Image Compression Using TelosB Mote

TIWSNE Mini-Project

Project Report

Motes in Spaces

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Contents

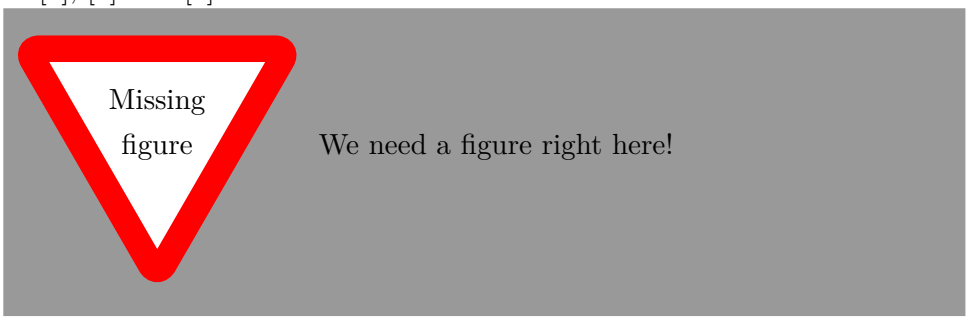
Todo list

Chapter 1

Introduction

Here is chapter 2. If you want to leearn more about LaTeX 2_ε, have a look at [1], [2] and [3].

I think this word is mis-pelled



Chapter 2

Theory

Here is the theory.

Table 2.1: The beginnings of the Golomb and Rice codes for a few parameter values. The midpoint (·) separates the high-order (unary) part from the low-order (binary) part of the codewords. The codes can be extended to all values of $n \geq 0$.

Golomb Rice	$m = 1$ $k = 0$	$m = 2$ $k = 1$	$m = 4$ $k = 2$	$m = 8$ $k = 3$
$n = 0$	**0·**	**0·0**	**0·00**	**0·000**
1	**10·**	**0·1**	**0·01**	**0·001**
2	**110·**	**10·0**	**0·10**	**0·010**
3	**1110·**	**10·1**	**0·11**	**0·011**
4	**11110·**	**110·0**	**10·00**	**0·100**
5	**111110·**	**110·1**	**10·01**	**0·101**
6	**1111110·**	**1110·0**	**10·10**	**0·110**
7	**11111110·**	**1110·1**	**10·11**	**0·111**
8	**111111110·**	**11110·0**	**110·00**	**10·000**
9	**1111111110·**	**11110·1**	**110·01**	**10·001**
⋮	⋮	⋮	⋮	⋮

$P - L$	0	1	2	3	4
codeword	**111**	**10**	**00**	**01**	**110**

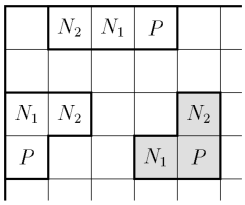


Figure 2.1: Nearest neighbors N_1 and N_2 of pixel P.

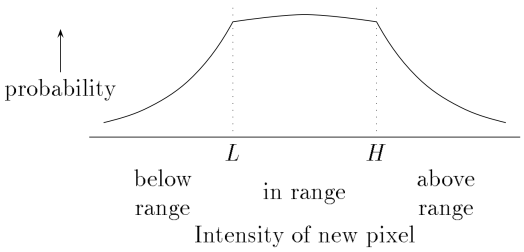
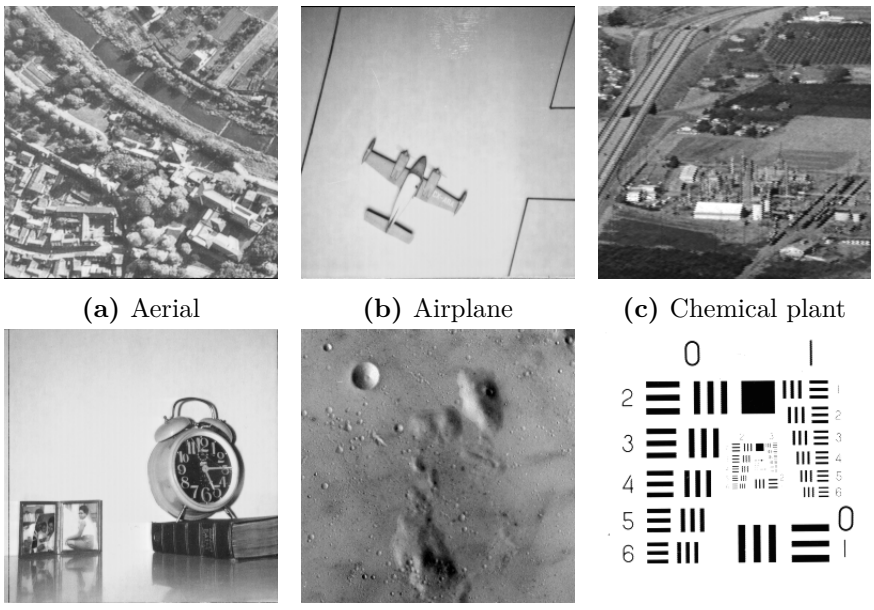


