

# Sound Excerpt Based Similarity Search in P2P Applications

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- Motivation
- Existing systems
- Integration

# Introduction

- P2P file sharing systems started in 1999
- Napster was followed by many similar centralised / decentralised application:

Direct Connect

Gnutella

Audiogalaxy

Freenet

Soulseek

Kademila

...

...

# Background

- Increasing number of home users with fast Internet
  - Besides P2P, propagates realtime audio services
    - Streaming media technology
  - Multicast overlay networks (e.g. peercast)

# Motivation

- Still growing number of shared audio files
- Generally text metadata for identification
  - Could be misleading
    - - masquarading, speling, style?

# Motivation

- New services based on listener feedback
- Pandora - music recommendation system
  - Music Genome - few hundred features
    - Ethnicity, piano solo, drum, funny (laughing)
- Audio similarity characterisation
  - Feature, qualifies the application

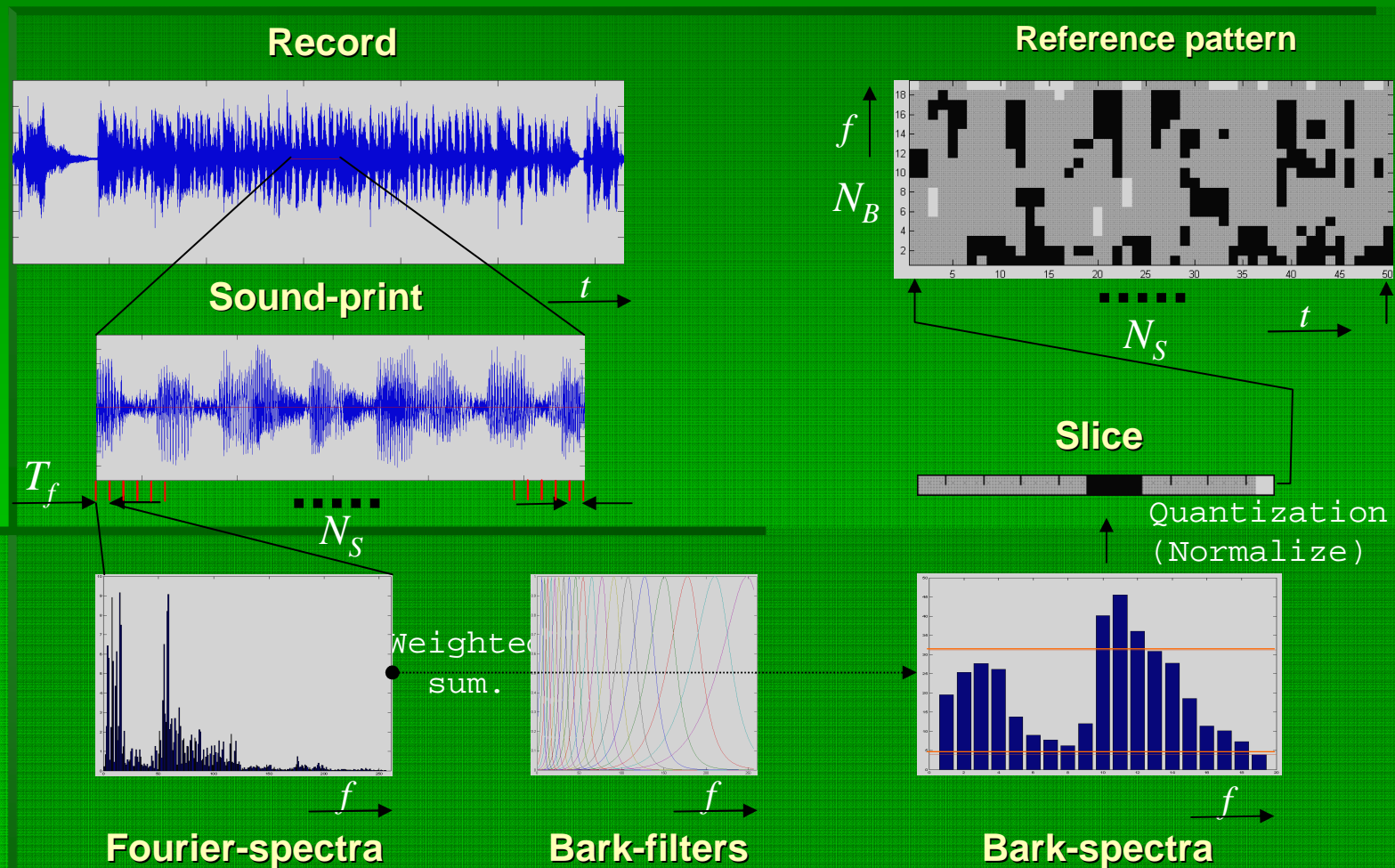
# Existing system

EMeSE (Experimental Media Stream rEcogniser)

