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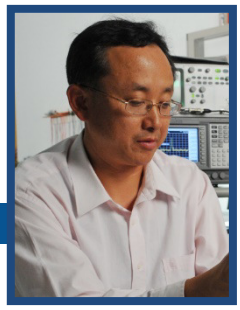

Microscale surface reconstruction by structure from motion for biological applications

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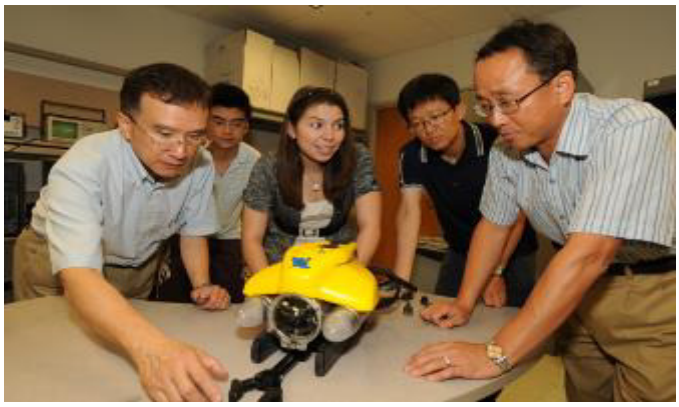
Abstract:

In this paper, we demonstrate a novel microscale surface reconstruction technology by Structure from Motion (SfM) for biological applications. Demands in 3D surface reconstruction of microscale parts for biological applications is ever increasing for molecular design, microscale geno/phenotyping, etc. In microscale photogrammetry, the confocal microscopic imaging technique has been the dominant trend. We propose a novel method to construct a 3D shape in microscale with less size limit of an object. Recently, the surface from motion (SfM) demonstrated reliable 3D reconstruction for macroscale objects. In this paper, we discuss the results of a novel micro-surface reconstruction method using the Surface from Motion in microscale. The proposed Micro SfM technique utilizes the photometric stereovision via microscopic photogrammetry. The main challenges lies in the scanning methodology, ambient light control, and light conditioning for microscale objects. Experiments with light sensitive aspects of the SfM in microscale has been shared and will be addressed in the paper..



Biography:

DUGAN UM achieved his PhD in the study of sensitive robotic skin for unknown environments motion planning. After he received his degree, he joined Caterpillar Inc. as a research engineer and worked for about 4 years at Caterpillar R&D group and Research Center. Currently he is teaching at Texas A&M University, Corpus Christi delivering his 4 years of engineering experiences into classes. His research areas include robotic motion planning, 3D sensing, Reinforce learning, and MEMS technology. He is currently an associate professor of Mechanical Engineering and Geospatial Computing Sciences, Texas A&M University at Corpus Christi, USA.