A Biologically Inspired Insect-like Robot with Soft Robotic Antennae

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TÜBİTAK
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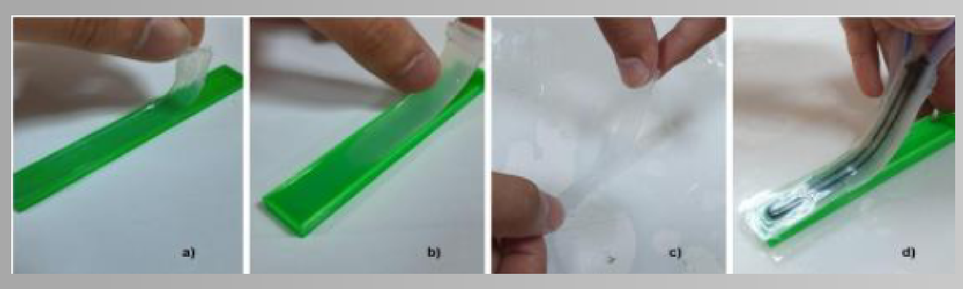
Objective

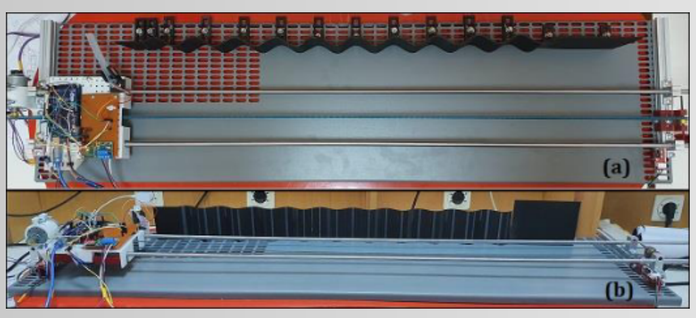
Bug algorithm implementation with soft sensors by an autonomous wheeled robot.

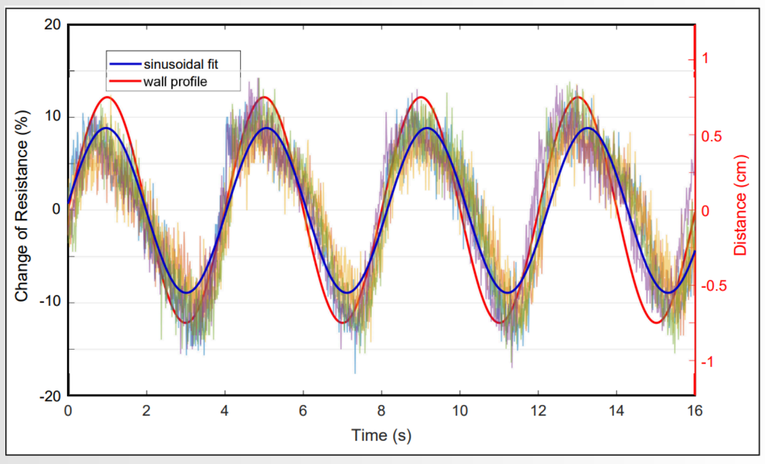
Innovation

- Cockroach(*Periplana Americana*) wall following inspired homemade, low-cost, short-range distance perceptive SOFT sensor.
- Bug algorithm implementation with soft sensors

