



A Biologically Inspired Soft Robotic Antenna for Insect-like Robots

SKY



Engineering Accreditation Commission

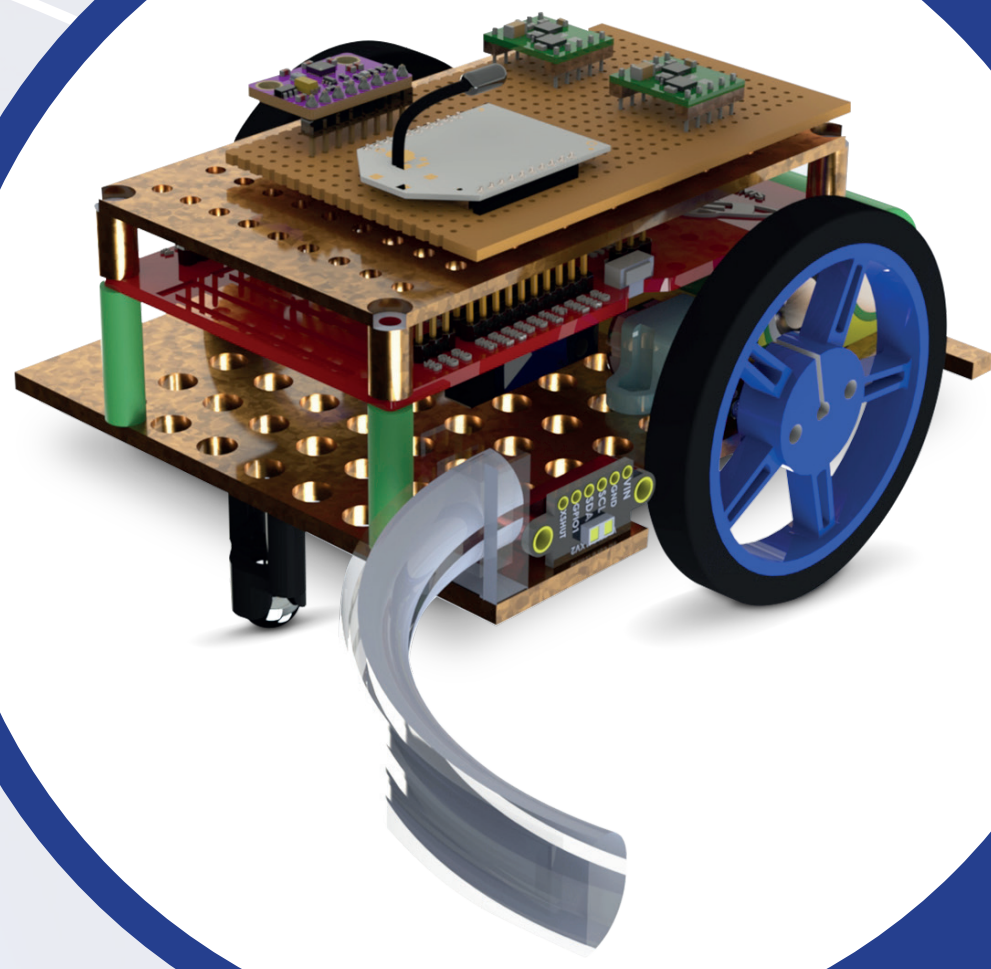
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INTRODUCTION

In this study, a soft robotic sensor with twist and strain sensing properties was manufactured for use in insect-type robots. When producing a soft robotic sensor, a rigid robotic structure has been designed that is inspired by the movement of the cockroach and the interaction of its sensor with its surroundings and can perform wall tracking using this soft robotic sensor.

