

Web-based Interactive Demo of Robot Navigation using Fuzzy Control Instruction

1 DETAILS

- Online demo: Web Demo
- Link of this document: Demo Instruction
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- Type of Artefact: **Interactive Tutorial / Demo**

2 INTRODUCTION

This work aims to to web technology.

In this project a web-based interactive demo which focuses on simulating how a real-life application of fuzzy sets theory is introduced. Fuzzy control can be implemented and used to be solutions in solving real-world problems. The robot navigation was chosen as an example to simulate how human beings can apply fuzzy sets theory in this scenario. With self-control of the robot, we can

easily specify a destination for it. The robot manipulates itself by walking to the waypoint we input. Thus, we will see that CI algorithms will have computational adaptivity and fault tolerance [1].

A specific task of the robot is achieving its input destination. However, it needs to face a number of various situations which have a different environment conditions. In order to deal with these, it should have multiple concurrent processes from all available sensor data. In this work, the end-to-end processes have been designed from scratch. Fuzzy rules and membership functions from [3] are mainly used for the navigation part. After applying fuzzy rules, the actual output for the robot is the velocity and adjusted angle of it is then calculated with the idea from [2] and fine-tuned.

Web-based interactive demo of robot navigation using fuzzy control was created with web-based technology. To the point, it can be used to open up education around the world from anywhere, anytime and any device. This project is implemented internally in mainly HTML and JavaScript, with helps from JavaScript libraries — *jQuery*, *Matter.js* and *plotly.js*.

REFERENCES

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- [3] Panus Nattharith. *Fuzzy logic based control of mobile robot navigation: A case study on iRobot Roomba Platform*. Scientific Research and Essays Vol, 8(2), 82-94 (2013).
- [4] Sansanee Auephanwiriyaikul. *Advanced Topics in Computer Engineering I (Fuzzy Set Theory)*. Chiang Mai University, 2004.
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