# Predominant Melody Extraction

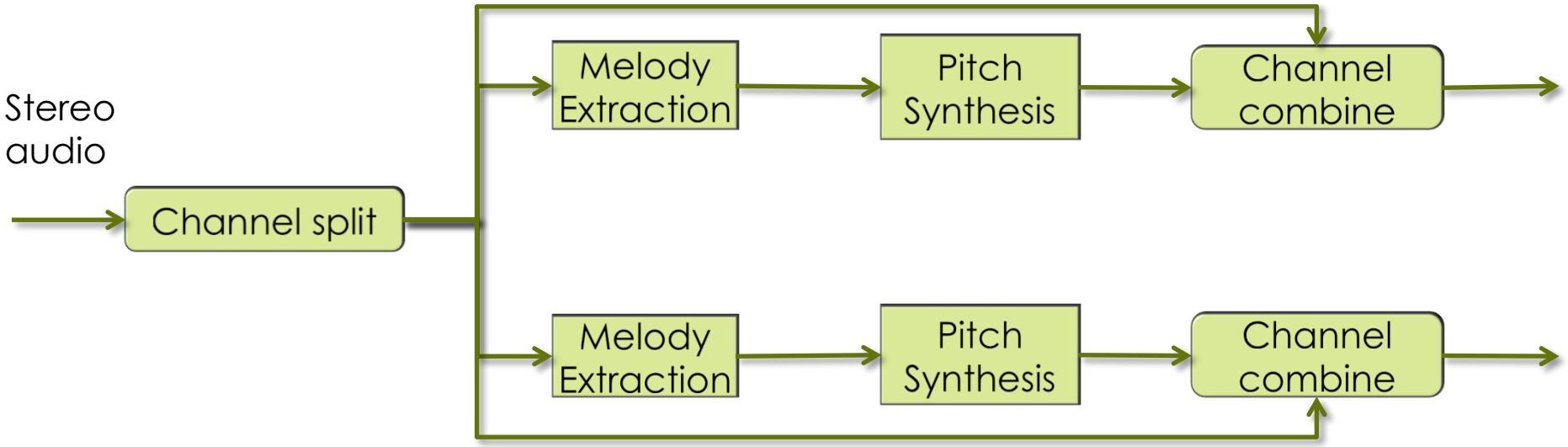
Sankalp, Sertan, Amruta and Gopal

2nd CompMusic Workshop Istanbul

# Experiment

- Database
  - Hindustani, Carnatic and Turkey Makam (~4 excerpts each)
  - Instrumental + Vocal (representative excerpts)
  - Monophonic + Polyphonic situation (HETEROPHONIC MUSIC)
- Algorithms
  - YIN – A. Cheveigne and H. Kawahara [1]
  - MakamToolbox- B. Bozkurt [2]
  - Swipe Prime – A. Camacho[3]
  - Melody Extraction, J. Salamon and E. Gomez [5]
  - PolyPDA – V. Rao and P. Rao [4]
- Evaluation (Informal)
  - Subjective

