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ROBOT MOTION CONTROL FOR A MOBILE ROBOT BY FUZZY LOGIC

By

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**A thesis Submitted to the
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَقَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا

عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

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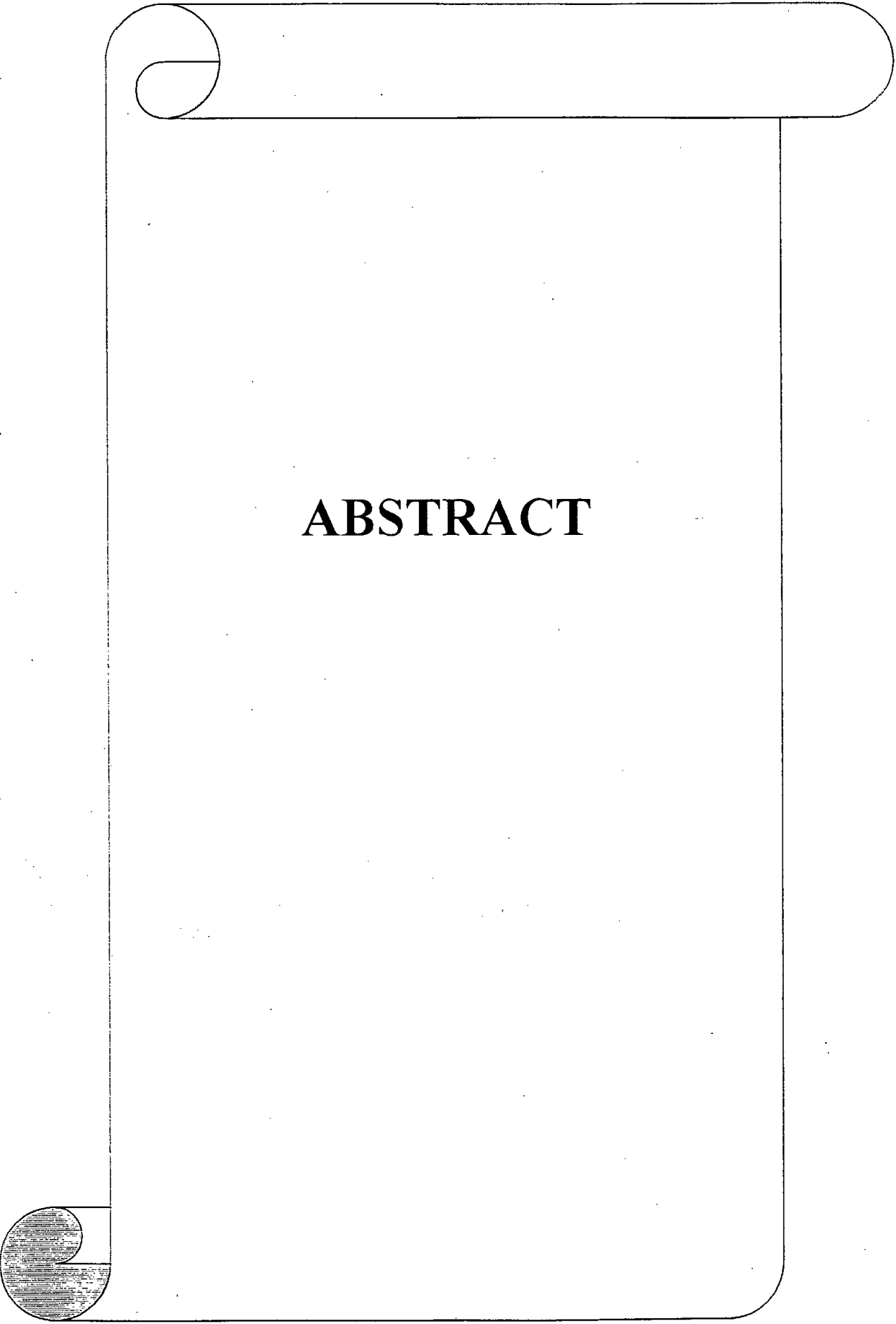
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ABSTRACT

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The thesis manipulates the problems of applying fuzzy logic theory to solve the motion control problem for a Mobile Robot.

In order to achieve optimum performance, it was essential for integrated merging with the human experts that can be achieved using fuzzy logic control for motion of MR.

The fuzzy logic control provides an algorithm, which can convert the linguistic control strategy, based on expert knowledge into an intelligent control strategy, which will be taken in the contents of the next chapters in details.

Starting in the first chapter with introduction demonstrating the importance and application areas of Mobile robots, also including a survey of motion control techniques for Mobile robots.

Introducing fuzzy logic systems and its classification, design of Fuzzy Logic Controller (FLC) handling its advantages over conventional controllers; and how to apply fuzzy logic to control the motion of an experimental Mobile robot Mobile robot explained in the next chapter.

Robotic architecture and its hardware including mechanical construction, types of motors used, motion control card, power circuit, speed measurement circuit demonstrated in third chapter.

Chapter four discusses the control action for the Mobile robot. It contains the design of the microcontroller-based H/W used and the applied control algorithm. It also discusses the sampling period selection and motors speed measurement technique.

Experimental work, results, and its discussion explained in the fifth chapter including tuning of fuzzy control system parameters, system analysis and program flowcharts used. Finally, Presenting conclusion and suggestions for future work, ending by the control program listing has been given in the appendices also the references used.

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