

An improve augmented reality approach for stem in Early childhood learning via image processing

ABSTRACT

This study aims to improve Augmented Reality marker detection by using a combination of several techniques of digital image processing. The first objective is to improve the marker used by removing noise from the marker by using bilateral filtering, the second objective is to improve the contrast on the marker by using the Histogram Equalization technique, and the third objective is to develop a marker-based Augmented Reality that has a good quality with a combination of Bilateral filtering and Histogram Equalization. Five experiments were carried out: the MSE test, the PSNR test, the FAST corner detection test, the marker distance test with the camera, and lighting test. The results of the MSE and PSNR tests show that the improved marker has a higher quality compared to the original marker. For the FAST corner detection test, the improved marker has more points compared to the original marker, and the results for the marker distance test and the camera show that the improved marker can be detected up to 70 cm and 80 cm compared to the original marker. For the lighting test also shows that the improved marker can be detected in all different lighting compared to the original marker.