Sensor Design

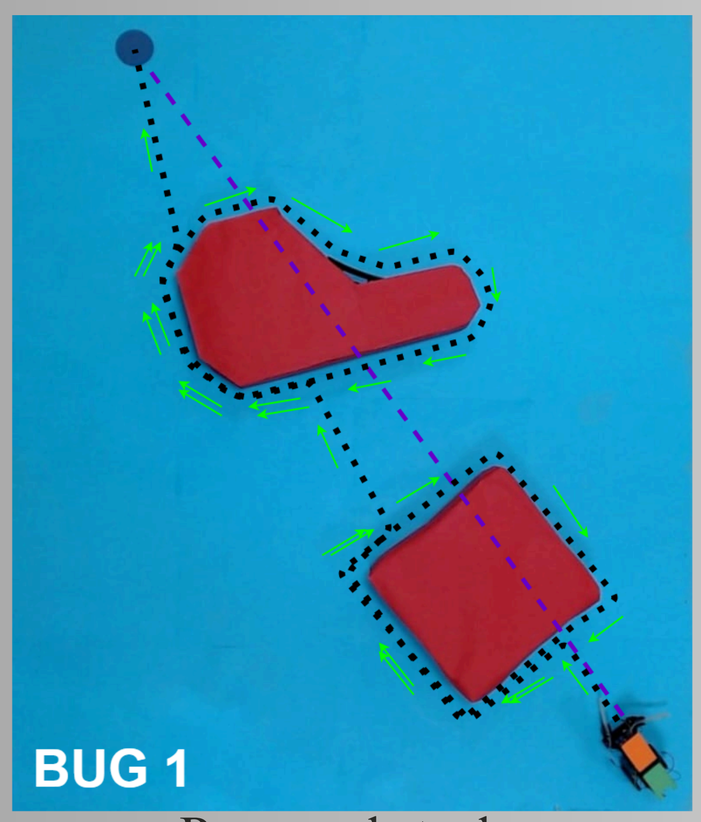




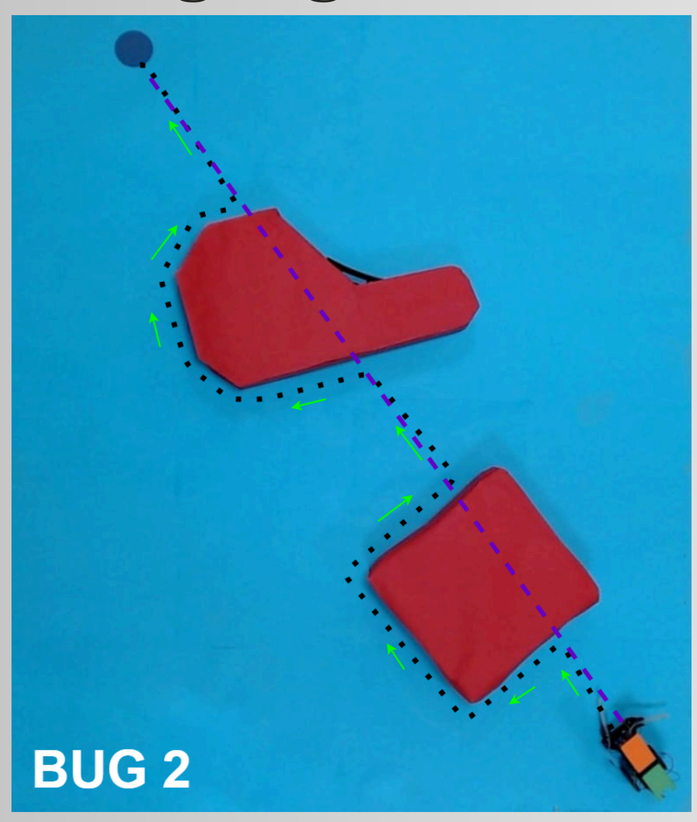


- Soft ECO-Flex, Shore-A hardness 40 Silicones, conductive carbon grease
- Sinusoidal testing walls as input for sensor characterization
- Testing many sensors for characterization
- Robust and reliable sensing

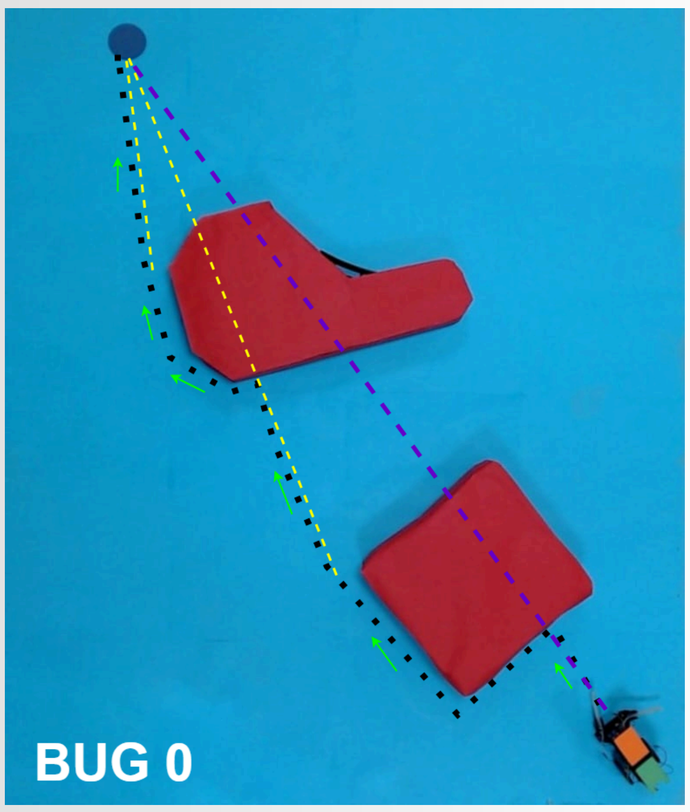
Bug Algorithms



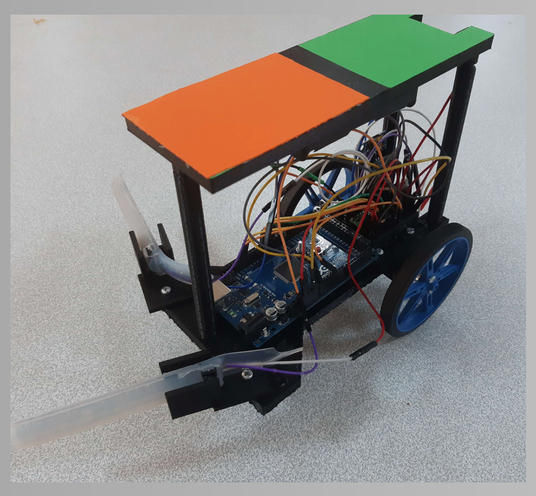
- Bumps obstacle
- Follows around entire object until it finds the closest point to target
- Moves to closest point
- Moves to target



- Bumps Obstacle
- Follows around until it reaches back on initial line from start to target
- Moves to target



- Bumps obstacle
- Follows around until the target is in clear line of sight
- Moves to target



Autonomous Robot Design

- Front and Side soft sensors
- Arduino Mega 2560 as the brain
- XBee communication with a computer
- Image processing based localization
- 2WD navigation

Future Work

- Mapping for unknown environments
- Built-in IMU module for navigation

Conclusion

- Soft sensors could be used in real-life applications as they are proven to implement bug algorithms.