計算機圖學與應用 6650

求解最佳基底

授課教師：王宗銘

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1. 請以 python 程式語言撰寫求解 multiple base (MB) data embedding algorithm 之最佳基底向量(optimal base vector, OBV)。

程式名稱：學號-04-determine OBV.py。
輸入: n, F 均為正整數。若輸入 n=0 或 F=0 則結束程式，否則持續等待下一次輸入 n, F.
n: number of pixels in a cluster
F: target notation

輸出：
1. Optimal Base Vector OBV:
2. Derived Notation M:
3. Difference D:
4. EMSE OBV:
5. PSNR:

Note:
1. Optimal Base Vector OBV=$(b_1, b_2, \dots, b_n)$, which has the smallest EMSE.
1. M=b1*b2*…*bn

2. EMSE(b)=$\frac{b^2-(-2)^{(b+1)\%2}}{12}$

3. EMSE(OBV)=$\frac{1}{n}\left(\sum_{i=1}^{n}\frac{(b_i)^2-(-2)^{(b_i+1)\%2}}{12}\right)$

4. n≥2

5. F≥4

輸入範例 1:
Input number of pixels in a cluster (n) and the target notation (F): 3 49

輸出範例 1
1. Optimal Base Vector OBV: 3, 4, 5
2. Derived Notation M: 60
3. Difference: 11
4. EMSE OBV: 1.3889
5. PSNR: 46.70

輸入範例 2:
Input number of pixels in a cluster (n) and the target notation (F): 5 499409

輸出範例 2
1. Optimal Base Vector OBV: 13, 13, 14, 14, 15
2. Derived Notation M: 532350
3. Difference: 32941
4. EMSE OBV: 16.3667
5. PSNR: 35.99

輸入範例 3:
Input number of pixels in a cluster (n) and the target notation (F): 6 2589478

輸出範例 3
1. Optimal Base Vector OBV: 11, 11, 11, 12, 13, 13
2. Derived Notation M: 2699268
3. Difference: 109790
4. EMSE OBV: 11.6944
5. PSNR: 37.45

輸入範例 4:
Input number of pixels in a cluster (n) and the target notation (F): 4 626

輸出範例 4
1. Optimal Base Vector OBV: 5, 5, 5, 6
2. Derived Notation M: 750
3. Difference: 124
4. EMSE OBV: 2.2917
5. PSNR: 44.53

2. 繳交檔案
(1) python 程式，程式名稱：學號-04-determine optimal base.py。