# Experiment : Processing Steps

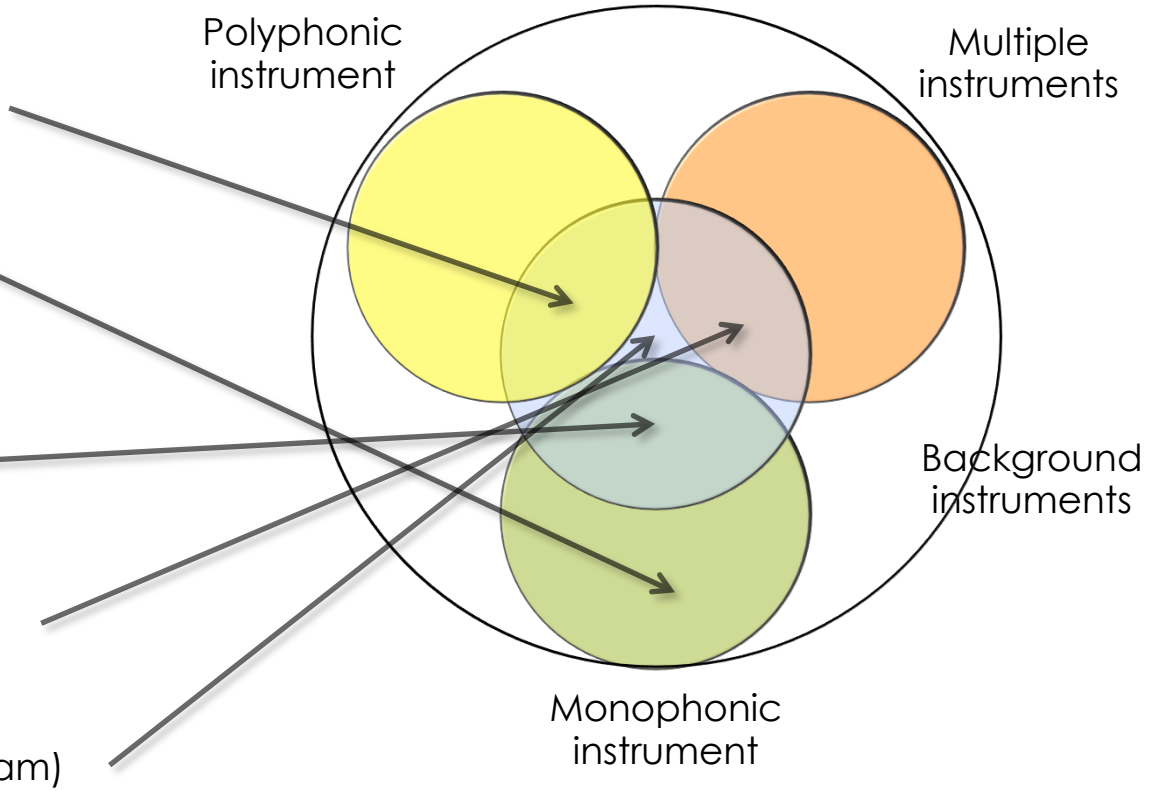


# Algorithms

| Algo | Mono/ Poly | V/UV decisions? | Time/Freq | Post Processing | Code |
|---|---|---|---|---|---|
| YIN | Mono | No | Time | No | C/Matlab |
| Makam TB | Mono | No | Time | Yes | Matlab |
| SwipeP | Mono | No | Freq | No | Matlab |
| PolyPDA | Poly | No | Freq | No | C |
| ME-Justin | Poly | Yes | Freq | No | C++ |

