

Master 2014

Mohan Prasath Thirumalaisamy

Analysis and Implementation of Image De-noising Algorithms for Optical Inspection of Micro Components.

ABSTRACT - Masterthesis

In the recent decades, micro components play a vital role in so many fields like industrial automation, medical technology, etc. The requirements of micro components are very important and the production of micro components and the quality inspection processes play a vital role in the micro component industries. The project deals with such a micro component which is produced and they are now in the quality inspection process.

As the micro cups are 1 mm in diameter and it is not possible to check the dimensions of the cup through the eyes. So, we need a special microscope (Confocal laser microscope capture 2D/3D information) to capture the image of the micro cups and then to verify the dimensions of the micro cups. Due to Different factors, the images of the micro cups are noisy. The task is to remove the maximum amount of noise from the image without affecting the geometry of the micro cups.

The task here is to apply the appropriate filter to remove the noise from the image without changing the geometric properties of the object. There are many filters available to remove the noise from the image, here in this project, three filters are taken into consideration.

They are

- BM3D (Block Matching 3D Filter)
- Scale-Space and Edge Detection Using Anisotropic Diffusion and
- Bilateral filter

These three filters were taken into consideration for this project. Each filter was compared and analyzed in detail through MATLAB GUI and the suitable filter was considered for the project. In accordance with the project, the filter parameters and their influence to the noise reduction and change in geometry are investigated and evaluated.