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Conference organized by:

This conference is dedicated to educators all over the world and to the members of the Research Forum for Applied Sciences Engineering and Technology (RFAET) whose passion for teaching, learning, research, and service are helping to transform the academy in many positive ways.

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Research Forum for Applied Sciences Engineering and Technology

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Welcome Message

The Research Forum for Applied Sciences Engineering and Technology (RFAET) welcomes you to the International Conference on Computer Software, Engineering, Information Technology, Aerospace and & Nuclear Engineering (CEAN).

We are happy you decided to join your colleagues from around the world to explore innovative technologies, pioneering pedagogical strategies, and a sampling of international collaborations that are being used to engage and retain students, researchers and Scholars in the new millennium.

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The organizing committee would like to thank all those people who were involved in making the conference a success. A great amount of planning and organizing is required to hold a successful conference, so we are indebted to those who volunteered their time and energy.

We want to thank all the members of the Research Forum for Applied Sciences Engineering and Technology (RFAET) who volunteered their time to help organize the conference.

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Conference Description

Research Forum for Applied Sciences Engineering and Technology (RFAET) provides an excellent venue for generating ideas. Conference participants will explore the latest trends, practices, and research in engineering technology and Applied Sciences tracks. The program will emphasize experimentation and pushing the boundaries of higher education.

ENGINEERING TECHNOLOGY

Acoustical Engineering Aerospace Engineering, Agricultural Engineering Biological Engineering and Sciences, Biological Systems Engineering Biomedical Engineering, Bioprocess Engineering Biotechnology, Building Services Engineering Chemical Engineering, Industrial Engineering Information Engineering, Informational Technology Manufacturing Engineering and Technology, Materials Engineering Mechanical Engineering, Mechatronics Nanotechnology and Nanoengineering, Naval Engineering Nuclear Engineering, Technology for Cloud Computing Technology for Community, Technology for Digital Age Technology for Human Use, Technology for Learning Civil Engineering, Computer Engineering Current issues and challenges in Engineering, Electrical Engineering Electronic Engineering, Energy Engineering Environmental Engineering, Food Engineering Genetic Engineering, Geotechnical Engineering Ocean Engineering and Technology, Optical Engineering Petroleum Engineering, Power Engineering Process Engineering, Resource Engineering Sensing Technology, Structural Engineering Systems and Software Engineering, Technology for Big Data Textile Engineering, Thermal Engineering Transport Engineering, Web Engineering Vehicle Engineering

APPLIED SCIENCES

Artificial Intelligence, Architecture, Astronomy, Biological Sciences, Botany, Chemistry, Design, Earth Science, Ecology, Marine Science, Physics, Space Sciences, Life sciences, Computer Sciences, Logic, Mathematics, Statistics, Systems Science, Electrical Engineering, Information, Technology, Industrial Engineering, Mechanical Engineering, Applied Physics, Health Sciences and Medicine, Ceramic Engineering, Computing Technology, Electronics, Energy, Environmental Engineering Sciences, Engineering physics, Environmental Technology, Fisheries Science, Forestry Science, Materials Engineering Micro technology, Nanotechnology, Nuclear, Technology, Optics, Zoology Transportation

Conference Awards

Best Paper Awards
The Organizing Committee will select the best paper considering the recommendations of the Scientific Review Committee based on the relevance to the theme, academic contribution, accuracy of the methodology, clarity of contents.

Best Presentation Awards – Sessions
The best presenter in each session will be selected considering the scientific quality, contents, time management, presentation style and level of interaction with the audience. The best presenter in each session will get a certificate.

Best Presentation Awards – Students
These awards will be awarded the best presenters selected from the PhD or Master level students' presenters. The selection criteria will be scientific quality, contents, time management and presentation style.

Track: Engineering, Technology, Computer and Applied Sciences

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Proposal of Pneumatic Drive Active Mattress for Pressure Ulcer Prevention and Transfer

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Recently, due to the progress of the aging society, the number of bedridden elderly increases remarkably. The disables who suffer from severe physical disabilities due to illness are also increased. Based on these situations, to prevent pressure ulcers, it is necessary to change their body position. The work for body position change is very important, however it increases the mental and physical burden for care workers. In this study, an active mattress using Tetrahedral-shaped flexible pneumatic actuators (TFAs) that can automatically change patient's attitude and transfer on the bed was proposed and tested, to prevent pressure ulcers and support for bed transfer. We also proposed and tested a multi-layer compact valve unit to realize a compact pneumatic drive unit. As a result, we confirmed that the object can be transported by using the method to give the bending motion after lifting it.

Index Terms: Tetrahedral-shaped flexible pneumatic actuator, Active mattress, Pneumatic drive system, Compact valve

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Proposal of Small-sized Six-legged Mobile Robot Using Tetrahedral-shaped Flexible Pneumatic Actuators

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In the previous study, as the purpose of training the trunk while playing games, the six-legged mobile robot using Tetrahedral-shaped Flexible pneumatic Actuators (TFAs) that can translate and rotate like a movable cushion was developed. In the report, in order to increase the carrying force per unit plane area of the robot, a miniaturized TFA was proposed and tested. The generated lifting force of the improved TFA was investigated. We confirmed that the generated lifting force of the improved TFA increased because of improved stiffness based on miniaturization. A small-sized six-legged mobile robot using improved TFAs and a compact pneumatic drive system was also proposed and tested. As a result, we confirmed that the tested small-sized mobile robot can translate and rotate smoothly even if the lifting force of the robot was increased compared with the previous one.

