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Assignment Lesson 5

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

Resolution of an image: 780x640 pixels

Number of frames per second: 45f/s

Number of bits: 24 bits color

2) Calculate entropy of following string:

Input string: adcabcdebaabeddccead

Answer

1). Calculate total size of an video in 1h15mn

Given: - resolution of an image: 780x640 pixels = 499,200 pixels

- number of frames per second: 45f/s
- number of bits: 24 bits color = 3 bits
- time: 1h15mn = 75 mn * 60 = 4500
  $\Rightarrow$ vns = 499,200 * 45 * 3 * 4500 = 303,264,000,000 bytes

2). Calculate entropy of following string:

Input string: adcabcdebaabeddccead

- Total number of string n = 19
- Probability of each symbol
  . $P(a) = 7/19 = 0.3684$
  . $P(b) = 3/19 = 0.1578$
  . $P(c) = 3/19 = 0.1578$
  . $P(d) = 4/19 = 0.2105$
  . $P(e) = 2/19 = 0.1052$

$\Rightarrow$ $H(X) = \Big(P(a)\log 2\big(P(a)\big) + P(b)\log 2\big(P(b)\big) + P(c)\log 2\big(P(c)\big) + P(d)\log 2\big(P(d)\big) + P(e)\log 2\big(P(e)\big) \Big)$

$H(X) = \Big((0.3684)\log 2(0.3684) + (0.1578)\log 2(0.1578) + (0.1578)\log 2(0.1578) + (0.2105)\log 2(0.2105)$
$\qquad + (0.1052)\log 2(0.1052) \Big)$

$\Rightarrow$ $H(X) = 0.564 + 0.416 + 0.416 + 0.527 + 0.316 = 2.239$

Therefore, H(X) = 2.239