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Master 2014

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GPU-based Evaluation of Centroid Detection Algorithm.

ABSTRACT - Masterthesis

Centroid estimation process has been a challenging task for wavefront sensors due to factors like noise, spot deviation and time. Many algorithms are proposed in literature which have their own advantages and disadvantages. This work presents Center of Gravity and Iterative Weighted Center of Gravity algorithms for centroid estimation. Center of gravity method is the fastest one in estimation when no noise is present in image, but when noise is introduced to image or the spot is deviated from center of wavefront, center of gravity method fails. These two drawbacks can be overcome by Iterative weighted center of gravity algorithm as it uses updated weighting function for estimation, but since it is an iterative process it is slow. In this work we presented parallel computing to reduce the estimation time for iterative weighted center of gravity method and also a thresholding function to reduce centroid estimation error. Results show that both proposals enhance the efficiency of iterative weighted center of gravity method.