SurfOnHertz

Software Radio FM Broadcast Receiver for Audio Indexing Applications

The issue

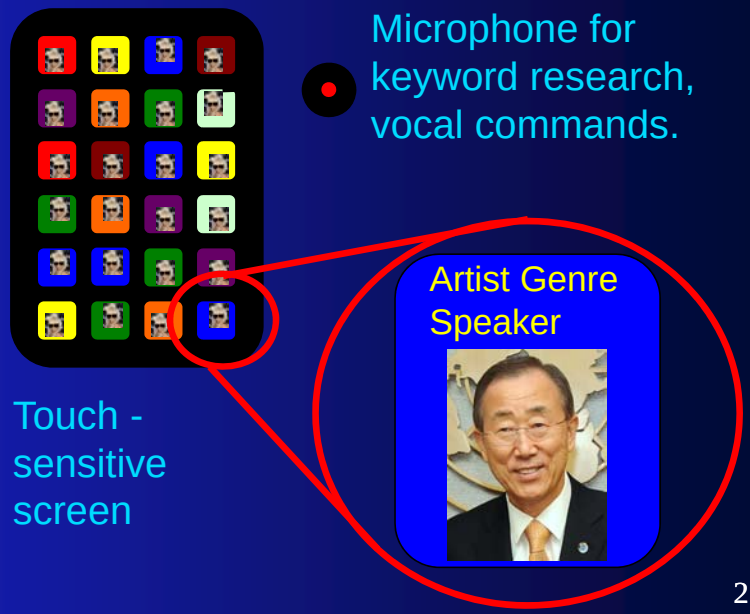
Today the Broadcast bands represent some true databases

How to exploit them ?

Applications :

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

Device :



The Goal

Today the Broadcast bands represent some true databases

How to exploit them ?

Applications :

Need indexing algorithms

- Which ones ?

Device :

Design of a Hertzian browser using software radio technics

Which Architecture ?

The system for the FM band

CEA

Analogue Front End

- Amplify the FM radio signal
- Minimizes intermodulation
- Minimizes noise

ETIS - ESPCI

Simultaneous Multichannel Receiver

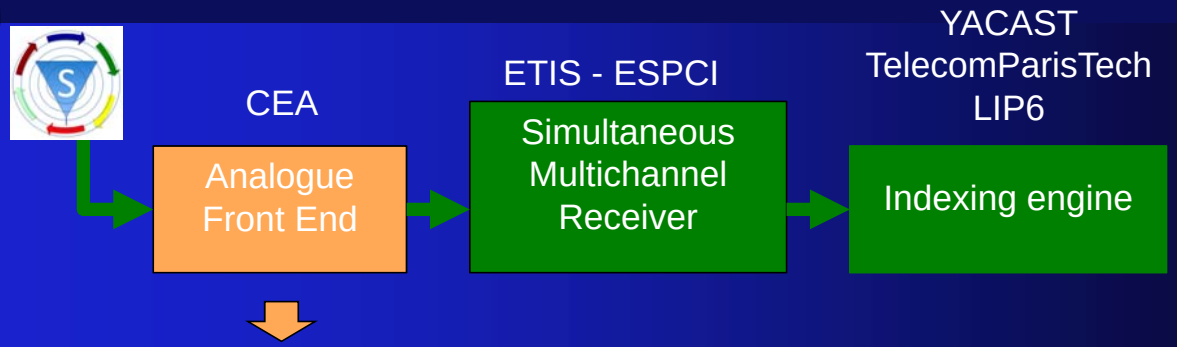
- Simultaneously demodulates every FM radio station

