SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF BIOMEDICAL ENGINEERING

19BMB302- BIOMEDICAL SIGNAL PROCESSING

III B.E. BME / V SEMESTER

Two Marks with Answers

Academic Year : 2022-2023 (Odd Semester)

UNIT V -DATA REDUCTION TECHNIQUES

1. What is an algorithm?

An algorithm is called an ordered and structured set of instructions, logical steps or predefined, finite and hierarchical rules, whose successive steps allow carrying out a task or solving a problem, making the relevant decision-making without doubts or ambiguities.

2. List the advantages of CORTES algorithm.

• The CORTES (Coordinate Reduction Time Encoding System) algorithm is a hybrid of the TP and AZTEC algorithms

• It attempts to exploit the strengths of each while sidestepping the weaknesses.

• CORTES uses AZTEC to discard clinically insignificant data in the isoelectric region with a high reduction ratio and applies the TP algorithm to the clinically significant high-frequency regions (QRS complexes).

• It executes the AZTEC and TP algorithms in parallel on the incoming ECG data.

• Whenever an AZTEC line is produced, the CORTES algorithm decides, based on the length of the line, whether the AZTEC data or the TP data are to be saved.

3. What is the optimization of the Huffman coding algorithm?

Huffman coding algorithm was developed by David Huffman as part of his class assignment at MIT. Optimality (only for a particular set of probabilities i.e. for a given model) of this algorithm can be proved by considering following two checks that always hold true while coding using Huffman algorithm:

4. What is the compression ratio of turning point algorithm?

The compression ratio of Turning point algorithm is 2:1, if higher compression is required then the same algorithm can be implemented on the already compressed signal so that it is further compressed to a ratio of 4:1. But after the 2nd compression, the required data in the signal may be lost since the signal is overlapped on one another.

5. What is turning point (TP)?

TP provides a way to reduce the effective sampling rate by half to 100 sps by selectively saving important signal points (i.e., the peaks and valleys or turning points).This is the reason behind selecting Turning Point (TP) over other direct data compression techniques. The algorithm processes three data points at a time.

6. How does the Turnitin algorithm work?

   The algorithm used is able to identify strings of words in a paper that are identical to those in the database. How does Turnitin work percentage? Most work will contain some words from other sources and this is nothing to worry about.

7. What is Huffman coding and Shannon Fano algorithm?

   We will go through the basics of encoding methods and the two algorithms: Huffman coding and Shannon Fano Algorithm so that we can understand the differences better. There are two types of encoding methods: Fixed length encoding and variable length encoding. In fixed length encoding, length of code for every character is fixed.

8. Is Huffman coding a greedy algorithm?

   A well-known Greedy algorithm is Huffman Coding. The size of code allocated to a character relies on the frequency of the character, which is why it is referred to be a greedy algorithm. The short-length variable code is assigned to the character with the highest frequency, and vice versa for characters with lower frequencies.

9. What is Huffman encoding used for?

   Huffman encoding is also used to compress MP3 files. Brotli compression algorithm by Google compresses data using a combination of a modern variant of the LZ77 algorithm, Huffman coding and 2nd order context modeling. Shannon Fano Algorithm is an entropy coding technique used for lossless data compression.

10. What is the Differences between Huffman and Shannon Fano algorithm?

    1. Results produced by Huffman encoding are always optimal. Unlike Huffman coding, Shannon Fano sometimes does not achieve the lowest possible expected code word length.
    2. The Huffman coding uses prefix code conditions while Shannon fano coding uses cumulative distribution function.However Shannon Fano algorithm also produces prefix codes