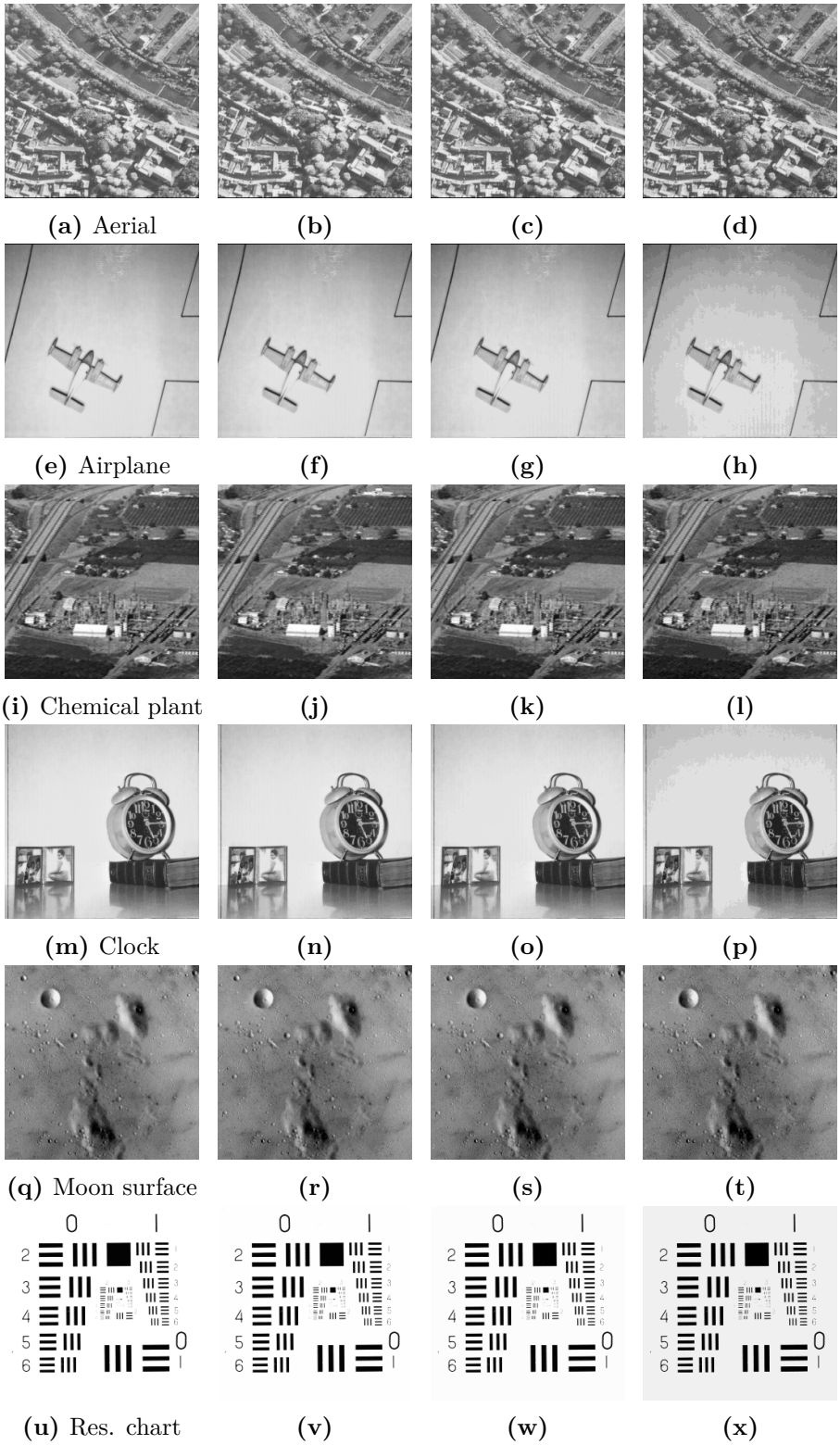
Figure 2.2: Scematic probability distribution of pixel values of P given L and H.



