

Satyug Darshan Institute of Engineering & Technology, Faridabad

Department of Computer Science & Engineering

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Programme: BCA DS	Year & Semester: 3 rd year & 5 th Sem
Course Name: Speech and Audio Processing	Course Code: BCA-23-309
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Unit I

Short answer questions

Q.N.	Question	KL
1	Define parametric speech coding. Give one example.	KL1
2	Explain coding delay in speech codecs.	KL2
3	Write any two advantages of robust speech codecs in noisy environments.	KL2
4	List the main functions of an encoder in speech synthesis.	KL1
5	Define the function of a decoder in a speech coding system.	KL1
6	Define the function of a decoder in a speech coding system.	KL1
7	Explain the various parts of the human auditory system.	KL2
8	Explain G-7.11.	KL2

Long answer questions

Q.N.	Question	KL
1	Discuss the essential requirements of a good speech codec in terms of quality, delay and robustness.	KL2
2	Classify speech coding techniques and explain each with appropriate examples.	KL1
3	Describe the general structure of the human auditory system.	KL2
4	Explain the complete process of speech signal processing.	KL2
5	Differentiate waveform coders and parametric coders.	KL4
6		
7	Explain the essential requirements of a speech codec in terms of quality, coding delay and robustness.	KL2
8	Describe speech signal processing also write applications in modern communication and audio systems.	KL2
9	Differentiate between all-pole and all-zero filters in terms of their system response and applications in speech modeling.	KL4
10	Explain pitch and pitch period estimation. Also write the common methods for pitch period estimation.	KL2
11	Explain the purpose of decomposing the total response into zero input (ZI) and zero state (ZS).	KL2

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Unit II

Short answer questions

Q.N.	Question	KL
1	Explain scalar quantization in speech processing.	KL2
2	Differentiate between a uniform and a non-uniform quantizer.	KL2
3	Explain the purpose of quantization in speech coding.	KL2
4	Explain the purpose of using a logarithmic quantizer in speech coding.	KL2
5	Define the main function of a quantizer.	KL1
6	Write the purpose of quantization in speech coding.	KL1
7	Differentiate between a uniform and a non-uniform quantizer.	KL2
8	Define non stationary signal.	KL1
9	Explain the role of quantizer.	KL2
10	Define prediction gain in linear prediction and state its significance.	KL1

Long answer questions

Q.N.	Question	KL
1	Explain the role of scalar quantizer in speech coding and compression.	KL2
2	Describe the working of an adaptive quantizer and its advantage in speech signal processing.	KL2
3	Compare uniform and logarithmic quantizers in terms of performance and complexity.	KL3
4	Explain the concept of Linear Prediction in speech processing	KL2
5	Explain the principle of vector quantization and discuss its advantages in speech coding.	KL2
6	Describe the working of an adaptive quantizer and its advantage in speech signal processing	KL2
7	Differentiate between uniform quantizer and non-uniform (logarithmic) quantizer in terms of step size and performance.	KL4
8	Describe the structure and function of the LPC encoder and decoder.	KL2
9	Give some applications of Levinson -Durbin algorithm.	KL1
10	Explain a logarithmic quantizer in details, giving its key benefits over other quantizer.	KL2
11	Explain main advantage of the Levinson Durbin algorithm over solving normal equations directly.	KL2
12	Differentiate between reflection coefficient quantization and log area ratio (LAR) quantization techniques.	KL4
13	Explain the process and purpose of voicing detection in LPC systems and discuss its importance in speech compression.	KL2

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Unit III

Short answer questions

Q.N.	Question	KL
1	Define Line Spectral Frequencies (LSFs).	KL1
2	Explain the purpose of bit allocation in LPC quantization.	KL2
3	Write the main purpose of voicing detection in LPC systems.	KL2
4	List the main components of an LPC decoder.	KL1
5	Define log area ratio (LAR) in LPC.	KL1
6	Define vocal tract filter.	KL1
7	Define pitch period in a speech signal.	KL1

Long answer questions

Q.N.	Question	KL
1	Discuss the conversion of LPC coefficients to Line Spectral Frequencies (LSFs) and the advantages of quantizing based on LSFs.	KL2
2	Differentiate between reflection coefficient quantization and log area ratio (LAR) quantization techniques.	KL4
3	Describe the limitations of the LPC model of speech production.	KL2
4	Explain the process of voicing detection in LPC systems and discuss its importance in speech compression.	KL2
5	Summarize the process of voicing detection in LPC systems and discuss its importance in speech compression.	KL2
6	Differentiate between reflection coefficient quantization and log area ratio (LAR) quantization.	KL4
7	Explain the challenges with standard LPC for non-stationary signal.	KL2
8	Explain LPC to LSF conversion.	KL2
9	Draw a simplified diagram of LPC encoders and explain each block.	KL2

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Unit IV

Short answer questions

Q.N.	Question	KL
1	Describe the working of the decoder in a CELP speech coding system	KL2
2	Explain the role of the codebook in the CELP model.	KL2
3	State any three limitations of the traditional Linear Predictive Coding (LPC) model.	KL1
4	List the main components of a generic CELP encoder.	KL1
5	Define Code Excited Linear Prediction (CELP)	KL1
6	Define ITU-T G.726 speech coding standard.	KL1
7	Enlist two features of algebraic CELP.	KL1
8	Explain the adaptive codebook and its role in CELP.	KL2
9	Define CELP encoder.	KL1
10	Describe speech coding standard.	KL2

Long answer questions

Q.N.	Question	KL
1	Explain the role of the analysis-by-synthesis loop in a CELP speech encoder.	KL2
2	Describe the working of the CELP speech production model with the help of a suitable block Diagram.	KL2
3	Differentiate between Code Excited Linear Prediction (CELP) and Linear Prediction Coding (LPC).	KL4
4	Discuss the limitations of the LPC model of speech production.	KL2
4	Explain the working principle of the Analysis-by-Synthesis speech coding technique with the help of a block diagram.	KL2
5	Describe the excitation codebook search process used in CELP coders.	KL2
6	Discuss the features and applications of ITU-T G.726, G.728, and G.729 standards in speech coding.	KL2
7	Describe the main components of a CELP decoder and its decoding operation.	KL2
8	Describe the key differences between Low Delay CELP and conventional CELP.	KL2
9	Describe the working of the decoder and encoder in a CELP speech coding system.	KL2