

Image Compression

LZW coding



LZW Encoding

- At the start, Dictionary contains all possible individual characters/intensities, and P is empty
- C = next character in the stream
- Is the string P+C present in the dictionary?
- If yes then
 - $P = P+C$
- Else
 - Output the code word which denotes P to the code stream
 - Add the string P+C to the dictionary
 - $P = C$

W a b b a W a b b a

P	-	W	a	b	b	a	W	W a	b	b b	a
C	W	a	b	b	a	W	a	b	b	a	-
P+C	W	W a	a b	b b	b a	a W	W a	W a b	b b	b b a	a
O/P	-	3	1	2	2	1	-	4	-	6	1

Index	Dictionary
1	a
2	b
3	W
4	W a
5	a b
6	b b
7	b a
8	a W
9	W a b
10	b b a

LZW Decoding

1. At the start, Dictionary contains all possible individual characters/intensities
2. cW = first code word
3. Output the string. cW to the charstream
4. $pW = cW$
5. cW = next code word
6. Is the string. cW present in the dictionary?
 - If yes
 - Output the string. cW to the charstream
 - $P := \text{string}.pW$
 - $C :=$ the first character of the string. cW
 - Add the string $P+C$ to the dictionary

LZW Decoding

- Else

P = string.pW

C = first character of the string.pW

Output the string P+C to charstream and add it to the dictionary (now it corresponds to the cW)

Are there more code words left in the codestream?

If yes go to step 4

Else END

Dictionary	a	b	w	wa	ab	bb	ba	aw	wab	bba
Index	1	2	3	4	5	6	7	8	9	10
										31221461
Pw	①	②	③	④	⑤	⑥	⑦	⑧		
String.Pw	-	3	1	2	2	1	4	6		
CW	-	w	a	b	b	a	wa	bb		
String.CW	3	1	2	2	1	4	6	1		
o/p	w	a	b	b	a	wa	bb	a		
P	-	w	a	b	b	a	wa	bb		
C	-	a	b	b	a	w	b	a		
P+C	-	wa	ab	bb	ba	aw	wab	bba		

Image

4x4

Class 8

39	39	126	126
39	39	126	126
39	39	126	126
39	39	126	126

Coding

Index	Dictionary
0	0
1	1
...	...
255	255
256	39-39
257	39-126
258	126-126
259	126-39
260	39-39-126
261	126-126-39

	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
P	-	39	39	126	126	39	39-39	126	126-126	39	39-39
C	39	39	126	126	39	39	126	126	39	39	126
P+C	39	39-39	39-126	126-126	126-39	39-39	39-39-126	126-126	126-126-39	39-39	39-39-126
O/P	-	39	39	126	126	-	256	-	258	-	-