

Revitalization Center



Makoto Yashiro
Professor



Hiroyuki Saito
Senior Associate Professor



Keita Nakamura
Associate Professor



Jun Ogawa
Associate Professor

Refereed academic journal

[ogawa-409-078-01:2017] T. Matsumoto., Y. Oyama., J Ogawa., K. Nakamura., and K. Naruse. Mechanism of generating drawbar pull of rod wheel on loose soil. *Artificial Life and Robotics*, 22(4):503–508, Dec. 2017.

In this paper, we propose a model of drawbar pull generated by wheels fitted with a rod and assess it by comparing measured values obtained from an experiment with those from the model. In recent years, many kinds of robots for weeding in paddy fields have been developed. However, almost all of these are large and heavy. We have previously developed a small, lightweight robot for weeding. This robot is equipped with a rod wheel that has roles of weeding and running. However, this wheel was developed by experience from demonstrations and its dynamics for control remain unknown. To solve this problem, we propose a new model for drawbar pull generated by rod wheels and evaluate it by comparing experimental values with those from the model.

Refereed proceedings of an academic conference

[keita-n-409-078-01:2017] K.Nakamura and T.Fujisawa. Music recommendation system using lyric network. In *Proceedings of 2017 IEEE 6th Global Conference on Consumer Electronics*, 2017.

This paper proposes the method to recommend music using lyric network. This method corresponding to more than thousands of musics. The authors focus each lyric of the music. Keywords representing music are extracted from its lyric by combining TF-IDF method and principle of discriminant analysis. Lyric network is generated based on extracted keywords. The connection of generated network can recommend other musics. Numerical experiment is carried out in order to analyze the lyric network constructed by the proposed method and investigate the effect on music recommendation. Experimental result shows the extraction for collection of musics whose lyrics are similar.

[ogawa-409-078-02:2017] J. Ogawa., M. Taira., K. Nakamura., and K. Naruse. Cellular Automaton Approach for Motion Pattern Analysis of Soft-bodied Agent. In *Proceedings of The 1st International Conference on Digital Practice for Science, Technology, Education, and Management*, Mar. 2018.

Soft-bodied agent (SBA) with ambiguous boundary between driving part and

body such as gel robot is expected to give action that can not be realized by conventional robot composed of metal parts in the field of soft robotics. There is a high degree of freedom in the arrangement of the drive system embedded in the soft body, however, there is no study to verify what kind of motion the agent is generated and how motional feature the agent is classified through these soft body. This paper discusses a motion pattern of soft-bodied agent by using one-dimensional cellular automaton through an elastic robot simulation by using voxel model. A one-dimensional cellular automaton (CA) is an approach that can classify temporal evolution of a state into four classes such as an ordered state and a chaotic state by using a discrete calculation model by a simple rule. We design an agent chemically bonded vibration motor and hard gel-like body in an virtual space and give an The volumetric vibration pattern of sine wave determined by CA into voxels as actuator in the body. As the result, we indicate that an ordered class and a chaos class give the chaotic behavior to the agent without an external noise, and we discuss that the chaos behavior

- [ogawa-409-078-03:2017] K. Nakamura., D. Kai., K. Mineta., J. Ogawa., and K. Naruse. Improvement for 3D Reconstruction Considering Passive Rotation by Towing Camera. In *Proceedings of The 1st International Conference on Digital Practice for Science, Technology, Education, and Management*, Mar. 2018.
- [ogawa-409-078-04:2017] F. Abe., J. Ogawa., K. Nakamura., and K. Naruse. Stable Pulling Out Strategy for Small Disaster Response Robot with Dual-arm. In *Proceedings of the 23rd International Symposium on Artificial Life and Robotics*, Jan. 2018.
- [ogawa-409-078-05:2017] H. Nakazawa., J. Ogawa., K. Nakamura., and K. Naruse. Robot Sweep Path Planning with Weak Field Constrains under Large Motion Disturbance. In *Proceedings of the SWARM 2017*, 2017.
- [ogawa-409-078-06:2017] K. Naruse., K. Hamatani., J. Ogawa., and K. Nakamura. Distributed Localization by Camera Robots with Consensus Filter. In *Proceedings of the SWARM 2017*, 2017.

Unrefereed proceedings of an academic conference

- [ogawa-409-078-07:2017] S. Kaminokado., J. Ogawa., K. Nakamura., and

Summary of Achievement

- K. Naruse. Simultaneous measurement system of position and orientation using Dual RTK-GNSS. In *The Spring Conference on Precision Engineering 2018*, 2018.
- [ogawa-409-078-08:2017] D. Yoshino., Y. Watanobe., Y. Yaguchi., K. Nakamura., J. Ogawa., and K. Naruse. Proposal of Pub / Sub message communication interface using RT-Middleware bridge between Message Brokers. In *SICE SI 2017*, 2017.
- [ogawa-409-078-09:2017] H. Nakazawa., Jun Ogawa., K. Nakamura., and K. Naruse. Probabilistic re-route planning for robots whose movement by environment is uncertain. In *SICE SI 2017*, 2017.
- [ogawa-409-078-10:2017] F. Abe., J. Ogawa., K. Nakamura., and K. Naruse. A drawing strategy considering sudden rotation center change for a dual arm robot. In *SICE SI 2017*, 2017.
- [ogawa-409-078-11:2017] J. Ogawa., K. Nakamura, and K. Naruse. Biological expression by coupled oscillator system of fixed topology. In *SICE SI 2017*, 2017.
- [ogawa-409-078-12:2017] J. Ogawa., M. Taira., K. Nakamura., and K. Naruse. Crawler Robot Simulation by using Elastic Voxels. In *The Autumn Conference on Precision Engineering 2017*, Sep. 2017.
- [ogawa-409-078-13:2017] F. Abe., K. Nakamura., J. Ogawa., and K. Naruse. Gripping Point Suggestion of Target Object by Ellipse detection Using Hough Translatefor Large Scale Remote Control Robot. In *2017 JSME Conference on Robotics and Mechatronics*, May. 2017.
- [ogawa-409-078-14:2017] T. Matsumoto., Y. Ooyama., J. Ogawa., K. Nakamura., and K. Naruse. Modeling of Generating Driving Force Mechanism for Rod WheelInteracting with Particles in the Soil. In *2017 JSME Conference on Robotics and Mechatronics*, May. 2017.
- [ogawa-409-078-15:2017] H. Nakazawa., Jun Ogawa., K. Nakamura., and K. Naruse. The Proposal of Path Planning for Sweeping Robot with Movement Instability. In *2017 JSME Conference on Robotics and Mechatronics*, 2017.

[ogawa-409-078-16:2017] Y. Ooyama., T. Matsumoto., K. Nakamura., J. Ogawa., and K. Naruse. Modeling of bulldozed soil volume by rod wheel considering interaction by soil particles. In *2017 JSME Conference on Robotics and Mechatronics*, May. 2017.

Academic society activities

[keita-n-409-078-02:2017] K.Nakamura, 2017.

Japan Society for Precision Engineering (JSPE) Affiliate

[keita-n-409-078-03:2017] K.Nakamura, 2017.

Member of public relations & information committee in Japan Society for Precision Engineering (JSPE)

[keita-n-409-078-04:2017] K.Nakamura, 2017.

Homepage & Public relations, ROBOMECH2017 Organizing Committee

Others

[keita-n-409-078-05:2017] K.Nakamura. Introduction of traveling salesman problem and its extended problem, 2017.

Invited talk at The 6th Workshop of Sustainable / Robotics System Design