

Glandular Shape Approximation in Colon Histology Images using MCMC

Khalid Masood

Department of Computer Science, University of Warwick, Coventry CV4 7AL, UK

1 Scope of the Work

Colon cancer is the second most common cancer and the most common cause of death, after the lung cancer, in the western and industrialized world. The disease can be treated very effectively if detected in its early stages. With so many improvements in the medical world, especially the drastic increase in the screening of cancer, there is a strong need for the development of automation techniques to support the manual diagnosis of the pathologists. The proposed technique is a step forward to a robust computer aided diagnosis for the patients of colon cancer.

2 Technical Contribution

Our approach is based on the idea that development of colon cancer alters the macroarchitecture of the tissue glands. The cancerous stimuli cause cells to adapt by altering their pattern of growth. This phenomenon results in the increase in the size of existing nuclei and also considerable increase in their number. The malignant tumor shows considerable variation in nuclei size and shape. Changes include the distortion in the shape of the tissue glands and change in the size and density of the collagen fibres. The number and size of nuclei of the malignant tissue increase considerably than normal tissue which results in the distortion of the glandular shape. Using Monte Carlo Markov Chain (MCMC), we focus on extraction of the glandular shape in colon histology images. In case of normal biopsies, it is possible to form a closed regular polygonal structure by connecting the gland nuclei in a sequential order. But in tumor cases, either the shape is distorted, resulting in irregular polygon, or there is no closed structure at all. Glandular shape extraction with MCMC is not only applicable for the diagnosis of colon cancer but it can also be used to classify histology images of prostate or breast.

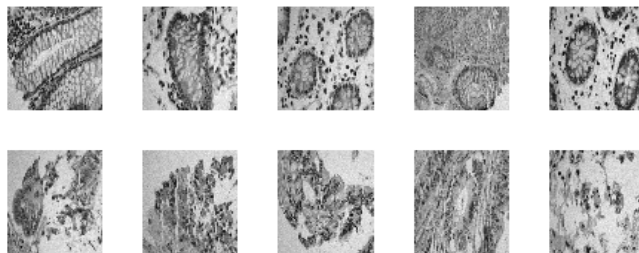


Figure 1. Colon Biopsy Images