



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A’ Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**COURSE NAME : 19EC513 – IMAGE PROCESSING AND COMPUTER  
VISION**

**III YEAR / V SEMESTER**

**Unit III- IMAGE COMPRESSION AND IMAGE SEGMENTATION**

**Topic : Arithmetic coding**



## Arithmetic Coding

- Unlike the variable-length codes described previously, arithmetic coding generates non-block codes. In arithmetic coding, which can be traced to the work of Elias, a one-to-one correspondence between source symbols and code words does not exist.
- Instead, an entire sequence of source symbols (or message) is assigned a single arithmetic code word. The code word itself defines an interval of real numbers between 0 and 1.
- As the number of symbols in the message increases, the interval used to represent it becomes smaller and the number of information units (say, bits) required to represent the interval becomes larger. Each symbol of the message reduces the size of the interval in accordance with its probability of occurrence.
- Because the technique does not require, as does Huffman's approach, that each source symbol translate into an integral number of code symbols (that is, that the symbols be coded one at a time), it achieves (but only in theory) the bound established by the noiseless coding theorem.

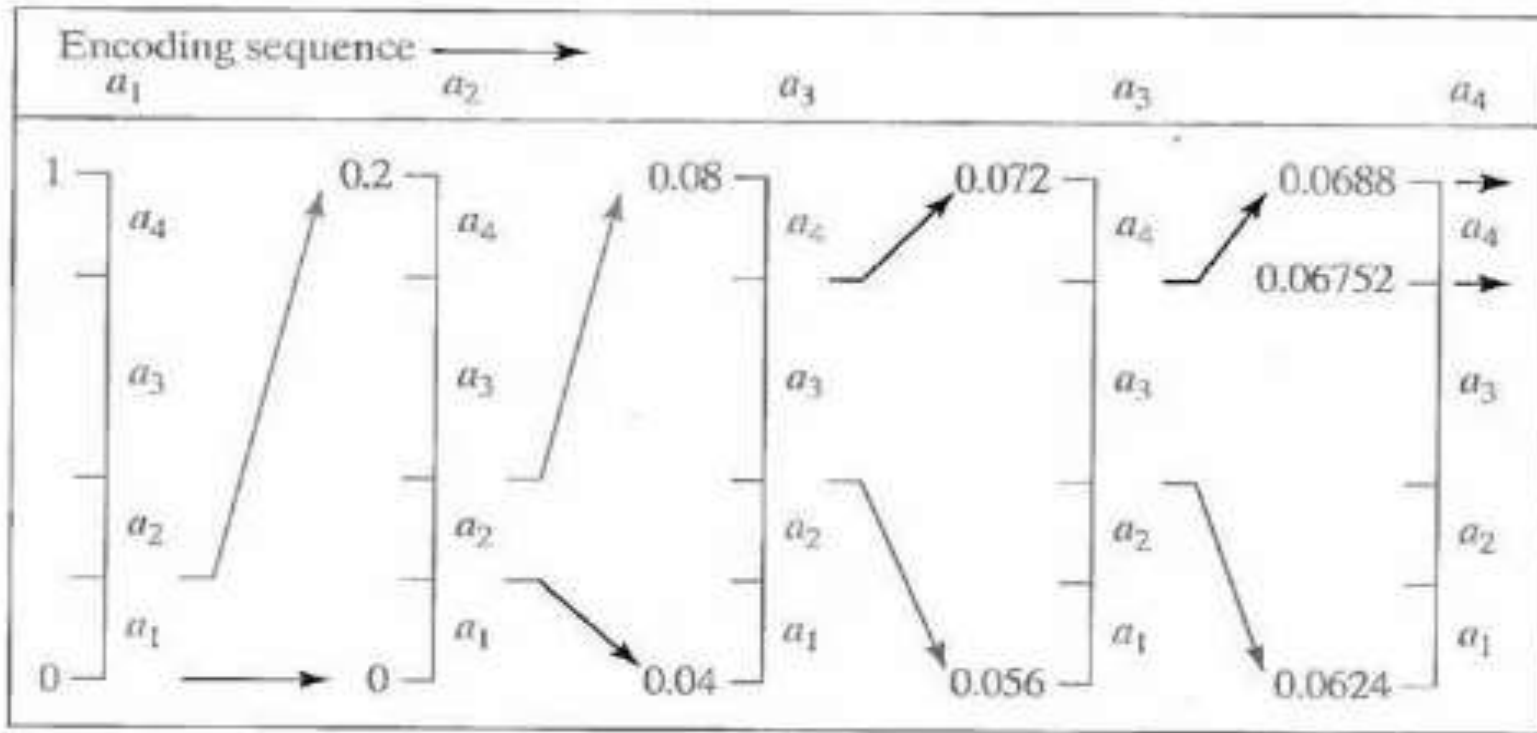
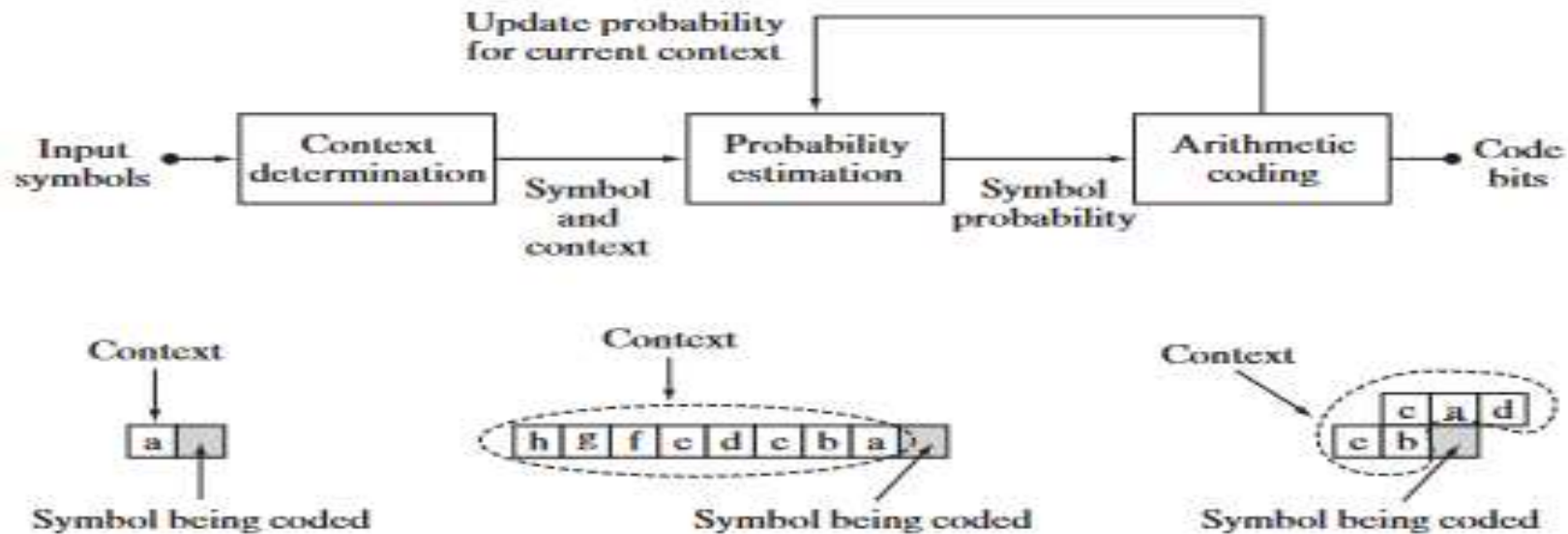


Fig.Arithmetic Coding Procedure

| Source Symbol | Probability | Initial Subinterval |
|---------------|-------------|---------------------|
| $a_1$         | 0.2         | [0.0, 0.2)          |
| $a_2$         | 0.2         | [0.2, 0.4)          |
| $a_3$         | 0.4         | [0.4, 0.8)          |
| $a_4$         | 0.2         | [0.8, 1.0)          |

Table: Arithmetic coding example





THANK YOU !!!