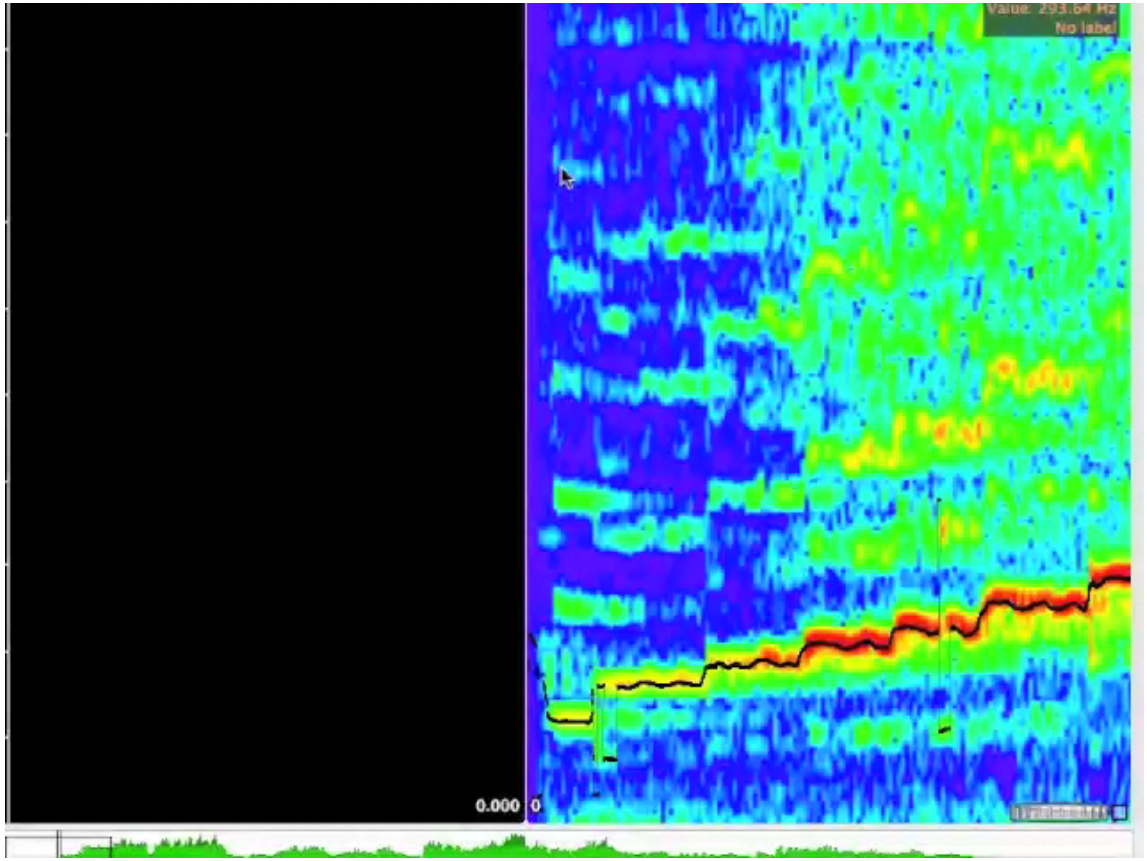
# Challenges: different scenarios

- Sitar performance
- Kanun performance
- Ney performances
- Solo Vocals
- Hindustani Vocal/ sarangi/flute
- Carnatic vocal + violin
- Ensemble (turkish makam)



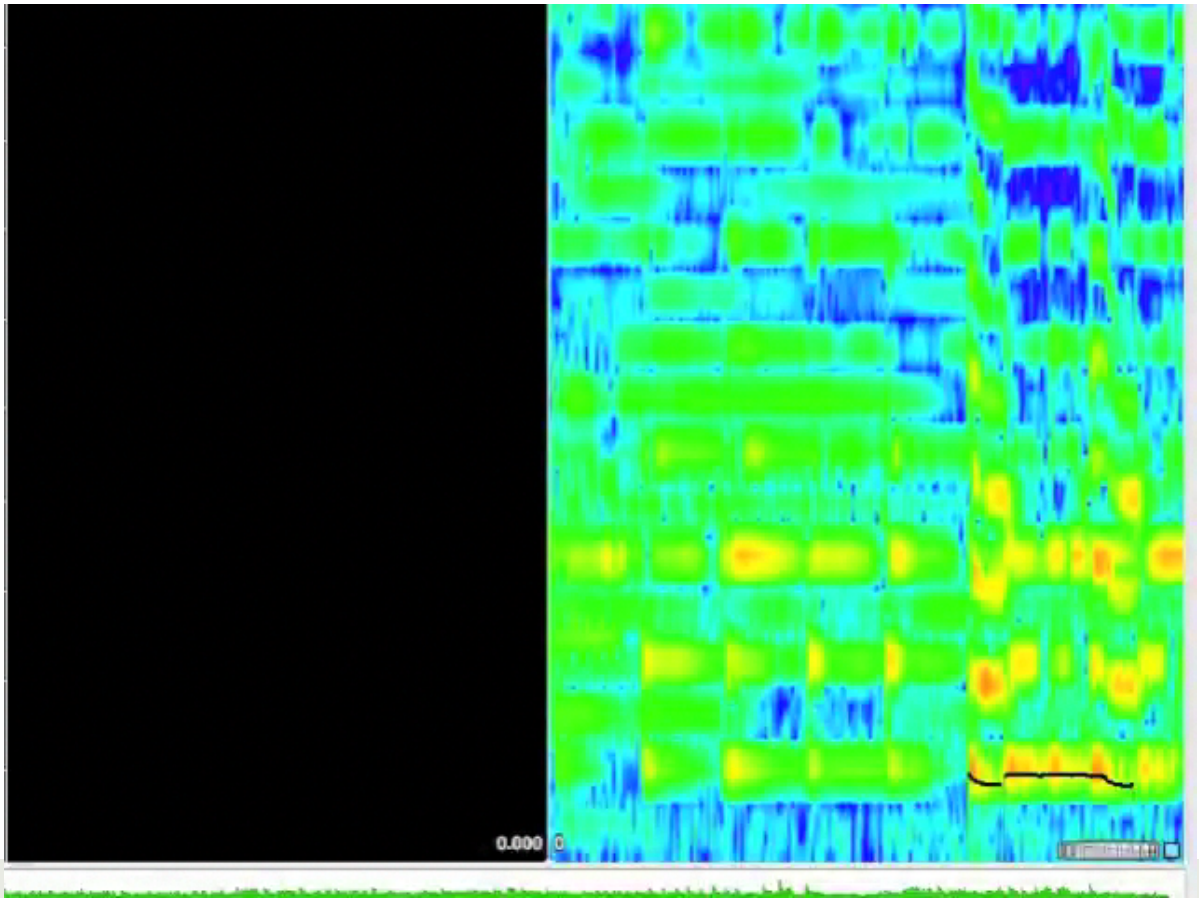
# Performance: scenario 1

- Monophonic instrument (YIN)



