Midterm Project 1

Part 1

Start, Endpoint, V–UNV Detection

- Based on log energy and zero crossing rate statistics
  - Training set for setting statistical thresholds
    - Use waveforms in Data1 and all but H.1 in Data2
  - Testing set to test algorithm performance
    - Use waveform H.1 in Data2
  - Use PRAAT
    - To find sampling frequency of waveform files
    - To mark (by hand) start, endpoint, V & UNV regions

Effect of background noise

- Freeze parameters from previous section
- Additive white Gaussian noise, with 20, 10 and 0 dB SNR
  - Global SNR (with respect to speech energy)

Part 2

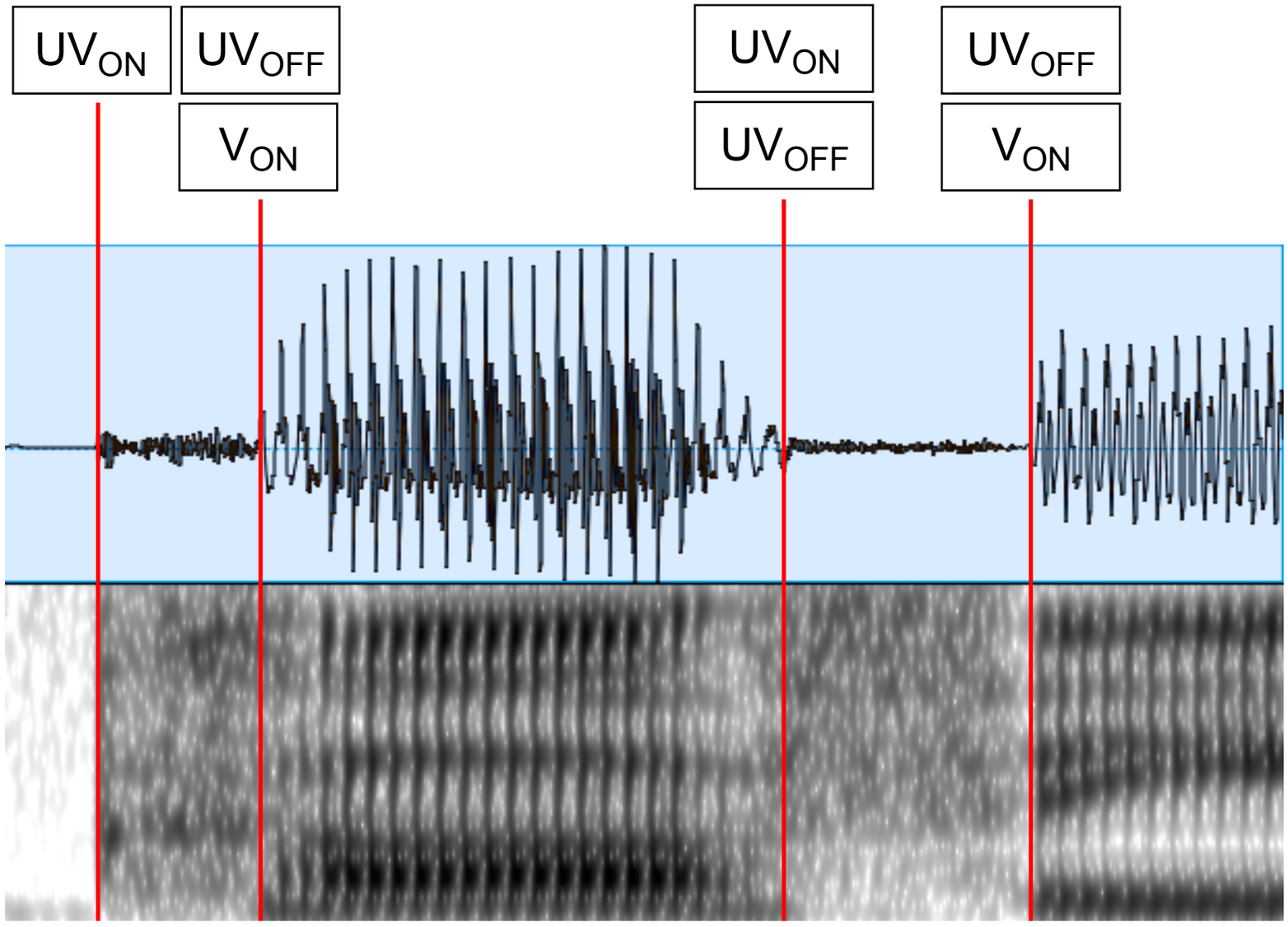
Pitch Estimation – choose one

- Parallel time domain processor described in class
- Autocorrelation (full band, 900 Hz filtered)
- Harmonic spectrum
- Notes
  - V–UNV detection from Part I
  - Training set and Testing set as in Part I
  - Reference pitch contours:
    - Use PRAAT

