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Assignment Lesson05

1) Calculate total size of an video in 1h15mn? If we know:

* Resolution of an image: 780x640
* Number of frames per second: 45f/s
* Number of bits: 24 bits color
* we calculate total size of a video per second (Vs):

Vs = R . Nf . Nb =780x640x45x1=22464000 bytes

* Then we calculate total size of a video in 80mn (Vns) by:

n=1h15mn=60x60+15x60=4500 second

Vns = R . Nf . Nb . n = Vs . n =22464000x4500=101088000000 bytes

2) Calculate entropy of following string:

Input string: adcabcdebaabeddccead

Count the occurrences of each symbol in the string:

a: 5

b: 3

c: 4

d: 5

e: 3

total string of symbol 20

Calculate the probability of occurrence for each symbol:

P(a) = 5/20 = 1/4 = 0.25

P(b) = 3/20 = 0.15

P(c) = 4/20 = 0.2

P(d) = 5/20 = 0.25

P(e) = 3/20 = 0.15

Calculate the entropy using the formula:

Entropy = -Σ(P(x) \* log2(P(x)))

= -(0.25 \* log2(0.25) + 0.15 \* log2(0.15) + 0.2 \* log2(0.2) + 0.25 \* log2(0.25) + 0.15 \* log2(0.15))

So 0.25 \* log2(0.25) ≈ 0.25 \* (-2) ≈ -0.5

0.15 \* log2(0.15) ≈ 0.15 \* (-2.737) ≈ -0.41055

0.2 \* log2(0.2) ≈ 0.2 \* (-2.322) ≈ -0.4644

0.25 \* log2(0.25) ≈ -0.5

0.15 \* log2(0.15) ≈ 0.15 \* (-2.737) ≈ -0.41055

Entropy ≈ -(-0.5 + (-0.41055) + (-0.4644) + (-0.5) + (-0.41055))

≈ 0.5 + 0.41055 + 0.4644 + 0.5 + 0.41055

≈ 2.2855 bit per symbol