- Known musical records were monitored
- Light-weight algorithm - P2P aware
- Short (1...10s) sections used for reference

# Existing system

EMeSE (Experimental Media Stream rEcogniser)



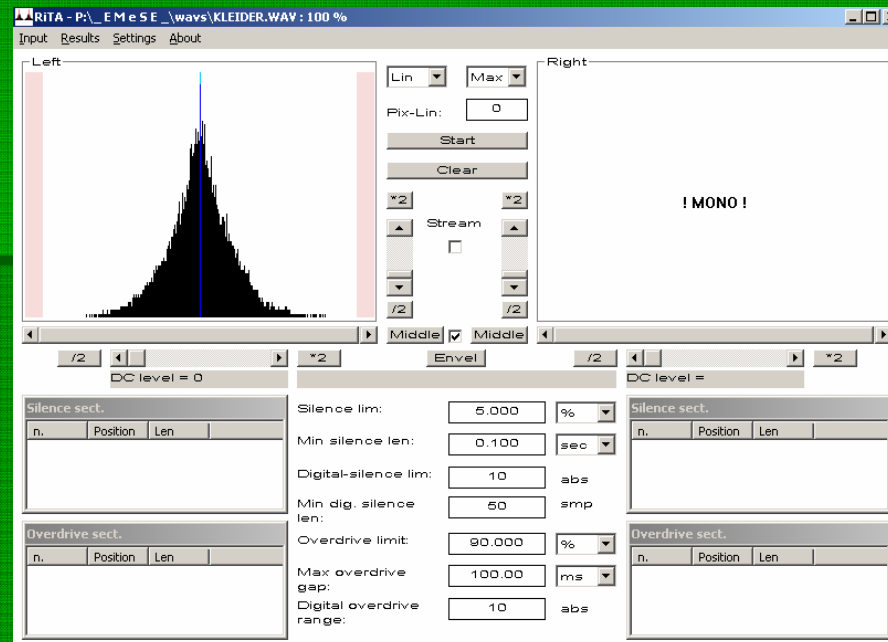
# Existing system

EMeSE (Experimental Media Stream rEcogniser)

# Signal level monitor

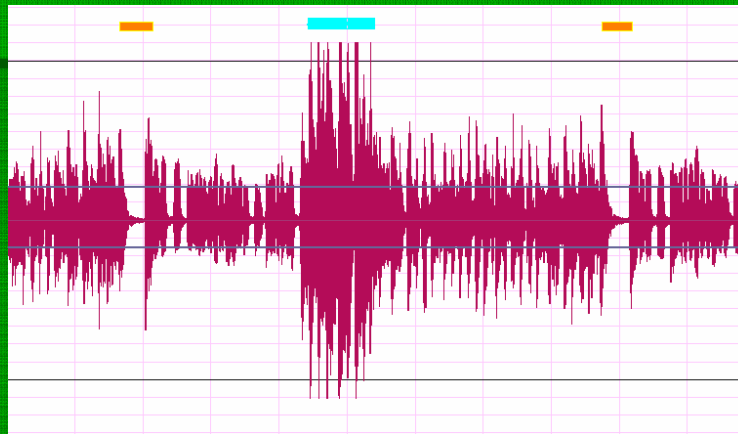
RiTA (Real Time Audio analyser)

- For our partner, the National Radio:
  - Signal histogram display
    - for debugging the signal route and the codecs




# Signal level analyser

- Determine silent and overdrives in records
  - {Threshold, critical duration} pairs
  - Section length, position series
  - Primarily for editing purposes



# MATCH - SIMILARITY

- Integrate these new procedures! 
  - low complexity also
- Short (1...4s) histogram
  - longer filters out characteristics
- Section series - can help identification
  - statistics - new searching strategy

# Application

- Sending extended references to peers
  - Local search

# Plans

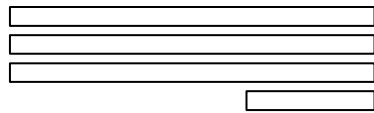
- Examine histograms of spectral features

- maximum

- centroid

$$= \frac{\sum_{n=0}^{N-1} f(n)x(n)}{\sum_{n=0}^{N-1} x(n)}$$

# THANK YOU!



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