

ABSTRACT

Currently humans is very dependent on the digitization process because it allows human to transferring, archiving, editing, and duplication. As well as on emerging technologies today, namely 3D Laser Scanner technology. 3D Laser Scanner System is a technology that can perform the scanning process of real objects into the 3 dimensional digital model.

In this research, will design 3D Laser Scanner which involving several main components, which are red laser, camera, microcontroller, actuator, and computer. Camera, laser, and object placed with triangulation technique. Laser emitted to the object that is being rotating as much as one full cycle using actuators. During the rotation process of an object, the camera takes several images of the object. Then the color of the laser light is detected by looking at the maximum intensity in each row of pixels in the red layer in every frame. Each pixel detection results are then processed into the form of point coordinates x, y, z or pointcloud using trigonometry calculation. Pointcloud of each frame are combined into an array which is then reconstructed to form a 3-dimensional digital objects.

The performance of scanning result in this final project determined by comparing the similarity between the ratio of the size of the scanning results with the ratio of the size of the real object. The best results are obtained when the angle between the camera and the laser is 45° , where the ratio of each side of the cube object scanning results is 0.991: 1.003: 1 with the ratio of the size of the real object is 1: 1: 1, and then the ratio between the diameter and height of the tube scanning results is 1: 0680 with the original ratio is 1: 0667.

Keywords: 3D Laser Scanner System, Color detection, triangulation, embedded systems.