

# Vocoder Project B Presentation 2

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# Adopted Methods

## New since last week

- Levinson-Durbin Algorithm. All-pole prediction filter for emulating human vocal tract.
- Zero-crossing to identify voice and unvoiced parts of the speech.
- Pre Emphasis Filter – first order high pass filter simply using `filter( )` in MATLAB
- Synthesized Voice -- implemented using `pulstrain( )`
- White-noise generated for unvoiced sounds

# Additional Research Excitation

- **Multiband Excitation Vocoder, (1988).** Daniel Griffin and Jae Lim. IEEE Transactions of acoustics, speech analysis, and Signal Processing. Vo. 36 No. 8
- **An Enhanced LPC Vocoder with No Voiced/Unvoiced Switch, (1984).** Soon Young Kwon, Aaron Goldberg. IEEE Transactions of acoustics, speech analysis, and Signal Processing. Vo. ASSP 32 No. 4
- **A New Model of LPC Excitation for Producing Natural Sounding Speech at Low-Bit Rates, (1982).** Bishnu Atal and Joel Remde.

# Problems

The fidelity of the synthesized voice; It is buzzy and robotic.

The vocoder works better for female voices. Lower male voices sound more buzzy.

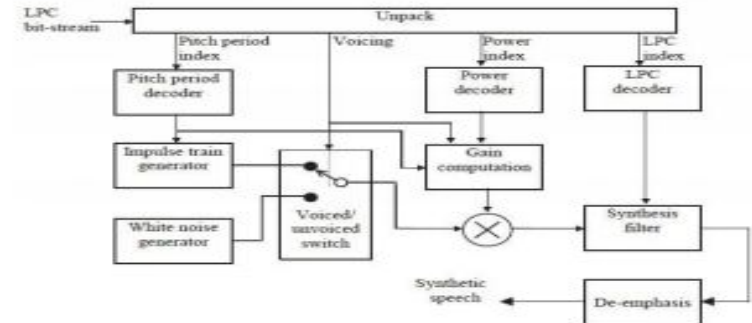
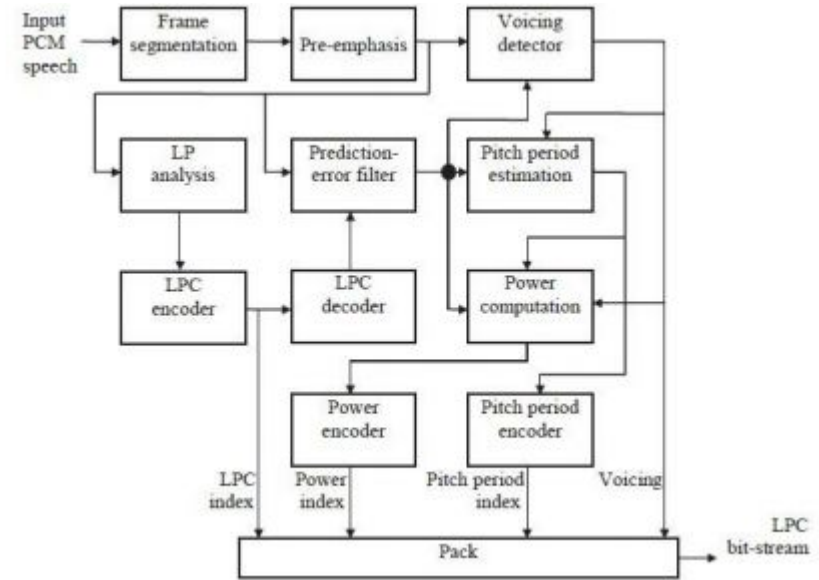
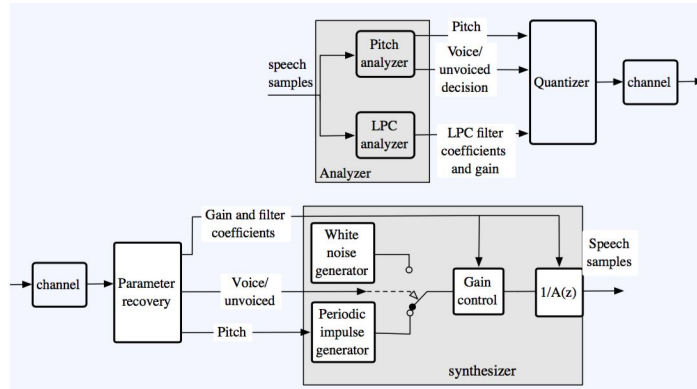
Works for only LPC order 10 and for lower sampling rates about 12kHz

Integrating cepstrum algorithm with the rest of the LPC script (currently it is running from auto-correlation).

# Demonstration

# Tasks to complete

- Implement MATLAB scripts and functions into GUI
- Improve fidelity of synthetic voice
- Male-to-female and visa-versa implementation



# Questions

- 1) What should we do in the 20 minute video presentation?
  - a) Demonstrate whatever we have working
- 2) Report Structure?
  - a) Like interim project report
  - b) Or like conference paper

# Milestones

- Generate a spectrogram - by 28 Feb, 2019 (completed)
- Determine the Pitch using Autocorrelation - by 1 March, 2019 (Incomplete)
- Determine the pitch using Cepstrum Analysis - (completed)
- Design the LPC Analyser - by 3 March, 2019 (completed)
- Design the Quantizer - by 6 March. 2019 (completed)
- Design the Synthesizer - by 8 March, 2019 (completed)



# Milestones

- Build a GUI for all the functions - by 10 March, 2019 (incomplete)
- Test out if everything works in conjunction to each other - by 12 March, 2019
- Correct if something is not working properly - by 15 March, 2019 (Optional)
- Final tests - 14 and 15 March, 2019

# Group member task division

- Anupam Mohanti - Spectrogram, Pitch detection using Autocorrelation function, LPC Analyser, Synthesizer, GUI
- Mark Allen-Piccolo - Spectrogram, Pitch detection using Autocorrelation function, LPC Analyser, Synthesizer, GUI, updating website

**We will share the tasks and delineate depending on what is needed.**