B.E (Full Time) End Semester DEGREE EXAMINATION, April /May 2011

Sixth Semester

Electronics and Communication Engineering

EC 9041 – INTRODUCTION TO SPEECH TECHNOLOGIES

(Regulation 2004)

Time: 3 Hours   Max.Marks:100

Answer ALL Questions

PART-A (10 x 2 = 20 Marks)

1. What is the definition of diphthong? What are the diphthongs in Tamil language?

2. Explain the importance of End Point detection in Speech Recognition?

3. Draw a block diagram that explains steps involved in extracting MFCC coefficients?

4. Explain briefly importance of dynamic time warping?

5. What do you mean by state tying? What is the importance of building tied state HMMs for speech recognition?

6. Explain one of the criteria used to overcome model mismatch in HMM modelling?

7. What are three different types of the HMMs and which one is used in general speech recognition systems?

8. Explain briefly the source channel model of speech recognition?

9. Draw the block diagram of sub-word unit based continuous speech recognizer?

10. What is prosody? What is the importance of prosody in text to speech systems?

PART-B (5 x 16 = 80 Marks)

11.(i) Draw the diagram of Speech production mechanism and identify different vocal organs?

(ii) Write five different manners of articulation? Give the list voiced and unvoiced fricatives in English?

12a.(i) Explain different modules of LPC front end processer for speech recognition?

'OR'

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12b. (i) What is Vector quantization? Explain its advantages and disadvantages?

(ii) Describe briefly two spectral distortion measures?

13a.(i) Explain briefly connected word speech recognition problem?

(ii) Explain two level dynamic programming algorithm for matching reference and test patterns in connected word speech recognition?

'OR'

13b. Explain different modules of Sphinx4 speech recognition system?

14a. (i) Give the definition of HMM model? What are basic assumptions we do for HMM modelling? Define three basic problems in modelling HMMs?

(ii) Explain briefly how Baum-Welch algorithm can be used to refine the parameters of HMM?

'OR'

14b. (i) What are Gaussian mixture models (GMMs)? What is the role GMMs in modelling state output distribution of HMMs?

(ii) Explain two different methods to improve parameters of HMM model when there is insufficient training data?

15a. (i) Explain different choice of units and their advantages and disadvantages in concatenative speech synthesis?

(ii) Explain how Pitch Synchronous Overlap and Add (PSOLA) is used for pitch modification?

'OR'

15b. (i) Explain different modules of text to speech systems?

(ii) What are the challenges you may expect in developing text to speech systems for Tamil?

END