

**REALISTIC FILM NOISE SIMULATION WITH SPACE-VARYING STATISTICS BASED ON
EXPERIMENTAL DATA FROM A NEW OPTICAL FILM DIGITISATION SETUP**

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ABSTRACT

Film noise downgrades the defect visibility significantly in industrial radiography and is consequently a major influencer of image quality. Particularly when simulating radiographic images, it is crucial to generate realistic noise in order to deliver accurate simulation results. Realistic, experimentally-based film noise generation is missing in the state-of-the-art.

In this presentation, a statistically inhomogeneous noise generator as well as a new optical setup for digitisation of radiographic films will be presented. Under various exposure conditions, films have been homogeneously exposed and developed and subsequently investigated by the optical setup in order to generate a database of noise characteristics. Capturing the spectral characteristics of the noise is of particular interest in enabling the accurate simulation of film noise. An important property of the presented noise simulation method is the ability to generate noise with space-dependant, inhomogeneous statistical properties where the internal correlation between neighbouring pixels of the noise is assured throughout the image. Various validation studies verify that the generated noise is indistinguishable from real noise. These validations include visual as well as statistical studies and will be presented in this talk.

Furthermore, it will be shown as a second finding that a new optical setup for digitising film noise can replace time-consuming microdensitometer measurements for film system classification. The presented setup efficiently measures the standard deviation of the optical density and can be used effectively to determine the inherent unsharpness of the film system.

Keywords: radiography, film noise, simulation

ACKNOWLEDGEMENTS

The work is funded by the EPSRC (iCASE) and supported by EDF S.A.

REFERENCES

[1] S. Eckel, P. Huthwaite, U. Zscherpel, N. Paul, and A. Schumm, "Realistic Film Noise Generation based on Experimental Noise Spectra," to be submitted

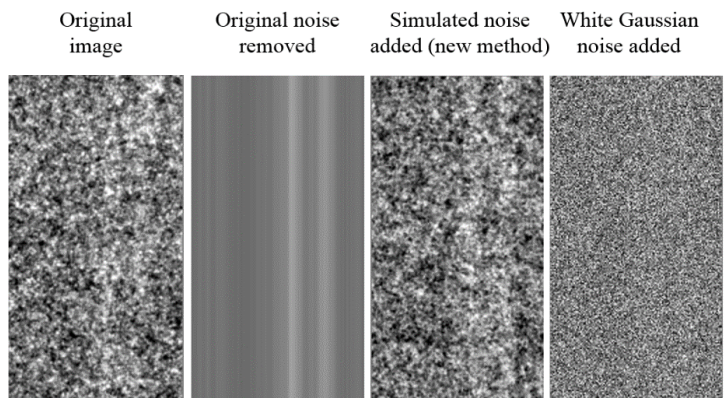


FIGURE 1: EFFECT OF DIGITISED REAL AND SIMULATED NOISE ON IQI WIRE PAIR VISIBILITY INCLUDING COMPARISON WITH EFFECT OF WHITE GAUSSIAN NOISE (IQI DIAMETER 0.08 MM, PIXEL SIZE 6.662 μ M)

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