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**Datasheet for the decision  
of 5 April 2019**

**Case Number:** T 2207/13 - 3.4.01

**Application Number:** 06814404.7

**Publication Number:** 1946446

**IPC:** G10L19/00, H04N7/26

**Language of the proceedings:** EN

**Title of invention:**

BASES DICTIONARY FOR LOW COMPLEXITY MATCHING PURSUITS DATA  
CODING AND DECODING

**Applicant:**

Rateze Remote Mgmt. L.L.C.

**Headword:**

Matching pursuits/RATEZE

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no)



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Case Number: T 2207/13 - 3.4.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.01**  
**of 5 April 2019**

**Appellant:** Rateze Remote Mgmt. L.L.C.  
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**Representative:** Ablett, Graham Keith  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 7 May 2013  
refusing European patent application No.  
06814404.7 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** P. Scriven  
**Members:** B. Noll  
R. Winkelhofer

## Summary of Facts and Submissions

- I. This appeal is against the decision of the Examining Division to refuse European patent application 006814404.7 on the grounds that the main request did not comply with Article 123(2) EPC and that the subject-matter claimed by an auxiliary request lacked inventive step (Article 56 EPC).
- II. In the statement of grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of a main request as before the Examining Division, or else one of two auxiliary requests filed with the statement of grounds of appeal. Oral proceedings were conditionally requested.
- III. The Board set out its preliminary opinion in a communication issued for preparing the oral proceedings. In particular, the Board saw a lack of inventive step in claim 1 of all requests. Reference was made to the following documents.

D1: Yuan, Y. and Monro, D.M., "Improved Matching Pursuits Image Coding", 2005 IEEE International Conference on Acoustics Speech Signal Processing, 18 - 23 March 2005, II-201 to II-204.

D2: Monro, D. M., "Basis picking for matching pursuits image coding", IEEE International Conference on Image Processing, 24 - 27 October 2004, 2495 to 2498.

D3: Neff, R., Zakhor, A., "Very low bit-rate video coding based on matching pursuits", IEEE Transactions

on Circuits and Systems for Video Technology, Vol. 7, No. 1, February 1997, 158 to 171.

D4: Czerepinski, P. et al., "Matching Pursuits Video Coding: Dictionaries and Fast Implementation", IEEE Transactions on Circuits and Systems for Video Technology, Vol. 10, No. 7, October 2000, 1103 to 1115.

IV. After the appellant informed the Board that it would not be represented at them, the oral proceedings were cancelled.

V. Claim 1 of the main request reads as follows:

*A method for selecting a bases dictionary for matching pursuits data coding, the method performed by a computing system having a processor and comprising:*

*i) providing a candidate dictionary having a plurality of candidate entries, each entry being a base function;*

*ii) coding by the processor a sample signal using candidate entries from the candidate dictionary to determine an optimal candidate entry that produces a maximum inner product;*

*iii) saving the optimal candidate entry in the bases dictionary;*

*iv) removing the optimal candidate entry from the candidate dictionary;*

*v) repeating steps ii to iv until a threshold is reached to produce the bases dictionary for matching pursuits data coding;*

*characterised in that step i further comprises the step of restricting the width of candidate entries in the candidate*

*dictionary to a width of 14 or less samples [sic].*

Claim 1 of the first auxiliary requests differs therefrom in that the word "sample" has been deleted in clause ii).

Claim 1 of the second auxiliary request reads as follows:

*A method for matching pursuits data coding performed by a computing system having a processor, comprising: identifying by the processor an entry from a bases dictionary for signal coding comprising a plurality of entries, each entry being a base function having a width of 14 or less samples [sic]; and utilizing the identified entry in a matching pursuits data coding to at least partially code a signal.*

## **Reasons for the Decision**

1. The invention relates to the selection of basis vectors from a dictionary of candidates. The purpose is to encode a given signal, for example a video signal, by a sparse representation of basis vectors which approximate the signal with sufficient accuracy. The basis vectors are selected from the dictionary by means of an algorithm which results in "best matching" base

vectors for the given data. The algorithm is commonly referred to in the technical literature as "Matching Pursuits".

*The main request*

2. It is undisputed that the method of claim 1 as defined by steps (i) to (v) is known both from D1 (paragraph 2.1) and from D2 (paragraph 3 "BASIS PICKING" at p. 2498). These steps do therefore not need further discussion.
3. The method as claimed further comprises the characterising feature of restricting the width of candidates in the dictionary to 14 or fewer samples.
4. The appellant argued for two advantages. Firstly, less computation was required to select the optimal basis and, secondly, less computation was required during subsequent matching pursuits data coding, because the inner product calculations involved only vectors of the restricted width. Starting from D1, the technical problem was how to decrease the computational cost of selecting an optimised basis. The solution to this problem was not obvious from the prior art.
5. D1 itself is silent about the creation of a dictionary. However, in the last paragraph of section I, D1 refers to D2, D3, and D4 (references [9], [2] and [7], respectively) in this context.
6. D2 discloses the use of 1289 candidate bases with widths between 3 and 15 samples (D2, Abstract and paragraph 2 of section 3).

7. D3 discloses that "*[A]ny collection of arbitrarily sized and shaped functions can be used with matching pursuits, as long as completeness is satisfied*" (page 159, left column, penultimate paragraph) and further teaches that a codebook "D0" (see Table 1 at p. 161) which consists of 20 discrete Gabor functions having defined attenuation, frequency, phase, and width of up to 35.
8. D4 discloses that the computational cost of a matching pursuit increases as the number of functions in the dictionary and their total width (in D4 referred to as "length") increase (p. 1105, left column, section II.A. 2 "Computational Cost and Memory Requirements"). It suggests a first dictionary of 16 functions (p. 1107, Table 1; section III.B) of maximum width 25, or a second dictionary of 11 functions (p. 1106, right-hand column; section III.C) of maximum width 17.
9. Considering the technical problem as formulated by the appellant, the skilled person, starting from D1 and aiming further to reduce the computational cost of matching pursuit encoding, would vary the number and widths of the functions in the dictionary, and would thus consider using only functions of width 14 or less.
10. The appellant's arguments are not persuasive. Solely restricting the width of functions to 14 or less does not per se lead to an improvement in coding. The appellant has not provided any example of a dictionary of such functions that shows an improvement. Selecting a width of 14 or less is an arbitrary choice from the known range of widths which does not provide any technical effect. The feature that the width is 14 or less is, therefore, solely a requirement to be met and does not make a contribution to improving the coding.

11. Claim 1 is therefore not allowable (Article 56 EPC).

*The first auxiliary request*

12. The above objection under Article 56 EPC does not depend on the presence of the word "sample" and is not overcome by deleting this word. The first auxiliary request is, therefore, not allowable either.

*The second auxiliary request*

13. Claim 1 of the second auxiliary request is broader than claim 1 of the superior requests, since it is not explicitly limited by features (i) to (v). However, claim 1 relates to substantially the same method as regards the way of defining the basis functions as regards their widths. The reasons under Article 56 EPC given above also apply to claim 1 of the second auxiliary request, which is, therefore, not allowable either.



**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



R. Schumacher

P. Scriven

Decision electronically authenticated