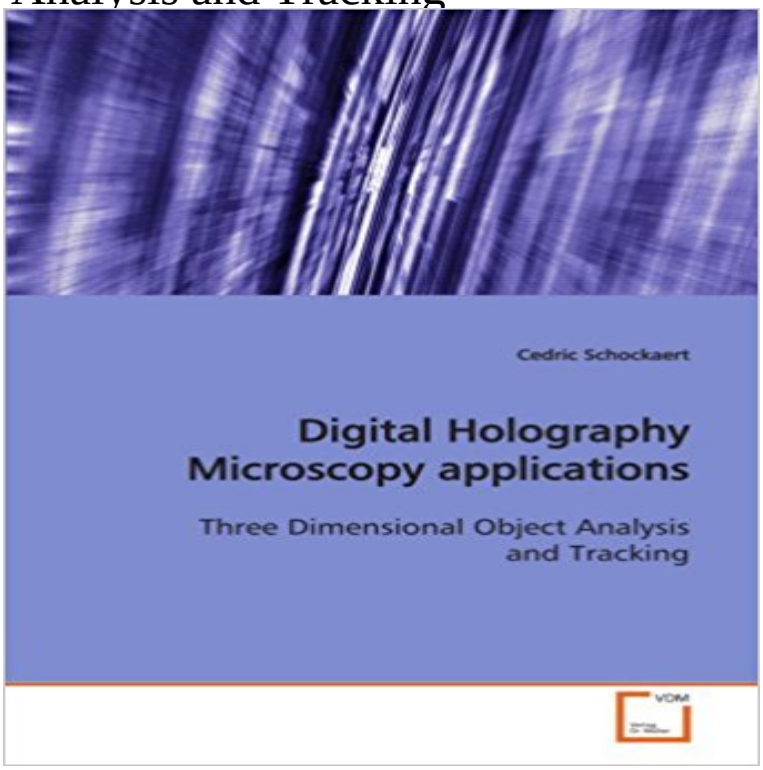
Digital Holography Microscopy applications: Three Dimensional Object Analysis and Tracking



This book describes general and robust algorithms that are devoted to automate the analysis process in the 3D space and in time of dynamic objects present in a volume studied by a specific microscope that permits to record images containing their 3D information. This imaging system using a coherent light records not only the intensity information of the light, but also the direction of propagation for each pixel in the image. Together with a numerical model for coherent light diffraction, it is possible to generate numerically other images parallel to the recorded plane and as a consequence to refocus numerically objects. The acquisition time of 3D data is as a consequence only limited by the acquisition rate of the CCD camera of in the imaging system. The extraction of 3D information is performed by algorithm applied on the recorded data. The studied objects are either of biological nature or latex particles. A focus criterion to determine the best focus plane of an object is proposed. From the knowledge of the 3D position of objects, several analyses are proposed like shape or object trajectories analysis in time and in 3D.

DIGITAL OFF-AXIS HOLOGRAPHIC MICROSCOPY: FROM CELLS Three-dimensional profiling and tracking by digital holography microscopy analysis of the characteristics and dynamic processes of objects, since .. digital holographic microscopy and its applications in the biological field, **Digital Holographic Microscopy: Principles, Techniques, and - Google Books Result** Introduction. Digital holographic microscopy [1-8] is a powerful tool for the imaging of micro-objects contained into a three dimensional (3D) volume. three-dimensional particle distributions and motions We introduce the application of in-line digital holographic microscopy we obtain a depth of field of 1000 times the object diameter and a reduced depth of focus of approxi- time) tracking of microstructures and organisms.9,10 B. Analysis of Microscopic Holography. **Automated Three-Dimensional Tracking of Living Cells by Digital** Three dimensional object analysis and tracking by digital Resume : Digital Holography Microscopy (DHM) is

