ABSTRACT

A major challenge in the latest computer-aided detection (CADe) of polyps in CT colonography (CTC) is to improve the false positive (FP) rate while maintaining detection sensitivity. Radiologists prefer CADe system produce small number of false positive detections, otherwise they might not consider CADe system improve their workflow. Towards this end, in this study, we applied a nonlinear regression model operating on CTC image voxels directly and a nonlinear classification

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INTRODUCTION

Colorectal cancer is the second leading cause of mortality due to cancer in the United States (Jemal et al., 2009; Mamonov, et al., 2014). Evidence has shown that the risk of colon cancer death could be reduced with early detection and removal of colonic polyps (Winawer et al., 1997). Fiberoptic (or optical) colonoscopy is considered the gold-standard diagnostic test as it offers direct biopsy or removal of suspicious colonic polyps (Winawer et al., 1997). However, optical colonoscopy is invasive, i.e., it has risks of complications such as perforation; it is expensive, and it requires a long examination time and creates high patient discomfort. Therefore, medical centers are seeking alternative techniques as population screening tools. CT colonography (CTC), also known as virtual colonoscopy, has been proposed as an alternative, less invasive technique for detecting colorectal neoplasms (Chaoui, Blake, Barish, & Fenlon, 2000; Coin et al., 1983; Johnson & Dachman, 2000; McKenna, et al., 2012; van Wijk, et al., 2010; Vining, 1997), which requires a lesser examination time and causes less patient discomfort. However, the sensitivity of CTC can be lower for inexperienced readers because there is a long learning curve for CTC reading. This
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