YACAST
TelecomParisTech
LIP6

Indexing engine

- Musical genre detection
- Publicity detection

Analogue Front End

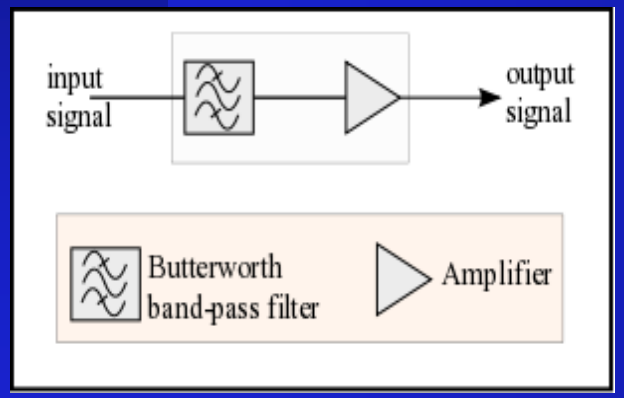


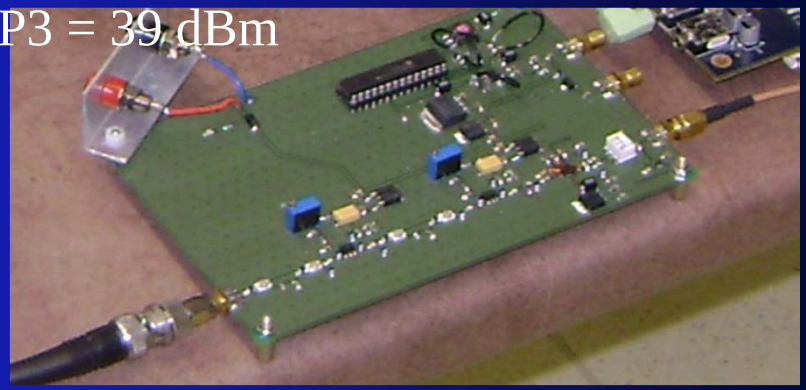
Band pass = 88 – 108 MHz

Gain = 60 dB

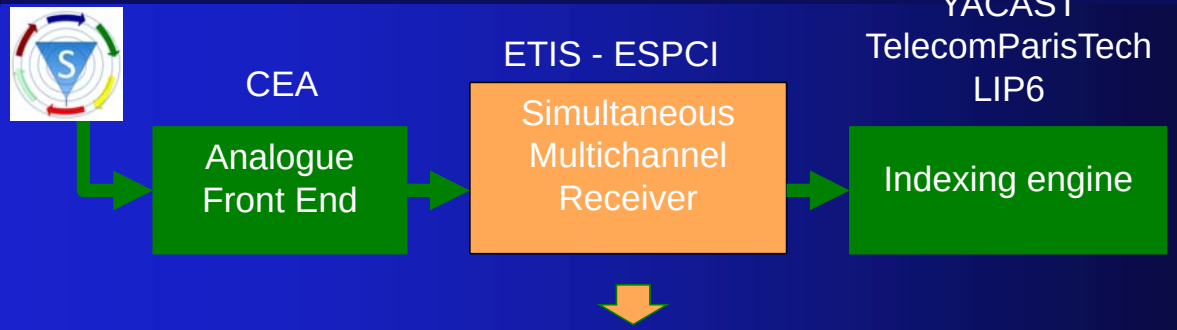
Noise Factor = 2.6 dB

IP3 = 39 dBm

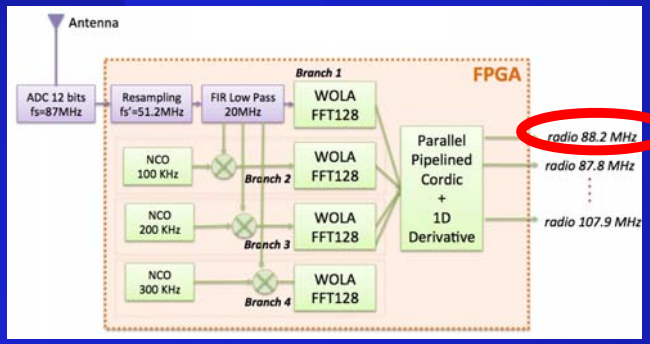


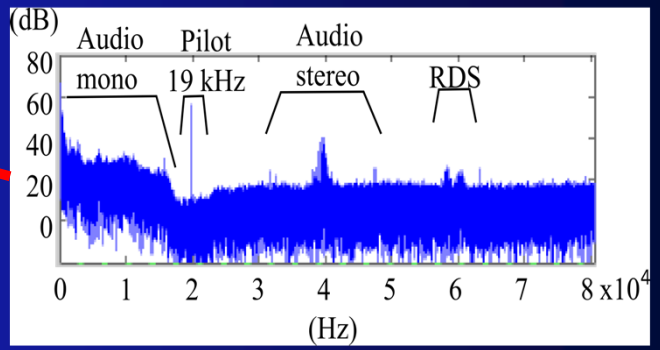


Receiver



Sampling @ 87MHz
DFT filterbank
FPGA implementation





Indexing engine

