

## Automated Preservation:

#### The Case of Digital Raw Photographs





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digital negative most authentic version of the image no lossy compression as in jpeg new tools may create better interpretations not an image: uninterpolated sensor data

### Developing a raw file











#### Evaluation framework

numerous proprietary raw formats – high risk normalization to standardized format desirable *How to evaluate and validate?* preservation planning systematic evaluation method and tool controlled experimentation automated measurements



#### Automated Measurements

traditional quality assurance methods are error based

common tools not reliable

#### requirements

perception based respecting ICC-profiles meaningful for color images



https://ece.uwaterloo.ca/~z70wang/research/ssim/#MAD

## Significant Properties - Content

#### relative AE



RAW

## SSIM

#### SSIM Hue

#### **SSIM** Saturation

## Significant Properties - Context



### Contribution

image comparison metrics implemented using Java Advanced Imaging API metadata verification using ExifTool comparing Adobe DNGConverter and digiKam migrate and validate a representative selection

### Results – CRW

#### RAW

#### DNG by digikam



## raw data are identical incorrect color matrix generated

## Results – CRW

	Canon	Power-
	shot S	45 (CRW)
Critoria	ADC	dKam
dimonsions (dcraw)	ident.	ident.
dimensions (ACR)	ident.	larger
rolativo AE	0%	0%
rolativo MSE	0	0
SSIM Value	1.0	0.84
SSIM Saturation	1.0	0.67
SSIM Hue	1.0	0.76
manual (dcraw) <sup>c</sup>	ident.	diff.
manual (ACR)	ident.	diff.



### Results – CR2



two embedded color matrices

## Results – CR2

	Canon	EOS	
	40D (CR2)		
Criteria	ADC	dKam	
dimensions (dcraw)	ident.	ident.	
dimensions (ACR)	ident.	larger	
rolativo AE	0%	0%	
relative MSE	0	0	
SSIM Value	1.0	1.0	
SSIM Saturation	0.91	1.0	
SSIM Hue	0.94	1.0	
manual (dcrnw) <sup>c</sup>	simil.	ident.	
manual (ACR)	ident.	diff.	



## Conclusion

# demonstrated fully automated QA using state of the art perceptual level method



well suited to falsify: find bad conversions yet not suited to fully verify conversions

SSIM allows meaningful measurements

### Outlook

implement workflows using taverna run large scale tests correlation of SSIM and manual evaluation use more tools for QA

expand approach to different types of content





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