

Attorney's Docket No.: 06618-637001
Client's Ref. No.: CIT3220

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Applicant : Hui Jin et al.
Serial No. : 09/861,102
Filed : May 18, 2001

Art Unit : 2634
Examiner : Dac V. Ha


Title : SERIAL CONCATENATION OF INTERLEAVED CONVOLUTIONAL CODES
FORMING TURBO-LIKE CODES

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attached to this facsimile communication cover sheet is an Amendment to the
03/04/2005 Office action and Transmittal Letter, faxed this 5th day of May, 2005, to the United
States Patent and Trademark Office.

Date: May 5, 2005

Respectfully submitted,
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Attorney's Docket No.: 06618-637001 / CIT3220

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Hui Jin et al.
Serial No. : 09/861,102
Filed : May 18, 2001
Title : SERIAL CONCATENATION OF INTERLEAVED CONVOLUTIONAL CODES
FORMING TURBO-LIKE CODES

Art Unit : 2634
Examiner : Dac V. Ha

VIA FACSIMILE

Mail Stop Amendment
Commissioner for Patents
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TRANSMITTAL LETTER

Correspondence relating to this application is enclosed. The required fees are computed below. Please apply the excess claims fee to Deposit Account No. 06-1050. Please apply any charges not covered, or any credits, to Deposit Account No. 06-1050.

Total Claims	35	-	31	=	4	\$100
Independent	4	-	4	=	0	\$0
TOTAL FEE DUE						\$100

Please apply the \$100 fee to Deposit Account No. 06-1050.

Date: May 5, 2005

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Attorney's Docket No.: 06618-637001/CIT3220

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Hui Jin et al. Art Unit: 2634
Serial No.: 09/861,102 Examiner: Dac V. Ha
Filed : May 18, 2001
Title : SERIAL CONCATENATION OF INTERLEAVED CONVOLUTIONAL
CODES FORMING TURBO-LIKE CODES

VIA FACSIMILE

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P.O. Box 1450
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AMENDMENT

In response to the Office action mailed March 4, 2005,
please reconsider this application in light of the following:

Amendments to the claims reflected in the Listing of Claims
beginning on page 2.

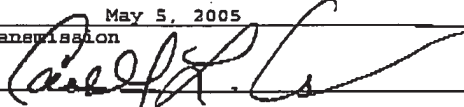
Remarks beginning on page 9.

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Attorney's Docket No.: 06618-637001/CIT3220

Listing of Claims

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method of encoding a signal, comprising:
 - obtaining a block of data in the signal to be encoded;
 - partitioning said data block into a plurality of sub-blocks, each sub-block including a plurality of data elements;
 - first encoding the data block to form a first encoded data block, said first encoding including repeating the data elements in different sub-blocks a different number of times;
 - interleaving the repeated data elements in the first encoded data block; and
 - second encoding said first encoded data block using an encoder that has a rate close to one.
2. (Original) The method of claim 1, wherein said second encoding is via a rate 1 linear transformation.
3. (Original) The method of claim 1, wherein said first encoding is carried out by a first coder with a variable rate less than one, and said second encoding is carried out by a second coder with a rate substantially close to one.

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4. (Original) The method of claim 3, wherein the second coder comprises an accumulator.

5. (Original) The method of claim 4, wherein the data elements comprises bits.

6. (Original) The method of claim 5, wherein the first coder comprises a repeater operable to repeat different sub-blocks a different number of times in response to a selected degree profile.

7. (Original) The method of claim 4, wherein the first coder comprises a low-density generator matrix coder and the second coder comprises an accumulator.

8. (Original) The method of claim 1, wherein the second encoding uses a transfer function of $1/(1+D)$.

9. (Original) The method of claim 1, wherein the second encoding uses a transfer function of $1/(1+D+D^2)$.

10. (Original) The method of claim 1, wherein said second encoding utilizes two accumulators.

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11. (Previously Presented) A method of encoding a signal, comprising:

receiving a block of data in the signal to be encoded, the data block including a plurality of bits;

first encoding the data block such that each bit in the data block is repeated and two or more of said plurality of bits are repeated a different number of times in order to form a first encoded data block; and

second encoding the first encoded data block in such a way that bits in the first encoded data block are accumulated.

12. (Previously Presented) The method of claim 11, wherein the said second encoding is via a rate 1 linear transformation.

13. (Previously Presented) The method of claim 11, wherein the first encoding is via a low-density generator matrix transformation.

14. (Original) The method of claim 11, wherein the signal to be encoded comprises a plurality of data blocks of fixed size.

15. (Currently Amended) A coder comprising:

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a first coder having an input configured to receive a stream of bits, said first coder operative to repeat said stream of bits irregularly and scramble the repeated bits; and

a second coder operative to further encode bits output from the first coder at a rate ~~close to~~ within 50% of one.

16. (Previously Presented) The coder of claim 15, wherein the stream of bits includes a data block, and wherein the first coder is operative to apportion said data block into a plurality of sub-blocks and to repeat bits in each sub-block a number of times, wherein bits in different sub-blocks are repeated a different number of times.

17. (Original) The coder of claim 15, wherein the first coder comprises a repeater having a variable rate and an interleaver.

18. (Original) The coder of claim 15, wherein the first coder comprises a low-density generator matrix coder.

19. (Original) The coder of claim 15, wherein the second coder comprises a rate 1 linear encoder.

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20. (Original) The coder of claim 19, wherein the second coder comprises an accumulator.

21. (Original) The coder of claim 20, wherein the second coder further comprises a second accumulator.