(a) Aerial **(b)** Airplane **(c)** Chemical plant

(d) Clock **(e)** Moon surface **(f)** Resolution chart

Figure 2.3: 256x256 pixel 8-bits grayscale test images [4]



(a) Aerial **(b)** **(c)** **(d)**

(e) Airplane **(f)** **(g)** **(h)**

(i) Chemical plant **(j)** **(k)** **(l)**

(m) Clock **(n)** **(o)** **(p)**

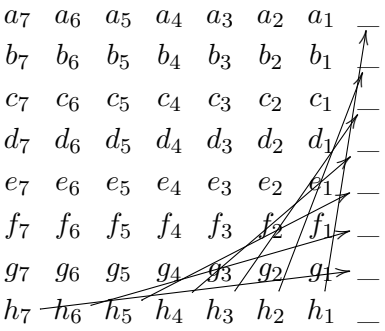
(q) Moon surface **(r)** **(s)** **(t)**

(u) Res. chart **(v)** **(w)** **(x)**

Figure 2.4: Restored images after lossy compression. Left pictures are the originals, right of then are the results of the Truncate1 compresseion, then Truncate2 and on the right Truncate4.

$a_7\ a_6\ a_5\ a_4\ a_3\ a_2\ a_1\ a_0$
$b_7\ b_6\ b_5\ b_4\ b_3\ b_2\ b_1\ b_0$
$c_7\ c_6\ c_5\ c_4\ c_3\ c_2\ c_1\ c_0$
$d_7\ d_6\ d_5\ d_4\ d_3\ d_2\ d_1\ d_0$
$e_7\ e_6\ e_5\ e_4\ e_3\ e_2\ e_1\ e_0$
$f_7\ f_6\ f_5\ f_4\ f_3\ f_2\ f_1\ f_0$
$g_7\ g_6\ g_5\ g_4\ g_3\ g_2\ g_1\ g_0$
$h_7\ h_6\ h_5\ h_4\ h_3\ h_2\ h_1\ h_0$

(a) 8 uncompressed bytes.



(b) Compressing 8 to 7 bytes.

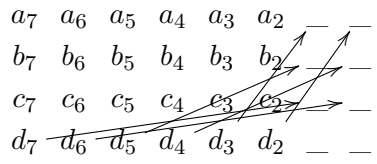
$a_7\ a_6\ a_5\ a_4\ a_3\ a_2\ a_1\ h_1$
$b_7\ b_6\ b_5\ b_4\ b_3\ b_2\ b_1\ h_2$
$c_7\ c_6\ c_5\ c_4\ c_3\ c_2\ c_1\ h_3$
$d_7\ d_6\ d_5\ d_4\ d_3\ d_2\ d_1\ h_4$
$e_7\ e_6\ e_5\ e_4\ e_3\ e_2\ e_1\ h_5$
$f_7\ f_6\ f_5\ f_4\ f_3\ f_2\ f_1\ h_6$
$g_7\ g_6\ g_5\ g_4\ g_3\ g_2\ g_1\ h_7$

(c) 7 compressed bytes.

Figure 2.5: Truncate1 compression algorithm.

$a_7\ a_6\ a_5\ a_4\ a_3\ a_2\ a_1\ a_0$
$b_7\ b_6\ b_5\ b_4\ b_3\ b_2\ b_1\ b_0$
$c_7\ c_6\ c_5\ c_4\ c_3\ c_2\ c_1\ c_0$
$d_7\ d_6\ d_5\ d_4\ d_3\ d_2\ d_1\ d_0$

(a) 4 uncompressed bytes.



(b) Compressing 4 to 3 bytes.

$a_7\ a_6\ a_5\ a_4\ a_3\ a_2\ d_3\ d_2$
$b_7\ b_6\ b_5\ b_4\ b_3\ b_2\ d_5\ d_4$
$c_7\ c_6\ c_5\ c_4\ c_3\ c_2\ d_7\ d_6$

(c) 3 compressed bytes.

Figure 2.6: Truncate2 compression algorithm.

(a) 2 uncompressed bytes.

(b) Compressing 2 to 1 bytes.

(c) 1 compressed bytes.

Figure 2.7: Truncate4 compression algorithm.

Chapter 3

Implementation

Here is the implementation.

Chapter 4

Conclusion

Here is the conclusion.

Bibliography

[1] Lars Madsen. Introduktion til LaTeX. http://www.imf.au.dk/system/latex/bog/, 2010.

[2] Tobias Oetiker. The not so short a introduction to LaTeX2e. http://tobi.oetiker.ch/lshort/lshort.pdf, 2010.

[3] Paul G. Howard and Jeffrey Scott Vitter. Fast and efficient lossless image compression. In *in Proc. 1993 Data Compression Conference, (Snowbird)*, pages 351–360, 1993.

[4] USC Viterbi School of Engineering. The usc-sipi image database. http://sipi.usc.edu/database/. [Online; accessed May 4, 2016].

Appendix A

Appendix A name

Here is the first appendix