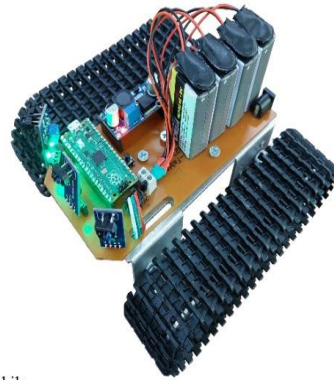


OBSTACLE AVOIDANCE FUZZY SYSTEM FOR MOBILE ROBOT WITH IR SENSORS

Oscoboinic Sebastian Fabian, Mihaela Hnatiuc

Electronic and Telecommunication Department,
Constanța Maritime University,
Constanța, Romania



In this paper, we propose an obstacle avoidance system that uses a fuzzy logic control algorithm, for mobile robots that use inexpensive IR sensors in order to guide the robot through an unknown environment.

Said system was programmed in micropython, utilizes one fuzzy system for total control of the robot and is self-contained.

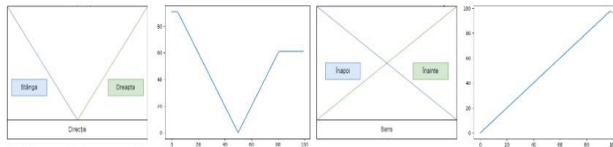
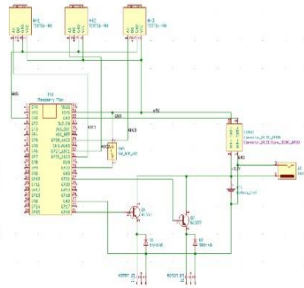
Results based on the following input values:

Antecedente(senzor_1,60000)

Antecedente(senzor_2,63695)

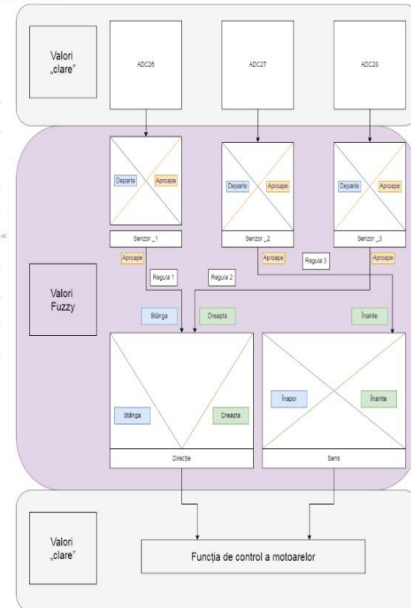
Antecedente(senzor_3,40000)

```
Shell -  
Python 3.7.9 (bundled)  
>>> !run fuzzy3.py  
  
Stanga: 91.552734375 fmainste 97.19085693359375 Dreapta 61.035156  
directie: 45.78424998678158  
sens: 66.31620881329991  
...
```



Acknowledgement

This work is supported by "Research Funds of the Constanta Maritime University", 2022
This work is supported by project CNFIS-FDI-2022-0414, Romania



CONCLUSION

Advances in the automation of everyday life have led to an increasing difficulty in providing adequate solutions to complex problems in a satisfactory time. Fuzzy logic provides an intuitive framework for solving complex problems, while maintaining the accuracy and reliability of the system in response to the given input data.

Fuzzy logic systems use fuzzy logic, a form of multi-valued logic in which the truth value of the variables can be any real number between 0 and 1. This is in contrast to traditional binary logic, which uses two values to define the value of truth of a variable.

To demonstrate the control capability of a fuzzy system, the design of a mobile robot with IR sensors is chosen for which a fuzzy control system written in the Micropython programming language was developed. The developed algorithm uses the "clear" values taken by the analog-to-digital converters of the controller to formulate a decision of directions and direction of movement in an unknown environment, with obstacles.

REFERENCES

- [1] Faisal M., Hedjar R., Al Sulaiman M., Al-Mutib K. „Fuzzy Logic Navigation and Obstacle Avoidance by a Mobile Robot in an Unknown Dynamic Environment”, International Journal of Advanced Robotic Systems(2012)
- [2] R. Singh, T. K. Bera, ”Obstacle Avoidance of Mobile Robot using Fuzzy Logic and Hybrid Obstacle Avoidance Algorithm”, Department of Mechanical Engineering, Thapar Institute of Engineering and Technology (2009)
- [3] T. Das , N. Kan “Design and implementation of an adaptive fuzzy logic-based controller for wheeled mobile robots”, IEEE on Control Systems Technology, vol.14, no.3, 501-510 (2006).