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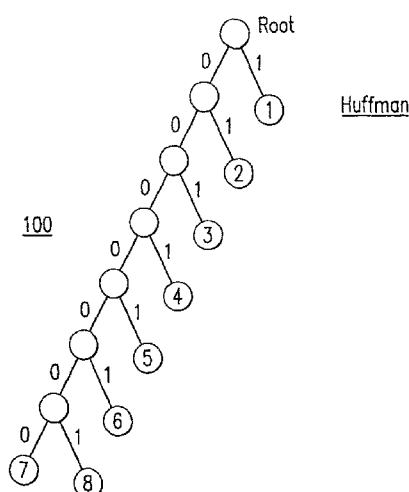
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(54) Title: DATA CODING



Symbol	Codeword
1	1
2	01
3	001
4	0001
5	00001
6	000001
7	0000001
8	00000001

(57) Abstract: Briefly, in accordance with one embodiment, a method of coding data is described.

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AMENDED CLAIMS

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1. A method of coding N symbols for storage or transmission, comprising:
 - (a) coding the N symbols that have a higher rank than a threshold rank T with a variable length set of codes, the coding being sufficiently unique so that the codes for each of the N symbols individually distinguish from one another; and
 - (b) coding the N symbols that have an equal or lower rank than the threshold rank T with a fixed length code that has a number of bits to sufficiently distinguish the codes for the N symbols individually between (1) the codes for the N symbols with the higher rank than the threshold rank T and (2) the other codes for the N symbols with the equal or lesser rank than the threshold rank T.
2. The method of claim 1, wherein at least one of steps (a) and (b) comprises binary coding.
3. The method of claim 1, wherein the variable length set of codes comprises a Huffman code.
4. The method of claim 1, wherein generating the fixed length code comprises:
 - using a first code which differs from other codes for a respective one of the N symbols having the higher rank than the threshold rank T; and
 - using a second code which uniquely identifies the respective one of the N symbols and which is indicative of a binary representation of a numeral in the range 1 to N - T.
5. The method of claim 4, wherein the first code comprises a sequence of zeroes and/or ones.

6. The method of claim 4, wherein $N - T + 1$ equals a power of two.
7. The method of claim 1, wherein the N symbols comprise a series of bits.
8. The method of claim 1, wherein the N symbols comprise text characters, pixel values within a still or moving image, or amplitudes within an audio system.
9. The method of claim 1, wherein the N symbols comprise non-numeric data.
10. The method of claim 1, wherein the N symbols are ranked according to expected or anticipated probability of occurrence.
11. The method of claim 1, wherein the N symbols are ranked according to frequency of occurrence.
12. The method of claim 1, wherein the coding of the N symbols changes during the coding process.
13. The method of claim 1, wherein the N symbols are coded such that a single code and count is assigned to a sequence consisting of consecutive identical occurrences of one of the N symbols, as in run-length coding.

14. A system, comprising:
 - a first analysis module configured to code the N symbols that have a higher rank than a threshold rank T with a variable length set of codes, the coding being sufficiently unique so that the codes for each of the N symbols individually distinguish from one another; and
 - a second analysis module configured to code the N symbols that have an equal or lower rank than the threshold rank T with a fixed length code that has a number of bits to sufficiently distinguish the codes for the N symbols individually between (1) the codes for the N symbols with the higher rank than the threshold rank T and (2) the other codes for the N symbols with the equal or lesser rank than the threshold rank T.
15. The system of claim 14, wherein the first or second analysis module is configured to perform binary coding.
16. The system of claim 14, wherein the variable length set of codes comprises a Huffman code.
17. The system of claim 14, wherein the second analysis module is configured to generate the fixed length code using:
 - a first code which differs from other codes for a respective one of the N symbols having the higher rank than the threshold rank T; and
 - a second code which uniquely identifies the respective one of the N symbols and which is indicative of a binary representation of a numeral in the range 1 to $N - T$.
18. The system of claim 17, wherein the first code comprises a sequence of zeroes and/or ones.

19. The system of claim 17, wherein $N - T + 1$ equals a power of 2.
20. The system of claim 14, wherein the N symbols comprise a series of bits.
21. The system of claim 14, wherein the N symbols comprise text characters, pixel values within a still or moving image, or amplitudes within an audio system.
22. The system of claim 14, wherein the N symbols comprise non-numeric data.
23. The system of claim 14, wherein the N symbols are ranked according to expected or anticipated probability of occurrence.
24. The system of claim 14, wherein the N symbols are ranked according to frequency of occurrence.
25. The system of claim 14, wherein the coding of the N symbols changes during the coding process.
26. The system of claim 14, wherein the N symbols are coded such that a single code and count is assigned to a sequence consisting of consecutive identical occurrences of one of the N symbols, as in run-length coding.

27. A computer-readable medium containing instructions for controlling at least one processor by a method comprising:
- (a) coding the N symbols that have a higher rank than a threshold rank T with a variable length set of codes, the coding being sufficiently unique so that the codes for each of the N symbols individually distinguish from one another; and
 - (b) coding the N symbols that have an equal or lower rank than the threshold rank T with a fixed length code that has a number of bits to sufficiently distinguish the codes for the N symbols individually between (1) the codes for the N symbols with the higher rank than the threshold rank T and (2) the other codes for the N symbols with the equal or lesser rank than the threshold rank T.
28. The computer-readable medium of claim 27, wherein at least one of steps (a) and (b) comprises binary coding.
29. The computer-readable medium of claim 27, wherein the variable length set of codes comprises a Huffman code.
30. The computer-readable medium of claim 27, wherein generating the fixed length code comprises:
- using a first code which differs from other codes for a respective one of the N symbols having the higher rank than the threshold rank T; and
 - using a second code which uniquely identifies the respective one of the N symbols and which is indicative of a binary representation of a numeral in the range 1 to $N - T$.
31. The computer-readable medium of claim 30, wherein the first code comprises a sequence of zeroes and/or ones.
32. The computer-readable medium of claim 30, wherein $N - T + 1$ equals a power of 2.

33. The computer-readable medium of claim 27, wherein the N symbols comprise a series of bits.
34. The computer-readable medium of claim 27, wherein the N symbols comprise text characters, pixel values within a still or moving image, or amplitudes within an audio system.
35. The computer-readable medium of claim 27, wherein the N symbols comprise non-numeric data.
36. The computer-readable medium of claim 27, wherein the N symbols are ranked according to expected or anticipated probability of occurrence.
37. The computer-readable medium of claim 27, wherein the N symbols are ranked according to frequency of occurrence.
38. The computer-readable medium of claim 27, wherein the coding of the N symbols changes during the coding process.
39. The computer-readable medium of claim 27, wherein the N symbols are coded such that a single code and count is assigned to a sequence consisting of consecutive identical occurrences of one of the N symbols, as in run-length coding.