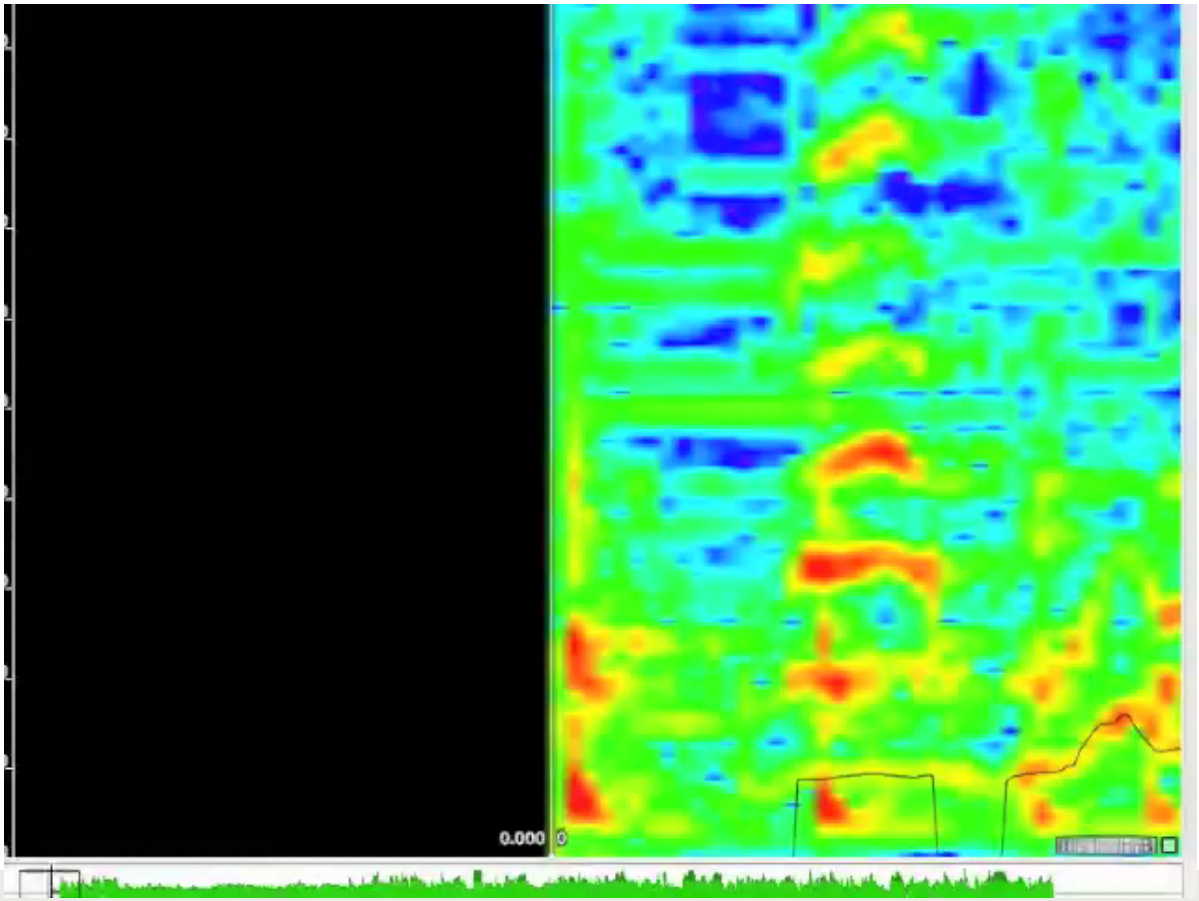
# Performance: scenario 2

- Polyphonic instrument (Justin's Algorithm)