CEA

Analogue Front End

ETIS - ESPCI

Simultaneous Multichannel Receiver

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Indexing engine

3 genres
MFCC + GMM
70% sensitivity

// receiver FPGA

Indexing engine GMM classifier

Radio 1

Radio 2

Radio N

Known advertisement

Music genre classification

Known advertisement

Music genre classification

Known advertisement

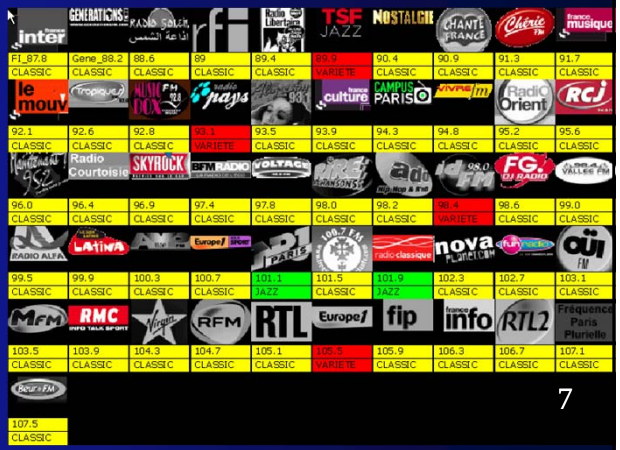
Music genre classification

Nespresso
"What's else" , etc.

