Remote Sensing

Classification validation

Classification validation

- Error matrix (confusion matrix) – compares ground truth data with results of classification

- Kappa coeficient – is a parameter which assesses how much better the classification is than a random classification, subject to the observed marginals in the true classes

  value of 0,9 means that we avoid 90% of errors using a classification algorithm instead of random classification

Error matrix computation

- Overall accuracy is the proportion of the total correctly classified pixels on the total number of pixels in the map:

110+90+55+30 / 301 = 95%

		Ground truth (reference) data				
	class	forest	field	water	urban	Σ
Classification	forest	110	0	5	0	115
	field	10	90	0	0	100
	water	0	0	55	0	55
	urban	1	0	0	30	31
	Σ	121	90	60	30	301

Error of omission

- = 11 / 121 = 9%

- sum of pixels within a <u>column</u> without main diagonal box / number of reference pixels

- an example of an error of commission is when certain pixels that are e.g. forest, are classified as another thing, such as urban.

		Ground truth (reference) data				
	class	forest	field	water	urban	Σ
Classification	forest	110	0	5	0	115
	field	10	90	0	0	100
	water	0	0	55	0	55
	urban	1	0	0	30	31
	Σ	121	90	60	30	301

Error of commission

- = 5 / 121 = 4%

- Sum of pixels within a <u>row</u> without main diagonal box / number of reference pixels

- An example of an error of omission is when pixels of a certain thing, for example maple trees, are not classified as maple trees

		Ground truth (reference) data				
Classification	class	<u>forest</u>	field	water	urban	Σ
	<u>forest</u>	110	0	**5**	0	115
	field	10	90	0	0	100
	water	0	0	55	0	55
	urban	1	0	0	30	31
	Σ	**121**	90	60	30	301

User's accuracy

- = 110 / 115 = 96%

- is the proportion of the pixels of class *i* which have been correctly classified on the total pixel assigned to the class *i*

		Ground truth (reference) data				
Classification	class	forest	field	water	urban	Σ
	forest	110	0	5	0	115
	field	10	90	0	0	100
	water	0	0	55	0	55
	urban	1	0	0	30	31
	Σ	121	90	60	30	301

Producer's accuracy

- = 110 / 121 = 91%

- Number of correctly classified pixels of a class / number of reference pixels

		Ground truth (reference) data				
	class	forest	field	water	urban	Σ
Classification	forest	**110**	0	5	0	115
	field	10	90	0	0	100
	water	0	0	55	0	55
	urban	1	0	0	30	31
	Σ	**121**	90	60	30	301

References

- Campbell, J.B. 1996: Introdution to Remote Sensing, Taylor and Francis, London
- Dobrovolný, P. 1998: Dálkový průzkum Země, digitální zpracování obrazu, Masarykova Univerzita, Brno
- Rennolls, K. 1999: Map accuracy, Ministry of Forestry and Estate Crops, European Union