

FINGERTIP FORCE MEASUREMENT BY IMAGING THE FINGERNAIL

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Abstract: Shear and normal forces from fingertip contact with a surface are measured by external camera images of the fingernail. Due to mechanical interaction between the surface, fingertip bone, and fingernail, regions of tension or compression are set up that result in reddening or whitening due to blood flow. The effect is quantitative enough to serve as a transducer of fingertip force. Due to individual differences, calibration is required for the highest accuracy. Automated calibration is achieved by use of a magnetically levitated haptic interface probe.

BRIEF BIOGRAPHY

John M. Hollerbach is Professor of Computing, and Research Professor of Mechanical Engineering, at the University of Utah. He also directs the Robotics Track, a joint graduate program between the School of Computing and Department of Mechanical Engineering. From 1989-1994 he was the Natural Sciences and Engineering/Canadian Institute for Advanced Research Professor of Robotics at McGill University, jointly in the Departments of Mechanical Engineering and Biomedical Engineering. From 1982-1989 he was on the faculty of the Department of Brain and Cognitive Sciences and a member of the Artificial Intelligence Laboratory at MIT; from 1978-1982 he was a Research Scientist. He received his BS in chemistry ('68) and MS in mathematics ('69) from the University of Michigan, and SM ('75) and PhD ('78) from MIT in Computer Science. He is presently the Vice President for Technical Activities of the IEEE Robotics and Automation Society, and Editor of the International Journal of Robotics Research.