22. (Original) The coder of claim 16, wherein the second coder comprises a recursive convolutional encoder with a transfer function of $1/(1 + D)$.

23. (Original) The coder of claim 16, wherein the second coder comprises a recursive convolutional encoder with a transfer function of $1/(1 + D + D^2)$.

24. (Currently Amended) A coding system comprising:
a first coder having an input configured to receive a stream of bits, said first coder operative to repeat said stream of bits irregularly and scramble the repeated bits;

a second coder operative to further encode bits output from the first coder at a rate ~~close to~~ within 50% of one in order to form an encoded data stream; and

a decoder operative to receive the encoded data stream and decode the encoded data stream using an iterative decoding technique.

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25. (Previously Presented) The coding system of claim 24, wherein the first coder comprises a repeater operative to receive a data block including a plurality of bits from said stream of bits and to repeat bits in the data block a different number of times according to a selected a degree profile.

26. (Original) The coding system of claim 25, wherein the first coder comprises an interleaver.

27. (Original) The coding system of claim 24, wherein the first coder comprises a low-density generator matrix coder.

28. (Original) The coding system of claim 24, wherein the second coder comprises a rate 1 accumulator.

29. (Previously Presented) The coding system of claim 24, wherein the decoder is operative to decode the encoded data stream using a posterior decoding techniques.

30. (Previously Presented) The coding system of claim 24, wherein the decoder is operative to decode the encoded data stream based on a Tanner graph representation.

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31. (Previously Presented) The coding system of claim 24, wherein the decoder is operative to decode the encoded data stream in linear time.

32. (New) The coding system of claim 24, wherein the second coder comprises a coder operative to further encode bits output from the first coder at a rate within 10% of one.

33. (New) The coding system of claim 24, wherein the second coder comprises a coder operative to further encode bits output from the first coder at a rate within 1% of one.

34. (New) The coding system of claim 10, wherein the second coder comprises a coder operative to further encode bits output from the first coder at a rate within 10% of one.

35. (New) The coding system of claim 10, wherein the second coder comprises a coder operative to further encode bits output from the first coder at a rate within 1% of one.

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REMARKS

Claims 1-35 are pending. Claims 32-35 have been added. Claims 15 and 24 have been amended. Support for the new claims and the claim amendments can be found in para. [0021].

In the action mailed March 4, 2005, claims 1-14 were allowed and claims 16, 22, 23, 25, and 26 were objected to as dependent from a rejected base claim but otherwise allowable. Applicant gratefully acknowledges the indication that these claims are patentable.

Claims 15 and 24 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,396,423 to Laumen et al. (hereinafter "Laumen").

The rejection of claims 15 and 24 contends that Lauman's coder 12 encodes bits "at a rate close to one." Applicant respectfully disagrees.

In particular, Lauman describes that coding in function block 12

"takes place, e.g., using a convolutional code or a turbo code. Coders 12 of this type usually have transmission rates of 1/2, 1/3, 1/4, etc., i.e., from one input bit, two output bits, or three or four output bits, are generated. The coded bit rate coming from inner coder 12 is thus always double, triple, or quadruple the data rate made available by block coder 11."

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In other words, Lauman's coder 12 does not encode bits "at a rate close to one." Nevertheless, to advance prosecution, Applicant has amended claims 15 and 24 to recite coders that encode bits at a rate within 50% of one.

Since the highest transmission rate that Lauman describes is 1/2, and 1/2 is not within 50% of one, Applicant submits that claims 15 and 24 are not anticipated by Lauman. Thus, the rejections of claims 15 and 24, and their dependent claims, should be withdrawn.

Applicant asks that all claims be allowed. Please apply excess claim fees to Deposit Account No. 06-1050. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: May 5, 2005

BY
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 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number

09/861/02

CLAIMS AS FILED - PART I

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a))		
TOTAL CLAIMS (37 CFR 1.16(c))	minus 20 =	*
INDEPENDENT CLAIMS (37 CFR 1.16(b))	minus 3 =	*
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(d))		

* If the difference in column 1 is less than zero, enter "0" in column 2.

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

RATE	FEE
	\$
X \$	=
X \$	=
+ \$	=
TOTAL	

RATE	FEE
	\$
X \$	=
X \$	=
+ \$	=
TOTAL	

CLAIMS AS AMENDED - PART II

5/5/05

(Column 1) (Column 2) (Column 3)

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total (37 CFR 1.16(d))	35	Minus 31	= 4
Independent (37 CFR 1.16(b))	4	Minus 4	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))			

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

RATE	ADDI- TIONAL FEE
X \$25	= 100.00
X \$	=
+ \$	=
TOTAL ADD'L FEE	100.00

RATE	ADDI- TIONAL FEE
X \$	=
X \$	=
+ \$	=
TOTAL ADD'L FEE	

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total (37 CFR 1.16(d))	*	Minus	=
Independent (37 CFR 1.16(b))	*	Minus	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))			

RATE	ADDI- TIONAL FEE
X \$	=
X \$	=
+ \$	=
TOTAL ADD'L FEE	

RATE	ADDI- TIONAL FEE
X \$	=
X \$	=
+ \$	=
TOTAL ADD'L FEE	

AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total (37 CFR 1.16(d))	*	Minus	=
Independent (37 CFR 1.16(b))	*	Minus	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))			

RATE	ADDI- TIONAL FEE
X \$	=
X \$	=
+ \$	=
TOTAL ADD'L FEE	

RATE	ADDI- TIONAL FEE
X \$	=
X \$	=
+ \$	=
TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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