A Tip-Extending Soft Robot Enables Reconfigurable and Deployable Antennas

ABSTRACT

Antennas are essential in wireless communications and powering systems. Applications such as search and rescue and space exploration would greatly benefit from antenna reconfigurability, as well as antenna deployment from a compact and easy-to-transport form. To achieve desired operating frequencies, return loss data from the antenna was used as feedback in a closed-loop system to control the antenna configuration. Our monopole supports a frequency tuning range that spans from 0.4 to 2 GHz and can tune between two target frequencies in approximately one second. We also show that the addition of branching and integrated actuators can be used to generate more complex and diverse antenna shapes. Branching is implemented in a model Yagi-Uda antenna and we explore the integration of pull cable actuators and pneumatic actuators with a model helical antenna.

EXISTING SYSTEM

- An alternative to traditional mechanical design exists in the emerging field of soft robotics.
- Soft robots have continuous, deformable bodies with infinite degrees of freedom that allow them to bend and twist with high curvatures to adapt to their surroundings.
- Additionally, the robots are cheap, lightweight, and portable due to the thin-walled, inflatable structure.

PROPOSED SYSTEM

- In this paper, that soft robots can be used to construct reconfigurable and deployable electromagnetic structures capable of effectively controlling operating frequency.
- Integrating soft robots with long-established electromagnetic devices, like antennas, offers a novel, low-cost solution for creating 3D RF devices that are reconfigured mechanically.
- Tip-extending robots can grow to many times their initial size, allowing frequency selectivity over many orders of magnitude.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

- Processor - intel core i3
- RAM 2GB
- Hard Disk

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SOFTWARE REQUIREMENTS:

SS(High Frequency Structure Stimulator) Anso

20 **GB**

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