

PET6J013 SPEECH PROCESSING**MODULE- I**

Mechanics of speech- Speech production: Mechanism of speech production, Acoustic phonetics - Digital models for speech signals - Representations of speech waveform: Sampling speech signals, basics of quantization, delta modulation, and Differential PCM - Auditory perception: psycho acoustics.

MODULE- II

Time domain methods for speech processing- Time domain parameters of Speech signal - Methods for extracting the parameters Energy, Average Magnitude, Zero crossing Rate - Silence Discrimination using ZCR and energy - Short Time Auto Correlation Function - Pitch period estimation using Auto Correlation Function.

MODULE- III

Frequency domain method for speech processing- Short Time Fourier analysis: Fourier transform and linear filtering interpretations, Sampling rates - Spectrographic displays - Pitch and formant extraction - Analysis by Synthesis - Analysis synthesis systems: Phase vocoder, Channel Homomorphic vocoder speech analysis: Cepstral analysis of Speech, Formant Estimation, Homomorphic and speech vocoder.

MODULE- IV

Linear predictive analysis of speech- Basic Principles of linear predictive analysis - Auto correlation method - Covariance method - Solution of LPC equations - Cholesky method - Durbin's Recursive algorithm, Application of LPC parameters - Pitch detection using LPC parameters - Formant analysis - VELP - CELP.

ADDITIONAL MODULE (TERMINAL EXAMINATION-INTERNAL)

Application of speech & audio signal processing- Algorithms: Dynamic time warping, K-means clustering and Vector quantization, Gaussian mixture modeling, hidden Markov modeling - Automatic Speech Recognition: Feature Extraction for ASR, Deterministic sequence recognition, Statistical Sequence recognition, Language models - Speaker identification and verification - Voice response system - Speech synthesis: basics of articulatory, source-filter, and concatenative synthesis - VOIP

TEXT BOOKS

1. Discrete-Time Speech Signal Processing, Thomas F, Quatieri, Prentice Hall / Pearson Education, 2004.

REFERENCE BOOKS

1. Speech and Audio Signal Processing, Ben Gold and Nelson Morgan, John Wiley and Sons Inc., Singapore, 2004
2. Digital Processing of Speech signals, L.R.Rabiner and R.W.Schaffer, Prentice Hall 1979
3. Fundamentals of Speech Recognition, L.R. Rabiner and B. H. Juang, Prentice Hall, 1993.
4. Discrete Time Processing of Speech Signals, J.R. Deller, J.H.L. Hansen and J.G. Proakis, John Wiley, IEEE Press, 1999.
5. Speech Communication Human and Machine, Douglas O Shaughnessy.S BSP BOOKS PVT LTD, 2nd edition.