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Automatic Pad Cleanness Detection using Fuzzy C-Means Clustering

Inner Tracking System (ITS) for ALICE (A Large Ion Collider Experiment) uses more than 24 thousands pixel chip detectors. Each chip composed of 103 pad detectors with thickness of 50 micro meters. To ensure the quality of the detectors, automatic visual chip inspection is needed to detect defects that happen during mass production and pickup. Several steps are performed for automatic visual inspection. First, Fourier based template matching is used to detect the position of the pad inside the image. After that, Fuzzy c-means (FCM) is used to cluster the presented on the pad found. The RGB information on each pixel is used as input for the FCM. The number of cluster defined for the FCM is 3 because each cluster will represent the die edge, the pad, and the defect. From the color of the cluster centers found, the defect is determined as the darkest color among the other clusters. From the experiment, it is shown that the proposed approach can achieve average accuracy of 90%.

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