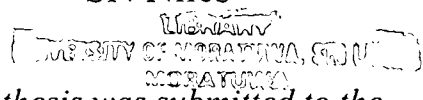


LB/DON/91/04

**DESIGN OF A COMPUTER SYSTEM  
for the  
ANALYSIS OF DEFECTS AND GRADING  
OF WOVEN FABRICS**

by

SN Niles



*This thesis was submitted to the*

*Department of Textile & Clothing Technology  
of the University of Moratuwa*

*in partial fulfilment of the requirements of the*

*Degree of*

**Master of Philosophy**

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**Department of Textile & Clothing Technology**

**University of Moratuwa**

**June 2004**

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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.

v!

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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-learned 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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