

Title:

Development of Pipe Inspection Robot using Soft Actuators, Microcontroller and LabVIEW

Journal:

International Journal of Advanced Computer Science and Applications, Volume 13, Issue 3, 2022.

Document Type:

Article

Authors:

Mohd Aliff, mohdaliff@unikl.edu.my

Mohammad Imran,

Sairul Izwan, sairulizwan@unikl.edu.my

Mohd Ismail, mohdismaily@unikl.my

Nor Samsiah,

Tetsuya Akagi,

Shujiro Dohta,

Weihang Tian,

So Shimooka,

Ahmad Athif.

Full text link:

Publisher :

<https://thesai.org/Publications/ViewPaper?Volume=13&Issue=3&Code=IJACSA&SerialNo=43>

Scopus preview:

[https://www.scopus.com/inward/record.uri?eid=2-s2.0-](https://www.scopus.com/inward/record.uri?eid=2-s2.0-85129760444&doi=10.14569%2fIJACSA.2022.0130343&partnerID=40&md5=025482c2372e8e82887bebd50f8e4202)

[85129760444&doi=10.14569%2fIJACSA.2022.0130343&partnerID=40&md5=025482c2372e8e82887bebd50f8e4202](https://www.scopus.com/inward/record.uri?eid=2-s2.0-85129760444&doi=10.14569%2fIJACSA.2022.0130343&partnerID=40&md5=025482c2372e8e82887bebd50f8e4202)

Abstract:

Pipeline transportation is particularly significant nowadays because it can transfer liquids or gases over a long distance, usually to a market area for use, using a system of pipes. The pipeline's numerous fittings, such as elbows and tees, as well as the various sizes and types of materials utilized, make routine inspection and maintenance challenging for the technician. Therefore, the compact and portable pipe inspection robots with pneumatic actuators are required for use in industry especially in hazardous areas. Flexible pneumatic actuators with clean and safe pneumatic energy have high mobility to move in complex pipelines. High safety features such as no oil or electrical leakage, which would be dangerous if used in an explosive environment are a major factor it is widely used nowadays. As a result, the goal of this study is to propose and present the development of pipe inspection robot that employ soft actuators and are monitored by LabVIEW for usage in a variety of pipe sizes and types. This research focuses on the movement of robots in the pipeline by proposing some important mechanisms such as sliding mechanism, holding mechanism, and bending unit to move easily and effectively in the pipeline. Experiments show that with an appropriate pneumatic pressure source of 4 bar, a flexible robot using the soft pneumatic actuator can bend and move in a 2-inch diameter pipe smoothly and efficiently. It has been discovered that the proposed mechanism may readily travel pipe corners while bending in any required direction.