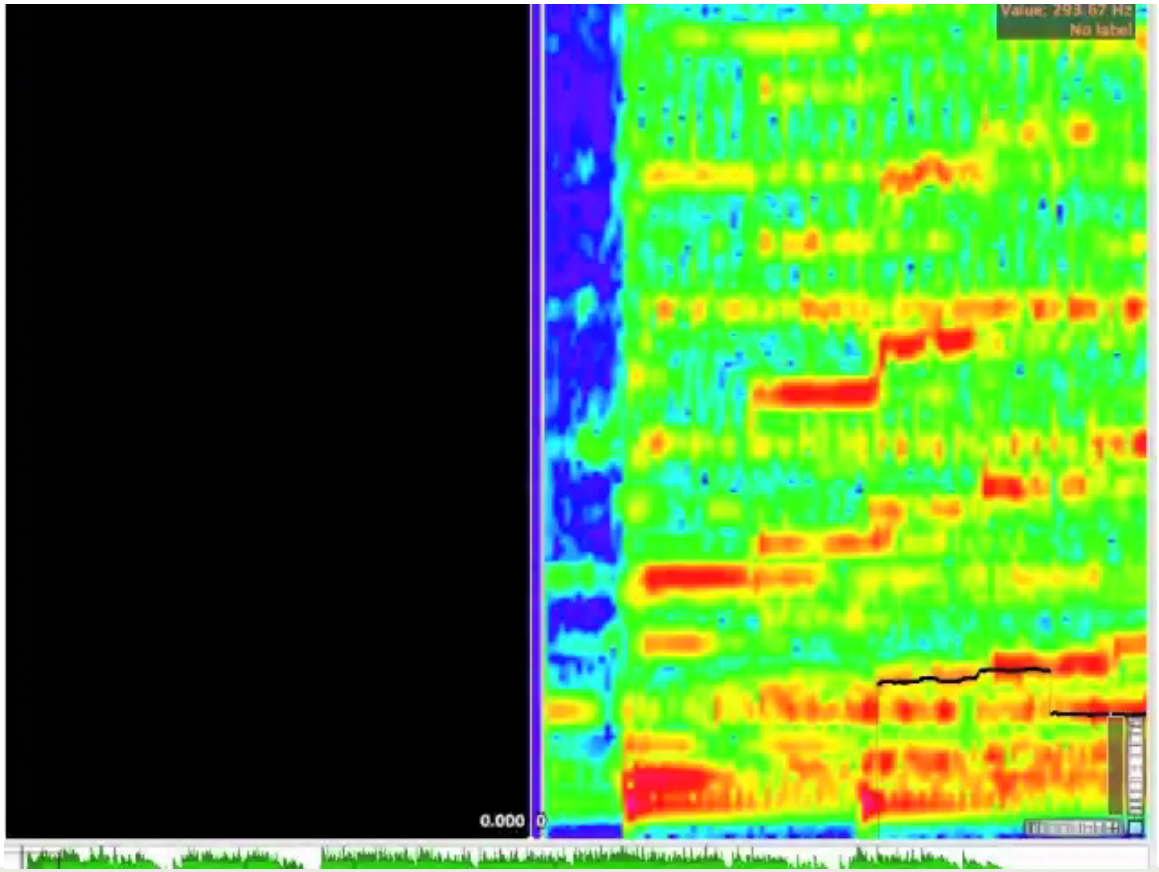
# Performance: scenario 3

- Multiple instruments + percussion + drone (PolyPDA)



# Performance: scenario 4

- Multiple instruments (mono + poly) + percussion (Justin)



# Additional Information

- Audio is monophonic or polyphonic
  - Example : Original  Tuned 
- Singer is male or female
- Vocal excerpt or instrumental excerpt

# Observations

- Taking advantage of stereo audio
  - Example Left  Right 
- Evaluation: Listening Vs representation
- Task dependent
  - Intonation, motif, tonic etc.

# Proposal for Essentia implementation

- YIN implementation (freq domain) → Needs revision
- YIN implementation + post processing → implementation of post processing in makamtoolbox
- Implement Multipitch algorithm→ Justin or PolyPDA ?

# References


- A. Cheveigne and H. Kawahara. YIN, a fundamental frequency estimator for speech and music. The Journal of the Acoustical Society of America, 111(4):1917, 2002
- B. Bozkurt, "An automatic pitch analysis method for Turkish maqam music," Journal of New Music Research, vol. 37, no. 1, pp. 1–13, 2008.
- Arturo Camacho, SWIPE: A Sawtooth Waveform Inspired Pitch Estimator for Speech and Music. PhD dissertation
- V. Rao and P. Rao. Vocal melody extraction in the presence of pitched accompaniment in polyphonic music.
- IEEE Transactions on Audio, Speech, and Language Processing, 18(8): 2145{2154, 2010.
- J. Salamon and E. Gomez. Melody extraction from polyphonic music signals using pitch contour characteristics. Audio, Speech, and Language Processing, IEEE Transactions on, (99):11, 2012.

# Questions