Index Terms: Extension type flexible pneumatic actuator, Tetrahedral-shaped flexible pneumatic actuators, Six-legged mobile robot

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Proposal of Delay type Multi-legged Pneumatic Drive System Using Soft Actuators with Compressed Choke Device

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A pneumatic actuator requires a control valve for each pressure chamber. A multi-legged robot with a synchronized motion requires many valves. In many cases, each leg of a multi-legged robot performs the same motion with different phase. By delaying the actuator's motion with various phases, the number of valves can be reduced to less than the number of pressure chambers to drive the multi-legged robot. In this study, a pneumatic soft actuator with a compressed choke device that can extend later after bending for only one valve operation was proposed and tested. We also report the development of a six-legged robot that six legs are driven by a small number of valves by using external compressed choke devices in a series-connected extension type flexible pneumatic actuators.

Index Terms: External compressed choke device, Delay type multi-legged drive system, Bending/extension type pneumatic soft actuator, Extension type Flexible Pneumatic Actuator

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Proposal of Dual-Arm type Extension/Bending Mechanism Using Extension Type Flexible Pneumatic Actuators for Rehabilitation Device of Upper Limbs

Masataka Shirakura [1*], Tetsuya Akagi [2], Shujiro Dohta [3], Takashi Shinohara [4], Feifei Cho [5], Masashi Yokota [6]
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Recently, rehabilitation devices using soft actuators have been actively research and developed. In the previous study, a flexible Pneumatic Linear Stepping Actuator (PLSA) that can perform a long stroke motion with large force was proposed and tested. The actuator can push and pull the rigid rod by switching the holding position of the rod, and it can change the direction of the rod by extension/bending mechanism using Extension type Flexible Pneumatic Actuators (EFPAs). In this report, based on the previous study about PLSA, a dual-arm type extension/bending mechanism that can give a passive exercise for upper limbs while grasping top ends of both robot arms is proposed and tested. A simple control system using fewer valves to control an attitude of both mechanisms according to commands through Bluetooth is also proposed and tested. The attitude control of the tested mechanism is also reported.

Index Terms: Extension/bending mechanism, Extension type flexible pneumatic actuator, Simple attitude control system, Embedded controller

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Proposal of Flexible Pneumatic Linear Stepping Actuator with Continuous Pushing/Pulling Mechanism in Bending Motion

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Recently, rehabilitation devices using soft actuators have been actively researched. In the device, soft actuators with long stroke motion and large force are required. In the previous study, a flexible pneumatic linear stepping actuator (PLSA) that can perform a long stroke motion with large force was proposed and tested. The PLSA can push and pull the rigid rod by switching the holding position of the rod. The prototype of PLSA could give passive exercise to upper limbs while a user grasps the end of the rod in the operation. However, it was difficult for the previous PLSA to perform the push/pull motion continuously. In this study, we proposed and tested an improved PLSA that can continuously push and pull the rod while changing the direction of the rod. The improved PLSA consists of a rod, three pneumatic chucks for rod, a serial connected two pushing/pulling mechanisms and a bending mechanism. The pushing/pulling mechanism and bending mechanism are consist of six extension type flexible pneumatic actuators (EFPAs) that are arranged in parallel in a cylindrical shape. The control system using an embedded controller and eleven on/off valves was also proposed and tested. As a result, it can be confirmed that the improved actuator (PLSA) can realize continuous pushing/pulling motion of the rod while the bending direction of the rod is changing.

Index Terms: Continuous Pushing/Pulling Mechanism in Bending Motion, Flexible Pneumatic Linear Stepping Actuator, Remote Control through Bluetooth, Extension type Flexible Pneumatic Actuator

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Proposal of Analytical Model of Flexible Pneumatic Spherical Actuator for Open-looped Attitude Control

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According to the progress of aging society, the pneumatic soft actuators with human friendly such as welfare support equipment and VR equipment have been developed. In the previous study, a flexible pneumatic spherical actuator (FPSA) that could give passive exercise to patients while grasping the top end of FPSA in motion was proposed and tested. The FPSA consists of three extension-type flexible pneumatic actuators (EFPAs) restrained by PET sheets to make a rugby ball shape. We also developed a non-contact type bending/extension sensor that consists of a hall sensor and a ring-shaped magnet. It was proposed for simply measuring bending angle of FPSA without knowing the whole shape. In this report, we propse an analytical model of FPSA that can calculate the whole shape of FPSA for various input pressure to three EFPA for open-looped attitude control. The proposed analytical model mainly focuses on simulating the behavior of the FPSA under no-load conditions and no disturbance. As a result, it can be confirmed that the calculated attitude of FPSA using the proposed model almost meets the behavior of the actual FPSA.

Index Terms: Analytical Model for Attitude Control, Flexible Pneumatic Spherical Actuator, Extension type Flexible Pneumatic Actuator

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