trying pitch predictor on noisy signal – optional

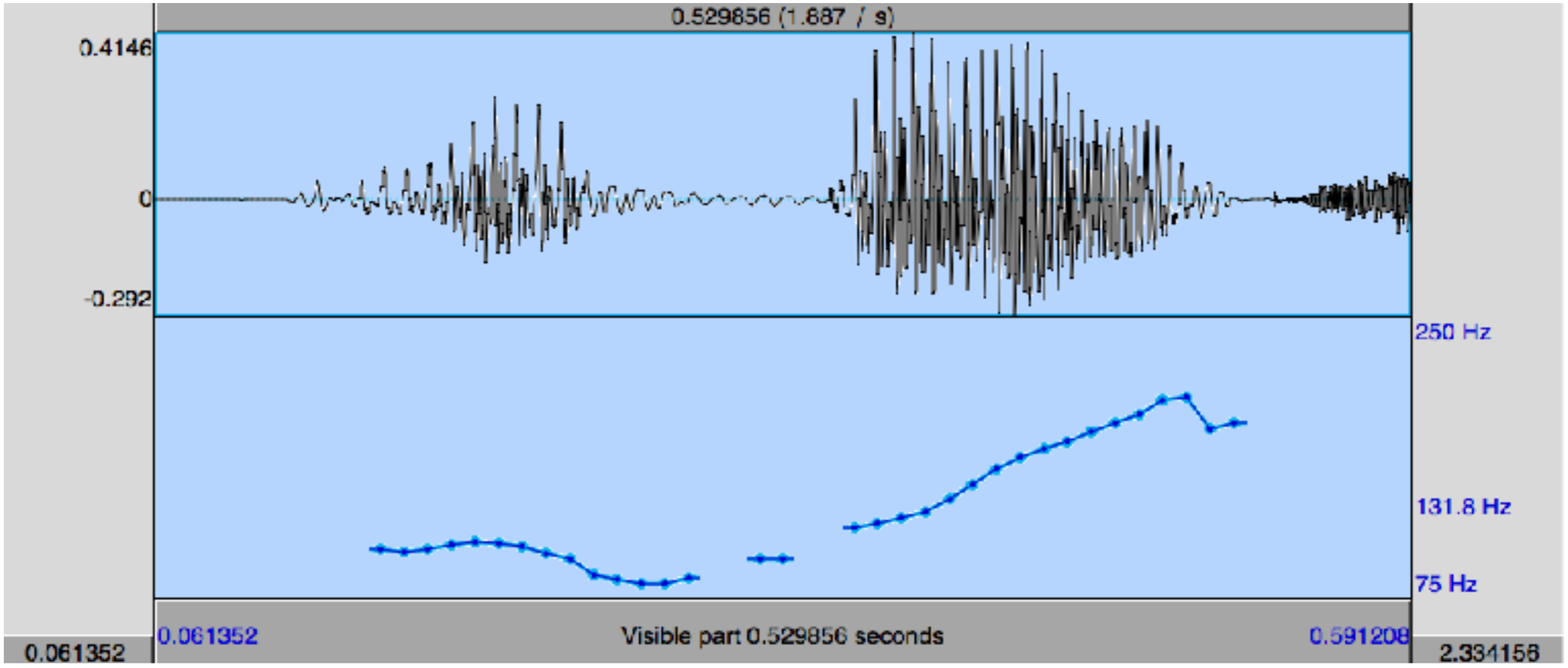
To obtain true points use Praat
(all 8 sentences, for training & for evaluation)

- Start, Endpoint, V–UNV regions
  - true V_{ON}, V_{OFF}, UV_{ON}, UV_{OFF}



To obtain true pitch use Praat

(all 8 sentences, for training & for evaluation)



- Pitch: As described in **Sound: To Pitch...**, Praat's standard time step for pitch analysis is 0.75 divided by the pitch floor, e.g., if the pitch floor is 75 Hz, the time step will be 0.01 seconds. In this way, there will be 4 pitch measurements within an analysis window, which is 3 / (75 Hz) = 40 milliseconds long.

What to Deliver?

- Report (PDF, 5-page long)
- Matlab scripts (in a zipped directory, separate from report)
- Due date – Tuesday, March 28, morning

(1) Start, Endpoint, V–UNV Detection	**(2) Pitch Estimation**
1.1 System description 1.1.1 Block diagram 1.1.2 Energy, ZC distributions *(histograms)* – Training material 1.1.3 Issues to be addressed: – Which parameters did you use? – How did you determine their value? – Other (you decide) 1.2 Performance 1.2.1 On H.1 (Testing set) – In terms of: – Plots (yours vs. reference) – Statistical look	2.1 System description 2.1.1 Block diagram 2.1.2 pitch distribution *(histogram)* – Training material 2.1.3 Issues to be addressed: – Which parameters did you use? – How did you determine their value? – Other (you decide) 2.2 Performance 2.2.1 On H.1 (Testing set) – In terms of: – Plots (yours vs. reference) – Statistical look

- *plot noisy histograms – for practice*
- *use class histograms for algorithms*