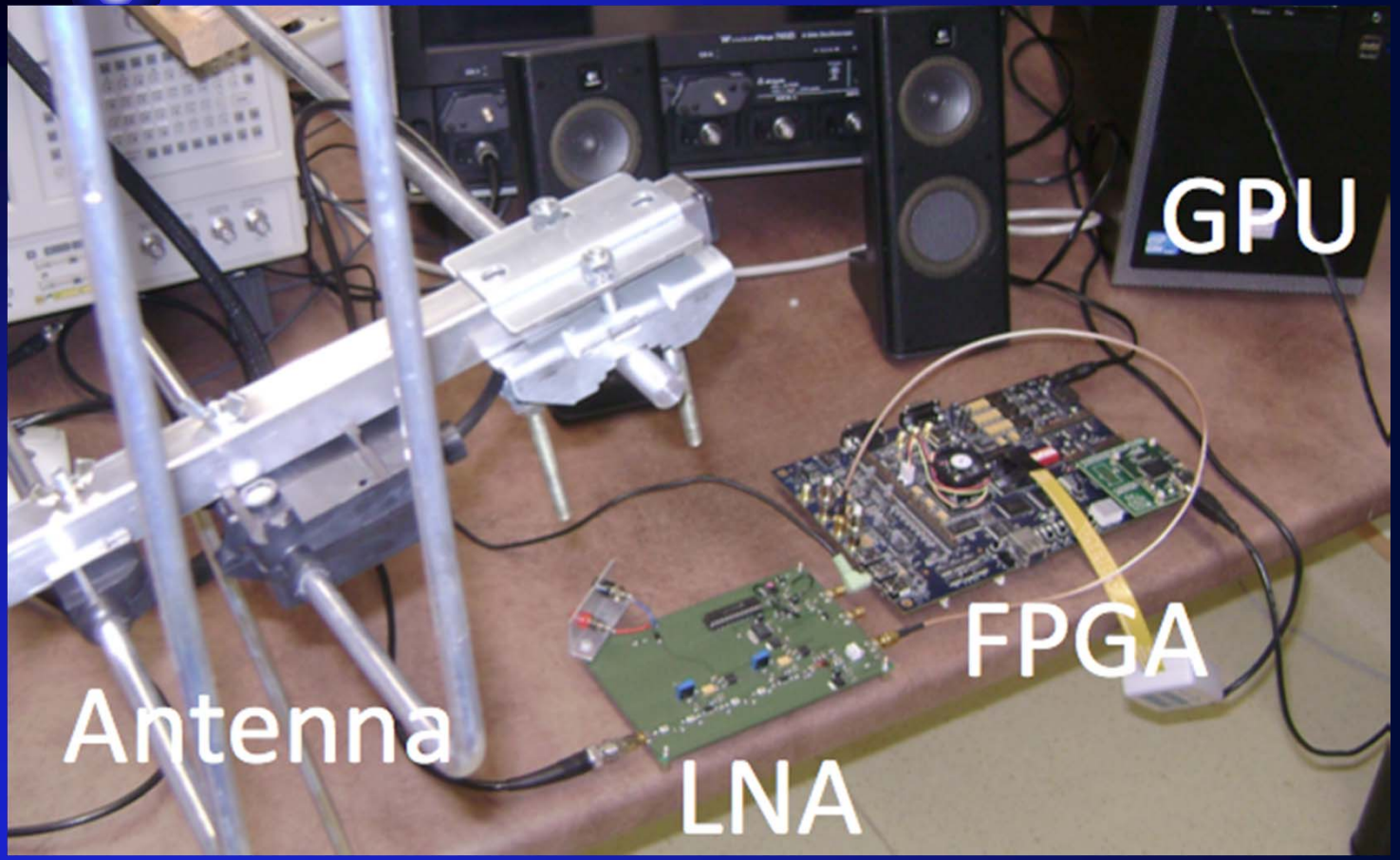
Classical

Variety

Jazz



Prototype



Conclusion

SurfOnHertz contributes to :

- First world of hertzian browser

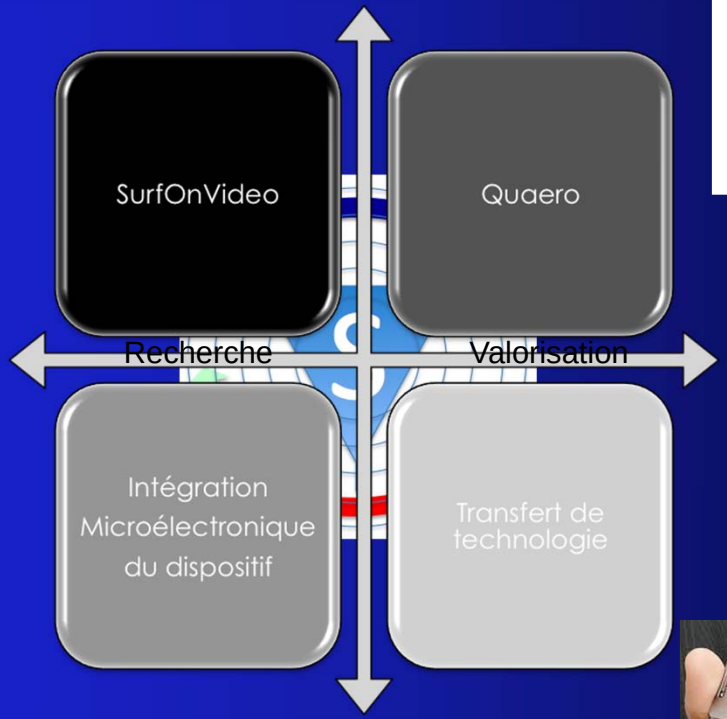
- All station demodulated in parallel
  - Ready for DRM+

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

Perspectives

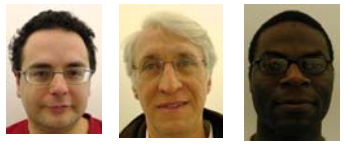
Hertzian browser for
- Digital radio
- Video

Integrated version



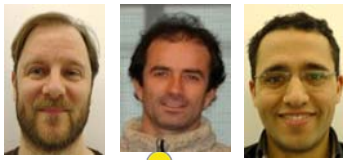
Team

Leader



ESPCI ParisTech

ETIS



LIP6

CEA

INSTITUT TELECOM

yacast

Thank you for the attention

http://olivieromain.free.fr/SurfOnHertz