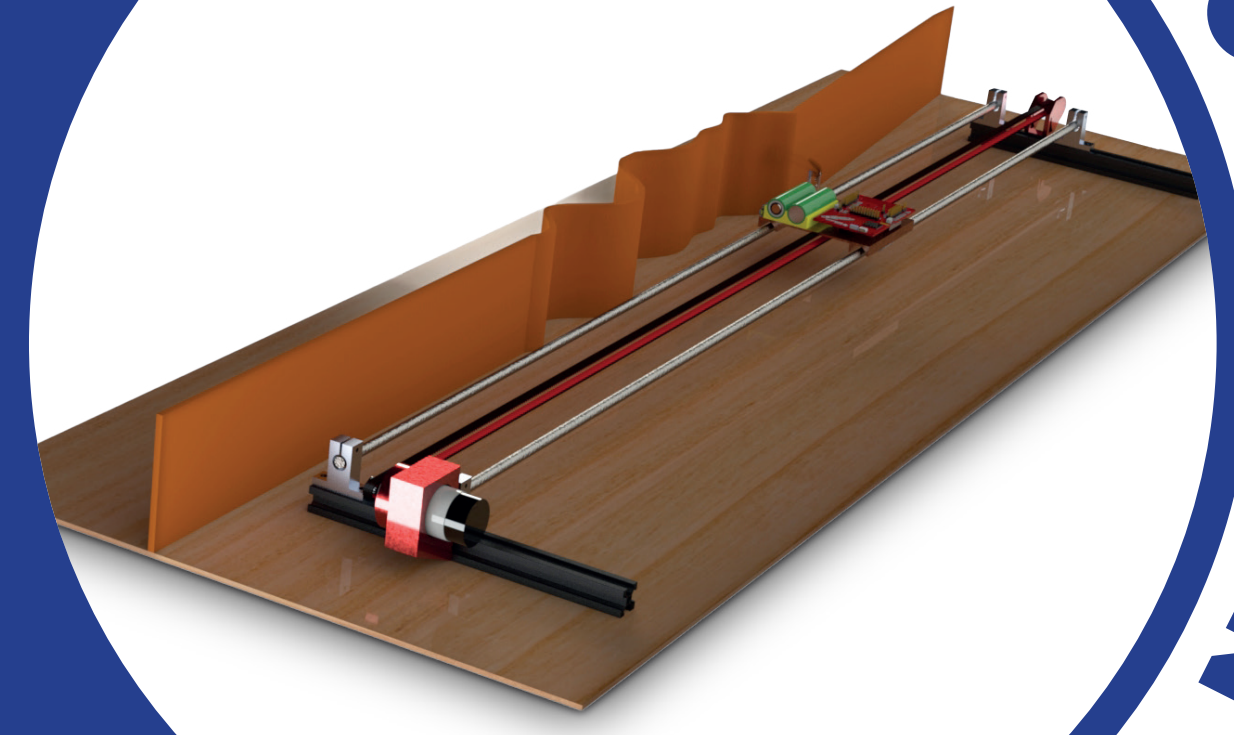
Keywords – soft robotic antennae; soft bending sensor; soft strain sensor; wall following; bio-inspiration

