

## Chapter 6

# Certain Investigation Titles on the Segmentation of Colon and Removal of Opacified Fluid for Virtual Colonoscopy

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### ABSTRACT

*Colorectal cancer (CRC) is a most important type of cancer that can be detected by virtual colonoscopy (VC) in the colon or rectum, and it is the major cause of death prevailing in the world. The CAD technique requires the segmentation of the colon to be accurate and can be implemented by two approaches. The first approach focuses on the segmentation of lungs in the computed tomography (CT) images downloaded from The Cancer Imaging Archive (TCIA) using clustering approach. The second method focused on the automatic segmentation of colon, removal of opacified fluid and bowels for all the slices in a dataset in a sequential order using MATLAB. The second approach requires more computational time, and hence, in order to reduce, the semiautomatic segmentation of colon was implemented in 3D seeded region growing and fuzzy clustering approach in MEVISLAB software. The approaches were implemented in multiple datasets and the accuracy were verified with manual segmentation by radiologist, and the importance of removing opacified fluid were shown for improving the accuracy of colon segments.*

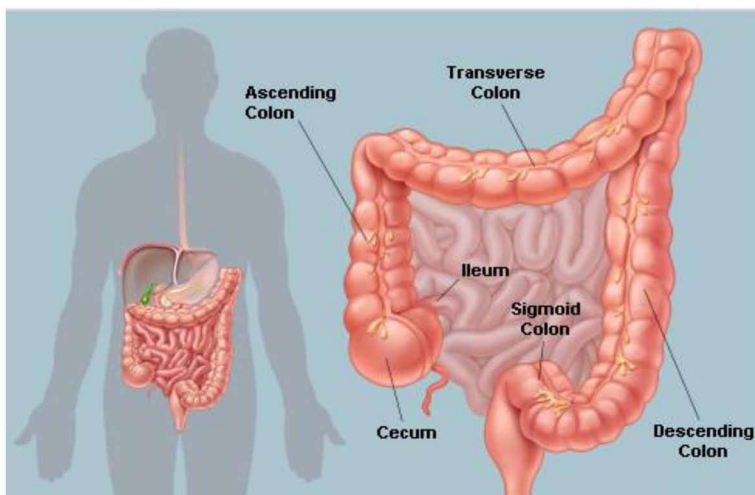
DOI: 10.4018/978-1-5225-5876-7.ch006

## INTRODUCTION

Colorectal Cancer (CRC) is a type of cancerous growth that develops in the colon or in the rectum, as shown in Figure 1. The Gastrointestinal (GI) system composed of colon and rectum are important parts of the digestive system. The probability of the occurrence of the cancer in the small intestine (bowels) is minimal when compared to the large intestine (colon), a muscular tube approximately 5 feet long in the region or in the rectum. The structure of the colon is comprised of four portions,

1. Ascending colon is located between a pouch called the cecum where the undigested food enters and the transverse colon. This branch of colon will extend upwards and terminate at a right colic flexure on the right side of the abdomen as shown in the Figure 1.
2. The transverse colon which is the longest part will bend downwards as it traverses from right to left for a short distance and it will bend upwards to form a U shaped curve. This part of the curve will finish below the spleen to form another flexure called splenic or left colic flexure.
3. The above section will be continued by the descending colon. As its name implies, this segment will descend from the splenic flexure to the lower level on the left side.
4. The fourth part is called the sigmoid colon for the reason that this segment will be of “S” shape; the sigmoid colon joins the rectum, which in turn will connect to the anus.

*Figure 1. Detailed Anatomy of the colon and rectum*



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