

## Design of Cylindrical Crawler Robot Inspired by Amoeba Locomotion

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**Abstract :** Recently, the need of colonoscopy is increasing because of the rise of colonic disorder including cancer of the colon. However, current colonoscopy depends on doctor's skill strongly. Therefore, a large intestine endoscope that does not depend on the techniques of a doctor with high safety is required. In this research, we aim at development a novel large intestine endoscope that can realize safe insertion without specific techniques. A wheel movement type robot, a snake-like robot and an earthworm-like robot are all described in the relevant literature as endoscope robots that are currently studied. Among them, the tracked crawler robot can travel by traversing uneven ground flexibly with a crawler belt attached firmly to the ground surface. Although conventional crawler robots have high efficiency and/or high ground-covering ability, they require a comparatively large space to move. In this study, a small cylindrical crawler robot inspired by amoeba locomotion, which does not need large space to move and which has high ground-covering ability, is proposed. In addition, we developed a prototype of the large intestine endoscope using the proposed crawler mechanism. Experiments have demonstrated smooth operation and a forward movement of the robot by application of voltage to the motor. This paper reports the structure, drive mechanism, prototype, and experimental evaluation.

**Keywords :** tracked-crawler, endoscopic robot, narrow path, amoeba locomotion.

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