

Fast Methods Fbr Split Codebooks

Elshafei-Ahmed, M

ELSEVIER SCIENCE BV, SIGNAL PROCESSING; pp: 2553-2565; Vol: 80

King Fahd University of Petroleum & Minerals

<http://www.kfupm.edu.sa>

Summary

This paper presents a fast method for building and searching split codebooks for vector quantization. The proposed method is evaluated in near transparent quality vector quantization of Line Spectral Frequencies (LSF) at 24-bit per frame. The method is based on a family of fractals called Space-Filling Curves (SFC). The SF curves achieve a significant saving in the complexity of vector quantization by reducing the problem to quantization in one-dimensional space. The paper presents algorithms for the generation of the SFC mapping utilizing the self-replication feature of the curves, and a number of simulation experiments to demonstrate the effectiveness of the method. It is shown that the SFC can reduce the search complexity of split codebooks by a factor of 8-32 times with a slight degradation in the vector quantization performance. (C) 2000 Elsevier Science B.V. All rights reserved.

References:

1. *NAT COMM SYST, 1992, 10106 CELP NCS
2. AHMED ME, 1998, P 1998 AM CONTR C JU, P1855
3. ATAL BS, 1991, ADV SPEECH CODING
4. BARTHOLDI JJ, 1988, MANAGE SCI, V34, P291
5. BIALLY T, 1969, IEEE T INFORM THEORY, V15, P658
6. BUTZ AR, 1971, IEEE T COMPUT, V20, P424
7. BUZO A, 1982, IEEE T ACOUST SPEECH, V28, P15
8. COX RV, 1996, IEEE COMMUN MAG, V34, P34
9. ELSHAFAIAHMED M, 1996, P 6 INT C COMP THEOR, P485
10. GERSHO A, 1992, VECTOR QUANTIZATION
11. GERSHO A, 1994, P IEEE, V82, P900
12. GRAY AH, 1976, IEEE T ACOUST SPEECH, V24, P459
13. GRAY AH, 1976, IEEE T ASSP, V24, P380
14. GRAY RM, 1998, IEEE T INFORM THEORY, V44, P2325

© Copyright: King Fahd University of Petroleum & Minerals;
<http://www.kfupm.edu.sa>

15. HILBERT D, 1891, MATH ANN, V38, P459
16. ITAKURA F, 1975, J ACOUST SOC AM, V57, S35
17. KAMATA S, 1996, P 13 INT C PATT REC, V3, P905
18. KAMATA S, 1998, P 14 INT C PATT REC, V2, P1575
19. KATAOKA A, 1995, P INT C UN PERS COMM, P818
20. LINDE Y, 1980, IEEE T COMMUN, V28, P84
21. MAKHOUL J, 1985, P IEEE, V73, P1551
22. MARKEL JD, 1976, LINEAR PREDICTION SP
23. MOAYERI N, 1994, IEEE T SPEECH AUDIO, V2, P490
24. OLIVERI F, 1986, P INT C AC SPEECH SI, P149
25. PALIWAL KK, 1993, IEEE T SPEECH AUDIO, V1, P3
26. PATRICK EA, 1968, IEEE T COMPUT, V17, P949
27. PEANO G, 1890, MATH ANN, V36, P157
28. PLATZMAN LK, 1989, J ASSOC COMPUT MACH, V36, P719
29. RAMACHANDRAN RP, 1995, IEEE T SPEECH AUDI P, V3, P157
30. SALAMI R, 1998, IEEE T SPEECH AUDI P, V6, P116
31. SCHROEDER MR, 1985, P ICASSP 85 INT C AC, V1, P937
32. SINGHAL S, 1989, IEEE T ACOUST SPEECH, V37, P317
33. SOONG FK, 1993, IEEE T SPEECH AUDIO, V1, P15
34. TREMAIN T, 1991, ADV SPEECH CODING
35. VISWANATHAN R, 1975, IEEE ACOUST, V23, P309
36. XIE MJ, 1996, IEEE T SPEECH AUDI P, V4, P234

For pre-prints please write to: abstracts@kfupm.edu.sa