ROBOT DESIGN

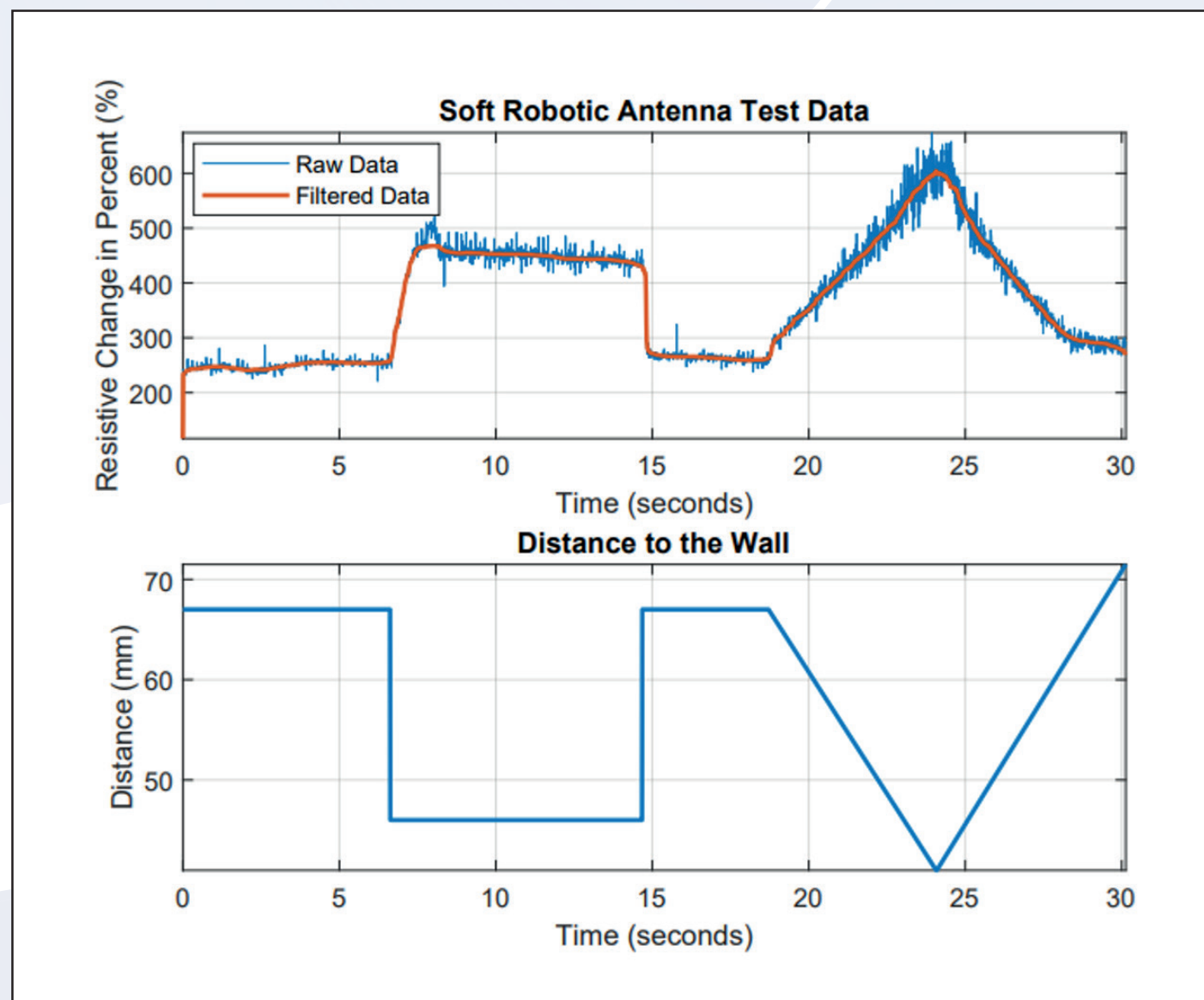


Robot designs that aim to provide solutions to problems by imitating or being inspired by systems found in human nature are called biotachlite robots. Inspired by the sensitivity of the cockroach (*Periplaneta americana*), which stands out with its wall tracking ability, a biotachlite robot capable of wall tracking has been designed. The designed robot performs wall tracking with a fixed distance using a soft robotic sensor. The tracking algorithm in question was carried out with a closed-loop control using distance data obtained from the sensor.

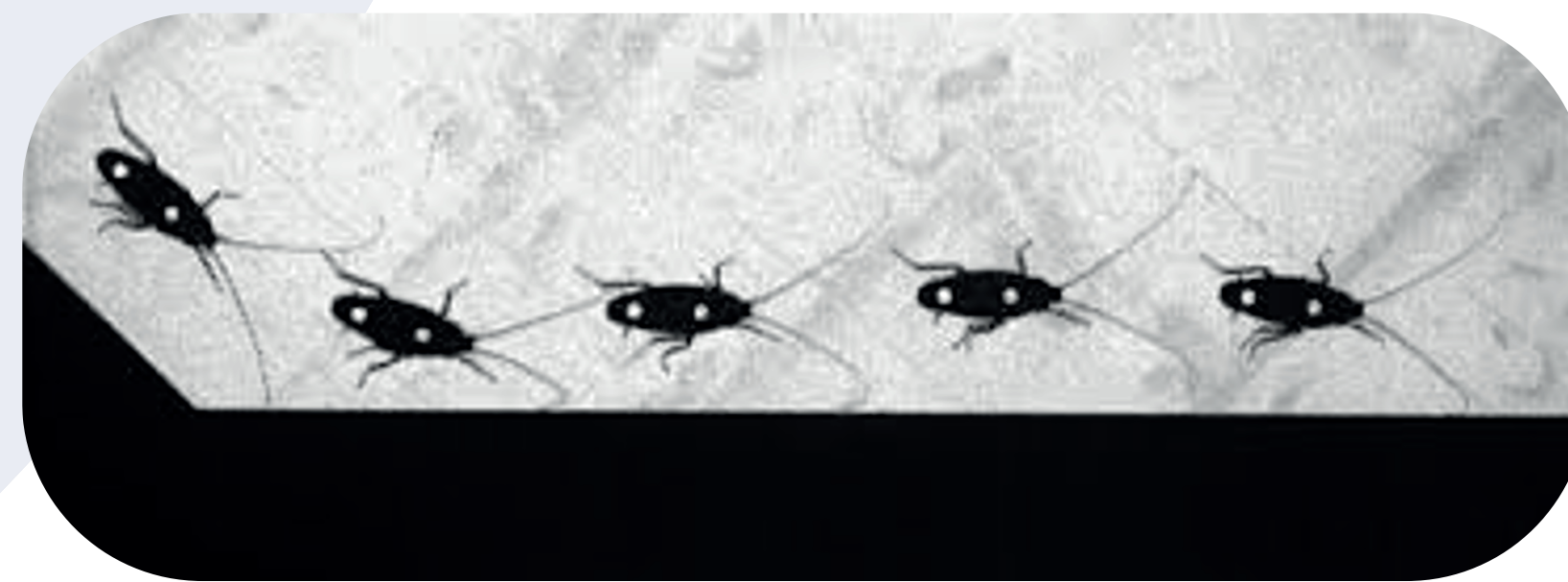
SOFT SENSOR PRODUCTION



Studies have been conducted on sensors designed from soft-based materials to capture mechanical signals that arise as a result of tactile sensing or interaction with the environment, to measure strain and bending. In this context, as an alternative to industrial sensors, a soft robotic sensor whose electrical resistance varies according to twisting and/or strain movements has been manufactured by injecting industrial carbon grease into a silicone rubber base structure.



As a result of the test, a constant resistance change was observed from the moment of start, corresponding to a constant wall distance.



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