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# DESIGN OF A COMPUTER SYSTEM

# for the

# ANALYSIS OF DEFECTS AND GRADING OF WOVEN FABRICS

*by*

SN Niles

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**DECLARATION**

No portion of the work in this thesis has been submitted to any University or Institution for any other academic qualification.

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## ABSTRACT

Inspection of fabrics is a major consideration in fabric manufacture, as well as in the manufacture of garments and other fabric-based goods. In the Sri Lankan industry fabric inspection is almost entirely carried out by manual methods, and is therefore subjective and prone to human error. This research has sought to address this problem by developing a computerised system to analyse and grade fabrics on the basis of captured defective images obtained from the fabric.

In this research a computer-based system for the objective assessment of fabric defects was designed. The system was designed with special emphasis on the fabric defects occurring in the Sri Lankan industry. Image processing techniques were used to analyse scanned images of the test fabric, compare it with an ideal sample which is made available, and identify defects according to pre-learnt rules. The information gathered was then used to grade the fabric, either by giving the frequency of occurrence of defects or by assigning points.

A new classification method for common defects was designed, that would facilitate easy grading according to commonly used grading systems. A coding system for defects was also designed, which helps in reporting defects to the user. The detected fabric defects were classified and stored according to the developed classification method and using the proposed coding system.


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# LIST OF ABBREVIATIONS & ACRONYMS

| | |
|---|---|
| AFIS | Automatic Fabric Inspection System |
| ASQC | American Society for Quality Control |
| ASTM | American Society for Testing Materials |
| BS | British Standards |
| DOG | Difference of Gaussian filter |
| EVS | Elbit Vision Systems |
| FDAS | Fabric Defect Analysis System |
| FFT | Fast Fourier Transform |
| FWA | Fuzzy Wavelet Analysis |
| ITMA | International Textile Machinery Association |
| KTA | Knitted Textile Association |
| LOG | Laplacian of Gaussian filter |
| UNIDO | United Nations Industrial Development Organization |
| WIRA | Wool Industry Research Association |

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