Bharatiya Vidya Bhavans'
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Subject : Foundation of Signal Processing Class : TE Computer / IT SEM-VI

Assignment-5

Topic : DSP Processor and Applications Date : 17-4-2023

Module : 5 DSP Processors and Applications of DSP

5.1 Need DSP processor, Difference between DSP processor & General Purpose (GP) Processor.

5.2 Case study of DSP applications to Speech Signal Processing and Biomedical Signal Processing.

Self Study Topic :
Multi-rate Signal Processing: Up sampling and Down sampling, Signal Compression, Carl Correlation Coefficient for measurement of degree of similarity between two signals.

Q1. Write Short Note on : Difference between GPP and DSP Processor.

Q2. What is Mulit Rate Signal Processing ? Where it is required?

Q3. How degree of Similarity is measured using Carl Correlation Coefficient formula?

Q4. A real-time bridge vibration measurement and analysis system based on sensor and high-speed DSP processor is required to be designed.

If the detected signal value is greater than user defined threshold value, then appropriate error message should get displayed on the screen.
(a) Draw block diagram of the complete DSP system. Justify the need of each block

(b) Write Algorithms/Flowchart to address the problem.

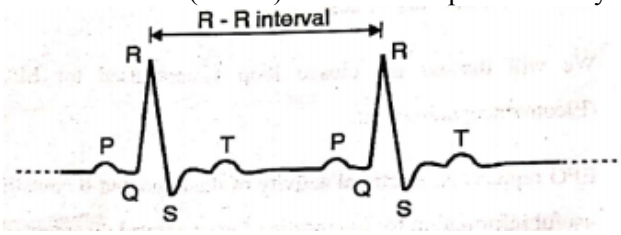
Q5. Draw the framework/block diagram of the DSP system using DSP processor for a real time digital audio noise filtering.

Input Specification: Audio Signal (i.e. Speech Signal)
Digital filter is already designed and impulse response h[n] of the filter is given.

Explain the blocks of system and specify the algorithm.

Q6. Fetal (unborn baby) ECG Monitoring is required to be done.

Description:

- Electrical activity of a heart is called as ElectroCardioGram (ECG).
- Fetal ECG represents electrical activity of the baby's heart. It is similar to the adult ECG waveform.
- The Fetal ECG (FECG) contains five peaks namely PQRST. This waveform is shown in Figure below.
- 

The shape of QRS complex waveform changes from patient to patient.

- Instantaneous heart rate is obtained by multiplying time interval between R-to-R (in miliseconds) by 60,00060,000 .

  Problem Statement: Capture ECG Signal and process is to measure instantaneous Heart Rate.

(a) Draw block diagram of the DSP system using DSP processor. Justify the need of each block.
(b) State Algorithms/Flowchart to address the problem.

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