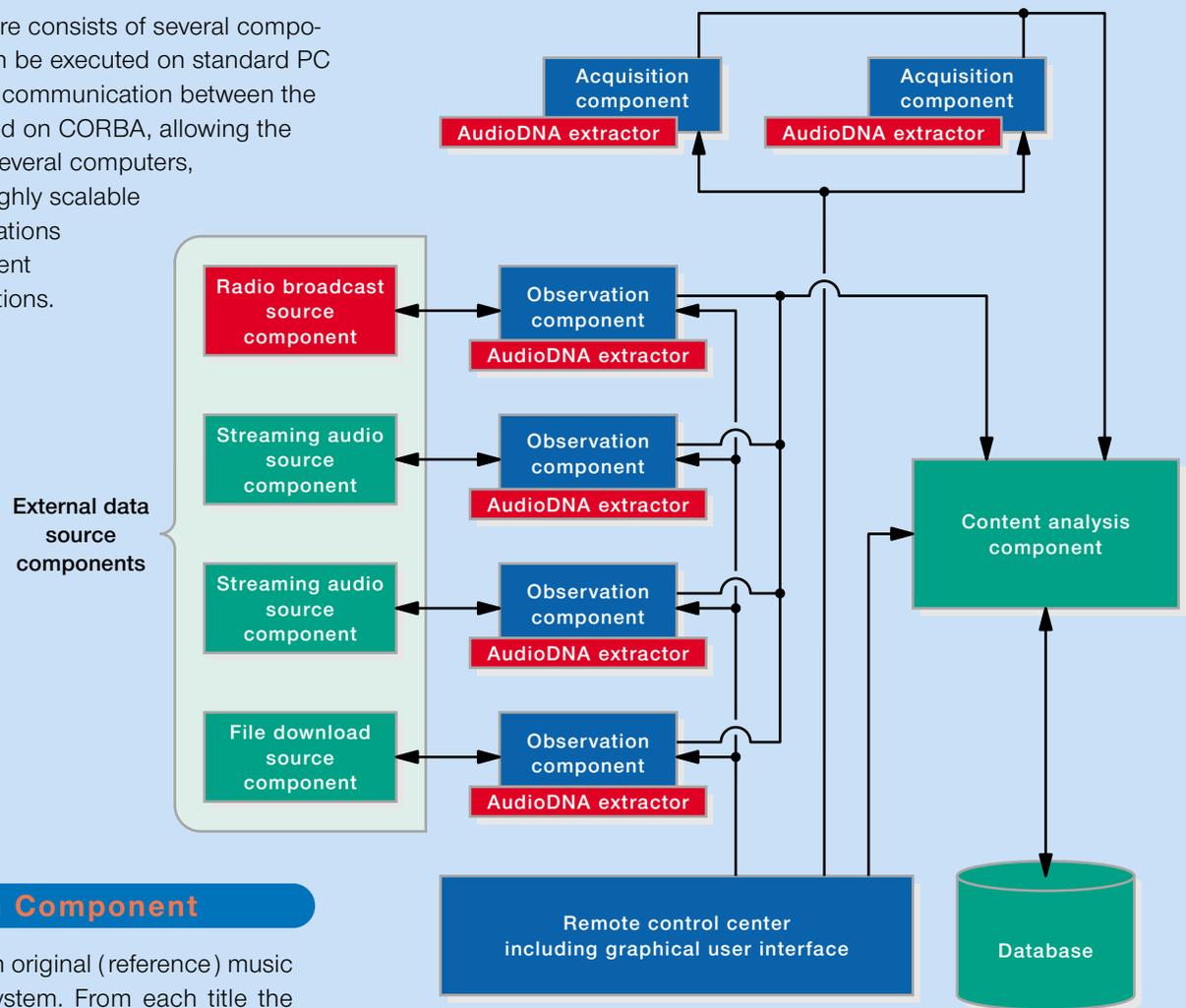
The main features of this system are the robustness against a manifold of different signal manipulation processes, which are often used in broadcast environments or bit rate compression technologies used for Internet transport. In such cases the observed audio signal differs from the original signal (master files) used as reference AudioDNA in the database.

In particular the RAA system is robust against:

- Broadcast processing effects  
Including pitching, limiting, exciting and compression
- Audio coding / compression  
Down to 24–32 kbit/s for MPEG-1 audio layer 3 compression (MP3), RealAudio and Microsoft Windows Media Audio (WMA)
- Drop-outs/ Missing sections  
Missing sections within an observed music title do not prevent identification, provided that the sections before and after the missing section can be identified independently.
- Mixing / Crossfadings  
The same holds for mixing to titles or crossfadings between titles. The sections before and after such an effect will be identified correctly.

# Technical Information

The RAA software consists of several components, which can be executed on standard PC equipment. The communication between the modules is based on CORBA, allowing the distribution on several computers, thus enabling highly scalable system configurations fitting very different kinds of applications.



## Acquisition Component

allows to bring in original (reference) music titles into the system. From each title the AudioDNA is calculated and stored in the reference database together with some descriptive attributes (metadata), including reference ID's to existing asset management systems.

### Supported audio formats

WAV, PCM (CD quality, 44.1 kHz, 16 bit), MP3

## Analysis Component

compares the AudioDNA received from the observation components with the AudioDNA stored in the reference database. A highly optimised indexing method is implemented delivering a matching performance which is about 100 times faster than real-time, thus allowing the concurrent analysis of that many audio signals.

## Observation Component

calculates the AudioDNA of examined music titles and sends them to the analysis stations. An observation component is able to work approximately three times faster than real time (using today's standard PC technology PIII @ 1 GHz). The usage of several observation components is possible and provides a high scalability of the system.

### Supported audio formats

WAV, PCM (several sample rates), MP3, MS Windows Media (WMA) and RealAudio (RM) are currently supported.

Other formats can be integrated on demand.

## For further information please contact

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