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Umit D Ulusar

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Recovery of Gastrointestinal Tract Motility Detection Using Naive Bayesian and Minimum Statistics

Umit D Ulusar
Akdeniz University, Antalya, TURKEY

Address correspondence to: Umit D. Ulusar, Ph.D.,
Computer Engineering Department, Engineering Faculty, Akdeniz University, 07058, Kampus, Antalya, Turkey
Phone: +90 242 310 6382
E-mail: umitulusar@akdeniz.edu.tr

Abstract

Loss of gastrointestinal motility is a significant medical setback for patients who experience abdominal surgery and contributes to the most common reason for prolonged hospital stays. Recent clinical studies suggest that initiating feeding early after abdominal surgery is beneficial. Early feeding is possible when the patients demonstrate bowel motility in the form of bowel sounds (BS). This work provides a data collection, processing and analysis methodology for detection of recovery of gastrointestinal track motility by observing BSs in auscultation recordings. The approach is suitable for real-time long-term continuous monitoring in clinical environments. The system was developed using a Naive Bayesian algorithm for pattern classification, and Minimum Statistics and spectral subtraction for noise attenuation. The solution was tested on 59 hours of recordings and 94.15% recognition accuracy was observed.

Keywords: Bowel sound, Electronic stethoscope, Real-time monitoring, Naive Bayesian, Kernel density estimation