

TO CATEGORIES 

1.400.000 PAGES OF RESEARCH

MONTHLY
1.200.000
PAGE VIEWS

OVER
300.000
VISTORS PER MONTH

new E-BOOKS 

FULLTEXT SEARCH

[GO!](#)

NEW: [Advanced Search](#)

Periodicals:

MSF

> Materials Science Forum

KEM

> Key Engineering Materials

SSP

> Solid State Phenomena

DDF

> Defect and Diffusion Forum

AMM

> Applied Mechanics and Materials

AMR

> Advanced Materials Research

AST

> Advances in Science and Technology

JNanoR

> Journal of Nano Research

Automatic Visual Inspection for Leather Manufacture

Journal [Key Engineering Materials](#) (Volumes 326 - 328)

Volume [Experimental Mechanics in Nano and Biotechnology](#)

Edited by Soon-Bok Lee and Yun-Jae Kim

Pages 469-472

DOI 10.4028/www.scientific.net/KEM.326-328.469

Citation Fu Qiang He et al., 2006, Key Engineering Materials, 326-328, 469

Online since December, 2006

Authors [Fu Qiang He](#), [Wen Wang](#), [Zi Chen Chen](#)

Keywords [Defect Detection](#), [Leather](#), [Multiresolution](#), [Visual Inspection](#), [Wavelet](#)

Abstract The visual inspection system was developed for defects detection on leather surfaces, which is an important component of automatic CAD/CAM cutting systems. The main functions of the system are quality control and raw material cutting. An efficient algorithm, which combines multiresolution approach, energy and entropy matrices, is presented for detection of defects embedded in leather surface images. A wavelet band selection procedure was developed to automatically determine the number of resolution levels and decompose subimages for the best discrimination of defects and removals of repetitive texture patterns in the image. An adaptive binary thresholding is then used to separate the defective regions from the uniform gray-level background in the restored image. The proposed methodology is able to efficiently detect several types of defects that current approaches cannot detect, and is fast enough to be used for real-time leather inspection.

Full Paper  [Get the full paper by clicking here](#)

First page example

JBBTE

> Journal of Biomimetics,
Biomaterials, and Tissue
Engineering

JMNM

> Journal of Metastable and
Nanocrystalline Materials

JERA

> International Journal of
Engineering Research in Africa

AEF

> Advanced Engineering Forum

NH

> Nano Hybrids



> @scientific.net

CONFERENCE

GO!

11/13/2012 - 11/15/2012

The International Conference on Advanced Eng

8/24/2012 - 8/25/2012

AMMT 2012: 2012 International Conference on

7/27/2012 - 7/29/2012

2012 International Conference on Intelligent Sys

more...

Key Engineering Materials Vols. 326-328 (2006) pp 469-472
Online available since 2006/Dec/01 at www.scientific.net
© (2006) Trans Tech Publications, Switzerland
doi:10.4028/www.scientific.net/KEM.326-328.469

Automatic visual inspection for leather manufacture

Fuqiang He^{1,a}, Wen Wang^{1,b}, Zichen Chen^{1,c}

¹Institute of Advanced Manufacture Engineering, Zhejiang University, Hangzhou 310027, China

^ahefuq@163.com, ^bwangwn@zju.edu.cn, ^cchenzc@sun.zju.edu.cn

Keywords: visual inspection; leather; defect detection; wavelet; multiresolution

Abstract. The visual inspection system was developed for defects detection on leather surfaces, which is an important component of automatic CAD/CAM cutting systems. The main functions of the system are quality control and raw material cutting. An efficient algorithm, which combines multiresolution approach, energy and entropy matrices, is presented for detection of defects embedded in leather surface images. A wavelet band selection procedure was developed to automatically determine the number of resolution levels and decompose subimages for the best discrimination of defects and removals of repetitive texture patterns in the image. An adaptive binary thresholding is then used to separate the defective regions from the uniform gray-level background in the restored image. The proposed methodology is able to efficiently detect several types of defects that current approaches cannot detect, and is fast enough to be used for real-time leather inspection.

Introduction

Automated visual inspection of leather surface defects is very important in the manufacturing of leather products that require unusually high quality. These operations are currently performed by human inspectors who tend to miss considerable numbers of defects because human beings are basically inconsistent and inappropriate for such simple and repetitive tasks. Furthermore, since manual inspection is slow and labor-intensive tasks, they can become a critical bottleneck in the entire production process. In this study we use machine vision to substitute for human inspectors for automated surface inspection. Automated inspection can reduce human workloads and labor costs while increasing throughput. More importantly, higher accuracy can be achieved by eliminating human error due to fatigue.

Leather as a natural material with its variety of visual appearances – nonhomogeneous in color, thickness, brightness, wrinkledness, etc. is a complex object for control and analysis. The presence of defects is critical factor for adjustment of the leather for manufacturing of particular good, because the existence of areas with leather defects maybe considered as unusable or useful only for particular purposes. There are well known different methods for analysis of leathers surface defects and classifications [3,4]. The method is based on statistical analysis of the image gray levels. Most of algorithms to detect the leather defect by extracting a set of textural features using co-occurrence matrix approaches[2], the Fourier transform, the Gabor transform[5] and the wavelet transform[1]. These analysis methods are generally based on the extraction of textural features in the spatial and spectral domains, besides high-dimensional feature space, the most difficult task of the feature-extraction approach is to choose adequate textural features which can sufficiently represent the uniqueness of the texture in the image.

This paper present an image reconstruction approach based on the analysis and synthesis wavelet transforms to inspect leather surface defects. It does not rely on textural features to detect local anomalies, and alleviates all limitations of feature-extraction methods. With proper selection of a smooth subimage or the combination of detail subimages at different multiresolution levels for image reconstruction, the global repetitive texture pattern can be efficiently removed and only local anomalies are preserved in the restored image,

Vision system for the leather manufacture

The visual inspection systems for textured surfaces have application in different areas for analysis of defects in textile, lumber, automobile paints, etc. The application to the leather industry was

All rights reserved. No part of contents of this paper may be reproduced or transmitted in any form or by any means without the written permission of TTP, www.ttp.net. (ID: 122.70.132.162-01/12/11.13.25.10)