SurfOnHertz

Software Radio FM Broadcast Receiver for Audio Indexing Applications
The issue

Today the Broadcast bands represent some true databases

How to exploit them?

Applications:
- Radio on demand
- Speaker research
- Publicity detection
- Music identification
- Musical genre detection
- ...

Device:
- Microphone for keyword research, vocal commands.
- Touch-sensitive screen
- Artist Genre Speaker
The Goal

Today the Broadcast bands represent some true databases

How to exploit them?

Applications:

- Need indexing algorithms

Device:

- Design of a Hertzian browser using software radio technics

Which Architecture?
The system for the FM band

- Analogue Front End
  - Amplify the FM radio signal
  - Minimizes intermodulation
  - Minimizes noise

- ETIS - ESPCI Simultaneous Multichannel Receiver
  - Simultaneously demodulates every FM radio station

- YACAST
  - Musical genre detection
  - Publicity detection

CEA

TelecomParisTech

LIP6

Indexing engine
Analogue Front End

Band pass = 88 – 108 MHz
Gain = 60 dB
Noise Factor = 2.6 dB
IP3 = 39 dBm
Receiver

CEA

Analogue Front End

Simultaneous Multichannel Receiver

Indexing engine

Sampling @ 87MHz
DFT filterbank
FPGA implementation
Indexing engine

CEA

Analogue Front End

Simultaneous Multichannel Receiver

ETIS - ESPCI

YACAST
TelecomParisTech
LIP6

Indexing engine

3 genres
- MFCC + GMM
- 70% sensitivity

Radio 1
- Known advertisement
- Music genre classification
- Classical
- Nespresso “What's else”, etc.

Radio 2
- Known advertisement
- Music genre classification
- Variety

Radio N
- Known advertisement
- Music genre classification
- Jazz
Prototype

Antenna

GPU

FPGA

LNA
Conclusion

SurfOnHertz contributes to:

- First **world** of hertzian browser

- All station demodulated in parallel
  - Ready for DRM+

- Classification of musical genre in real time
  - 70% of sensitivity
Perspectives

Hertzian browser for
- Digital radio
- Video

Integrated version
Team

Leader
Thank you for the attention

http://olivieromain.free.fr/SurfOnHertz