

# Image Correlation For Shape Motion And Deformation Measurements Basic Conceptstheory And Applications By Michael A Sutton 2009 03 26

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### [Image Correlation For Shape Motion](#)

#### **Image Correlation for Shape, Motion**

Image Correlation for Shape, Motion and Deformation Measurements Basic Concepts, Theory and Applications ABC Michael A Sutton University of South Carolina Department of Mechanical Engineering Columbia, SC 29208 USA sutton@scedu Hubert W Schreier Correlated Solutions, Inc

#### **Image Correlation for Shape, Motion and Deformation ...**

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#### **[EPUB] Image Correlation For Shape**

Image Correlation for Shape, Motion and Deformation Measurements provides a comprehensive overview of data extraction through image analysis Readers will find and in-depth look into various single- and multi-camera models (2D-DIC and 3D-DIC), two- and three-dimensional computer vision,

and volumetric digital image correlation (VDIC)

### **Image Correlation for Shape, Motion and Deformation ...**

Image Correlation for Shape, Motion and Deformation Measurements Basic Concepts, Theory and Applications 4y Sprrineei g< r Contents 1 Introduction 1 11 Literature Survey 1 111 Early History 1 112 Photogrammetry, 1850-Present 1 113 Digital Image Correlation - Background and Related

### **[eBooks] Image Correlation For Shape Motion And ...**

Image Correlation for Shape, Motion and Deformation Measurements discusses the fundamentals, theoretical improvements, and practical applications of digital image correlation (DIC) This book is a collaboration of decades of research and development of 2D and 3D digital image correlation software

### **Application of High Speed Digital Image Correlation for ...**

Application of High Speed Digital Image Correlation for Vibration Mode Shape Analysis Thorsten Siebert<sup>1</sup>, Digital Image Correlation (DIC) is a full-field image analysis method, based on grey value digital images, that time should be short enough in order to avoid motion blurring and freeze the image of the moving object In this

### **Correlated Solutions, Inc.**

Image Correlation for Shape, Motion and Deformation Measurements discusses the fundamentals, theoretical improvements, and practical applications of digital image correlation (DIC) This book is a collaboration of decades of research and development of 2D and 3D digital image correlation software

### **Accuracy enhancement of digital image correlation with B ...**

The interpolation algorithm plays an essential role in the digital image correlation (DIC) technique for shape, deformation, and motion measurements with subpixel accuracies At the present, little effort has been made to improve the interpolation methods used in DIC In this Letter, a family of recursive interpolation schemes based

### **Uncertainty estimation and reduction in digital image ...**

Digital image correlation, "DIC" [3], refers to a class of non-contacting methods that acquire images of an object, store images in digital format and perform image analysis to extract full-field shape, motion or deformation measurements The technique, originally developed by a ...

### **Lecture 7: Correspondence Matching**

Key idea: Cross correlation with a filter can be viewed as comparing a little "picture" of what you want to find against all local regions in the image For this reason, it is sometimes called "matched filtering" In fact, you can prove that the best linear operator for finding an image patch is essentially the patch itself

### **Shape-correlated Deformation Statistics for Respiratory ...**

Keywords: respiratory motion prediction, 4D motion modeling, correlation analysis, shape modeling, image guided radiation therapy, 4D lung CT 1 INTRODUCTION 4D image-guided radiation therapy (IGRT) in general is still in its early stage of development 1 The treatment of inoperable tumors in lung remains a therapeutic challenge

### **Shape-correlated Statistical Modeling and Analysis for ...**

linear dense image matching methods easily fail in regions where artifacts interfere Learning-based linear motion modeling techniques have the

advantage of incorporating prior knowledge for robust motion estimation In this research shape-correlation deformation statistics (SCDS) capture strong correlations between the shape of the lung and

### **Minimizing Noise and Bias in 3D DIC**

Classic correlation function: sum of squared differences (SSD) of the pixel values (smaller values = better similarity)  $\sum_{i,j} (I(x_i, y_j) - I(x_i + u, y_j + v))^2$   
 | Correlation function Pixel coord, reference image Displacement (disparity) n: subset size (9 in our example) Image before motion Image after motion

### **Digital Image Correlation for Measurement of In-Plane ...**

Image Correlation for Shape, Motion and Deformation Measurements: Basic Concepts, Theory and Applications New York: Springer, 2009 Print Eq 3: Stress=Force/Area Eq 1: Cross-sectional Area Eq 2: Actual engineering stress Eq 5: Concentration factor for a circular hole in a flat plate Eq 4: Young's Modulus for Elastic Deformation

### **Image Correlation Pattern Optimization for Micro-scale In ...**

Image correlation for shape, motion and deformation measurements: basic concepts, theory and applications Springer Science & Business Media, 2009 [5] HW Schreier and MA Sutton Systematic errors in digital image correlation due to undermatched subset shape functions Experimental Mechanics, 42(3):303-310, 2002

### **APPENDIX E - Digital Image Correlation Effort**

11 DIGITAL IMAGE CORRELATION Digital image correlation is a non-contacting measurement technique that uses images taken with a charged couple device (CCD) digital camera to track in-plane motion An image is digitized into a certain number of pixels, each with a corresponding level of light intensity Therefore, every digital image taken has a

### **High-speed Digital Image Correlation as a Tool for 3D ...**

Abstract The contribution deals with the use of high-speed digital image correlation in a measurement and motion analysis of relatively big objects such as robots or manipulators Digital image correlation method is an optic non-contact technique, which can be used in a wide range of applications in experimental mechanics This method

### **Pixel-level robust digital image correlation**

image areas where the classic approach completely fails to recover motion due to severe image de-correlation, the proposed method provides reliable 17 M A Sutton, J-J Orteu and H W Schreier, Image correlation for shape, motion and deformation measurements (Springer, 2009) 18 B Pan, H Xie and Z Wang, "Equivalence of digital

### **Digital Image Correlation for Performance Monitoring Abstract**

the motion of mechanism parts in a real-time and non-intrusive manner One way to accomplish this is by using highspeed video- and Digital Image Correlation (DIC) In this approach, individual frames of the video are analyzed to track the motion of mechanism components The derived performance metrics