Accepted Manuscript

Title: Robust and High-Performance Soft Inductive Tactile Sensors based on the Eddy-Current Effect

Authors: Hongbo Wang, Jun Wai Kow, Nicholas Raske, Gregory de Boer, Mazdak Ghajari, Robert Hewson, Ali Alazmani, Peter Culmer

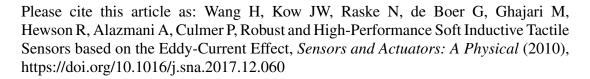
PII: S0924-4247(17)31785-5

DOI: https://doi.org/10.1016/j.sna.2017.12.060

Reference: SNA 10547

To appear in: Sensors and Actuators A

Received date: 10-10-2017 Revised date: 27-12-2017 Accepted date: 27-12-2017



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

Robust and High-Performance Soft Inductive Tactile Sensors based on the Eddy-Current Effect

Hongbo Wang^{a, b,}1, Jun Wai Kow^a, Nicholas Raske^c, Gregory de Boer^a, Mazdak Ghajari^d, Robert Hewson^c, Ali Alazmani^a, and Peter Culmer^a

 $Email \ address: \ \underline{ustcwhb@gmail.com} \ (H.W.), \ \underline{el11jwk@leeds.ac.uk} \ (J.K.), \\ \underline{n.raske@imperial.ac.uk} \ (N.R.), \ \underline{G.N.deBoer@leeds.ac.uk} \ (G.B.), \ \underline{m.ghajari@imperial.ac.uk} \ (M.G.), \\ \underline{r.hewson@imperial.ac.uk} \ (R.H.), \ \underline{A.Alazmani@leeds.ac.uk} \ (A.A.), \ \underline{P.R.Culmer@leeds.ac.uk} \ (P.C.).$

1Correspondence: <u>ustcwhb@gmail.com</u>, <u>hongbo.wang@iit.it</u>, Dr Hongbo Wang is currently at the Center for Micro-BioRobotics of the Istituto Italiano di Tecnologia (IIT), Pontedera, 56025, Italy.

Highlights

- The first Soft Inductive Tactile Sensor (SITS) is proposed.
- Working principle and design methodology of SITS are discussed.
- A SITS prototype achieves a resolution of 0.82 mN in a range of over 15 N.
- The presented SITS can operate in water or other harsh environments.
- The SITS systems are low cost, durable, low hysteresis, and high performance.

Abstract

Tactile sensors are essential for robotic systems to interact safely and effectively with the external world, they also play a vital role in some smart healthcare systems. Despite advances in areas including materials/composites, electronics and fabrication techniques, it remains challenging to develop low cost, high performance, durable, robust, soft tactile sensors for real-world applications. This paper presents the first Soft Inductive Tactile Sensor (SITS) which exploits an inductance-transducer mechanism based on the eddy-current effect. SITSs measure the inductance variation caused by changes in AC magnetic field coupling between

1

^a School of Mechanical Engineering, University of Leeds, Woodhouse Lane, Leeds, LS2 9JT, UK

^b Center for Micro-BioRobotics, Istituto Italiano di Tecnologia (IIT), Viale Rinaldo Piaggio 34, Pontedera 56025, Italy

^c Department of Aeronautics, Imperial College London, South Kensington Campus, London, SA7 2AZ, UK

^d Dyson School of Design Engineering, Imperial College London, 10 Princes Gardens, London, SA7 1NA, UK

Download English Version:

https://daneshyari.com/en/article/7133655

Download Persian Version:

https://daneshyari.com/article/7133655

<u>Daneshyari.com</u>