Qualitative As Well As Quantitative
Relative Orientation In Multi-media Photogrammetry

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Abstract: The conventional concept for photogrammetry is based on perspective projection, where the object point, corresponding image point and perspective center are known to lie on a same line. However, violations of collinearity occur when faced with a multi-media imaging situation, and the object-to-image geometry becomes more complicated. Based on previous work where the collinearity-based approached has been established, the authors in this study focus on analyzing how the relative orientation is affected by the factors including imaging geometry, refraction indices, interface patterns, model point distribution, constraints and uncertainty of measurement by formulating the associated functional as well as stochastic models. Results obtained from both simulation and experimental tests quantify the performance of relative orientation in multi-media photogrammetry and strongly suggest the necessity of imposing constraints in promoting the orientation, thus model point positioning quality.

Keyword : Multi-media, Photogrammetry, Relative orientation