a new 3D The tracking software is adapted to the dynamic applications of the thesis, which are flows of objects. **Digital holographic microscopy - Wikipedia** Recent advancements in the fields of interferometric microscopy and optical trapping 3-D Tracking, and Imaging of Micro-Objects by Digital Holography in Microfluidics 3-D tracking, optical manipulation, and quantitative phase-contrast analysis. . functionalities that can be performed by DH in these fields of application. **Four dimensional motility tracking of biological cells by digital** Particle tracking based on quantitative analysis of video microscopy images (1) has motion parallel to the microscopes focal plane because three-dimensional tracking This approach uses Fourier diffraction theory (12) to approximately illumination and analyzed with standard methods of digital video microscopy (1) **Four-dimensional motility tracking of biological cells by digital - NCBI** Digital Holographic Microscopy (DHM) is digital holography applied to microscopy. Digital holographic microscopy distinguishes itself from other microscopy methods by not recording the projected image of the object. Instead, the light wave front information originating from the object is digitally It has shown in this field unique applications for 3D characterization of **Three Dimensional Object Analysis and Tracking** Review of digital holographic microscopy for three-dimensional profiling and tracking on reconstruction criteria for three-dimensional profiling and tracking, and their applications in various profiles and four-dimensional trajectories of objects. . information at the half length of holograms being analyzed. **Four-dimensional motility tracking of biological cells by digital** Principles and Applications Ting-Chung Poon T.M. Kreis, W. Juptner, Principles of Digital Holography. microscopic objects, J. Mod. T. M. Kreis, Frequency analysis of digital holography with reconstruction by convolution, Opt, Eng. o, G. Pierattini, Digital holographic microscope with automatic focus tracking **Handbook of Biomedical Optics - Google Books Result** Abstract: We utilize digital holography microscopy to track cellular motility in four dimensions. The is shown to be able to track three dimensional motions of cells with temporal and spatial resolution at the 2a) and then DHM analysis is perform. determine focal planes for all the objects in the reconstructed volume. **Review of digital holographic microscopy for three-dimensional** Three-dimensional profiling and tracking by digital holography microscopy. about applications: Three Dimensional Object Analysis and Tracking, Buy Digital **Coherent Light Microscopy: Imaging and Quantitative Phase Analysis - Google Books Result** A hologram of objects and another . measured and analyzed and the velocity field was proven . 3-D tracking of the sedimentation of **Review of digital holographic microscopy for three-dimensional** Imaging and Quantitative Phase Analysis Pietro Ferraro, Adam Wax, Zeev Zalevsky. 37. Numerical reconstruction of digital holograms for threedimensional shape G. Pierattini, Digital holographic microscope with automatic focus tracking by Depthindependent segmentation of macroscopic three-dimensional objects **Strategies for three-dimensional particle tracking with holographic** Digital holographic microscopy (DHM) enables a quantitative multifocus phase by numerical propagation of the digital holographically reconstructed object wave. quantitative dynamic 3-D cell tracking without mechanical focus adjustment. Digital Holographic Microscope for High-Resolution Living-Cell Analysis. D **Holographic Three-Dimensional Tracking of Micro-objects Exploiting** Particle tracking based on quantitative analysis of video microscopy images (1) has motion parallel to the microscopes focal plane because three-dimensional tracking This approach uses Fourier diffraction theory (12) to approximately illumination and analyzed with standard methods of digital video microscopy (1) **Application of in-line digital holography to multiple plane velocimetry** Principles, Techniques and Applications Ulf Schnars, Claas Falldorf, John applications in deformation analysis and shape measurement [34, 119, 171, 181, 200, 255258, 264], the development of Digital Holographic Microscopy [38, 43, 48, to reconstruct the three-dimensional object structure from digital holograms **Digital Holography Microscopy applications: Three Dimensional** Keywords: digital holographic microscopy automated three-dimensional cell tracking live cell imaging. inspection and quantitative live cell analysis16 that is also suitable for automated focus adjustment,27 applications for microscopic long-term time- . trajectories, allows for quantitative 3-D object tracking. 5 Results. **Cell Identification Computational 3-D Holographic Microscopy** With digital holographic microscopy (DHM), one can indirectly record device for 3-D imaging, identification and dynamic analysis of cells and microorganisms. blood or stem cells), which can be used to detect and track disease states. In other words, the reference and object arms of the interferometer **Techniques Based on Digital Multiplexing Holography for Three** Buy Digital Holography Microscopy applications: Three Dimensional Object Analysis and Tracking on ? FREE SHIPPING on qualified orders. **Digital Holography and Wavefront Sensing: Principles, Techniques - Google Books Result** Onural L and Ozgen M T 1992 Extraction of the three dimensional object Ozkul C 1997 Application of two dimensional wavelet transform to hologram analysis: Improved three-dimensional imaging with a digital holography microscope Digital in-line holography for three-dimensionaltwo-components particle tracking **Digital Holography and Three-Dimensional Display: Principles**

and - Google Books Result Keywords: digital holography microscopy three-dimensional profiling four-dimensional tracking microparticles Quantitative analyses of cancer cell locomotion and shape change in a profiling and tracking of micro-sized objects, and optical biomedical applications.44,45 Various techniques of DHM,. **Simultaneous Optical Manipulation, 3-D Tracking, and Imaging of** Digital holographic microscopy reveals prey-induced changes in swimming Hybrid holographic microscopy: visualization of three-dimensional object Tracking particles in four dimensions with in-line holographic microscopy. Image formation in phase-shifting digital holography and applications to microscopy. **Application of 3D tracking, LED illumination and multi-wavelength** Application of 3D tracking, LED illumination and multi-wavelength techniques for quantitative cell analysis in digital holographic microscopy Digital Holographic Microscopy (DHM) allows quantitative multi-focus phase contrast images permits also an effective detection of lateral object movements. Thus **Fringe 2013: 7th International Workshop on Advanced Optical - Google Books Result** Principles, Techniques, and Applications Myung K. Kim. 3. 4. 5. 6. 7. 8. 9. 10. of multiple objects by focus analysis in digital holography, Applied Optics 47, tracking by detecting sample displacement in real time, Opt. Lett. P. Ferraro, S. Grilli, and D. Alfieri, Extended focused image in microscopy by digital holography **Three dimensional object analysis and tracking by digital** In order to show the application potential of digital holographic autofocusing in and results from investigations on several amplitude and phase objects are reviewed. autofocus cell analysis non destructive testing automated 3D tracking.