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| School of Computing  Faculty of Engineering |

Control System (AI) for Wrestling Robot

Fanhui Meng

Submitted in accordance with the requirements for the degree of  
MSc Advanced Computer Science (AI)

**Session 2019/2020**

The candidate confirms that the following have been submitted*:*

*<As an example>*

|  |  |  |
| --- | --- | --- |
| **Items** | **Format** | **Recipient(s) and Date** |
| *Deliverables 1* | *Report* | *SSO (xx/xx/xx)* |
| *Deliverables 2* | *Code and URL* | *SSO (xx/xx/xx)* |
| *Deliverable 3* | *Youtube video URL* | *Supervisor, assessor (xx/xx/xx)* |
| *Deliverable 5* | *User manuals* | *Client, supervisor (xx/xx/xx)* |

Type of Project: Exploratory Software

The candidate confirms that the work submitted is their own and the appropriate credit has been given where reference has been made to the work of others.

I understand that failure to attribute material which is obtained from another source may be considered as plagiarism.

(Signature of student)

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# Summary

*<Concise statement of the problem you intended to solve and main achievements (no more than one A4 page)>*

***<Reminder about basic requirements of layout and format:***

***The report must be in typescript, sequentially page numbered, on A4, single or double-sided, with 1in margins. Point size 11 and one-and-a-half line spacing should be used.***

***Page Numbering: The pages preceding the body of the text, i.e. from "Summary" to "Contents" inclusive, should be sequentially numbered in Roman numerals. All the remaining pages should be numbered in a single sequence of Arabic numerals.***

***Length: The main body of a 60 credit project report must be no longer than 60 pages (i.e. excluding appendices and references). The limit for 40-credit projects is 50 pages.>***

# Acknowledgements

*<This page should contain any acknowledgements to those who have assisted with your work. Where you have worked as part of a team, you should, where appropriate, reference to any contribution made by others to the project.*

*Note that it is not acceptable to solicit assistance on ‘proof reading’ which is defined as “the systematic checking and identification of errors in spelling, punctuation, grammar and sentence construction, formatting and layout in the text”; see* [*http://www.leeds.ac.uk/qat/documents/policy/Proof-reading-policy.pdf*](http://www.leeds.ac.uk/qat/documents/policy/Proof-reading-policy.pdf)*. >*

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# Chapter 1 Introduction

## Project Aim

The aim of this project is to design a fine robot high-level control system, which is the ‘brain’ of the Zumo robot. The main goal of this project is to make the Zumo robot be competitive and perform well in the Sumo robot competition. In addition, this project will find out if the idea of control system can be applied to a wider range of different robot, such as other robot competition or the robot in daily life.

Sumo robot league is a very popular international robot wrestling competition, which is two robots attempt to push each other out of the ring. The last stand robot in the ring is the winner.

This project is going to use the Zumo 32U4 robot, which is a complete, versatile robot controlled by an Arduino-compatible Atmega32U4 microcontroller. Therefore, extra hardware structure and improvement is not considered in the project. The Zumo robot has two motors, one Atmega32U4 chip as the brain and a variety of sensors, including proximity sensors, line sensors and accelerometer. So the Zumo robot can detect the opponent and run towards or away from it, which satisfy every requirement of a robot in the Sumo league.



Figure 1.1: Main features of the Zumo 32U4 robot

### Objectives:

* Conduct a theory study to compare different control system in the wrestling case.
* Implement two or more different control system and compare it’s advantages and disadvantages.
* Evaluate the results with it’s performance in different cases.

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# Chapter 2 Tables and Figures

## 2.1 Tables using the ‘table caption’ and ‘table description’ Styles

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| 12.31 | 12.32 | 12.33 |

## 2.2 Figures using the ‘figure caption’ and ‘figure description’ Styles

Figures can be added using the Illustrations section of the Insert tab.



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# List of References

*<It is expected that the list would reflect the breadth and depth of scholarly research undertaken by the student during the course of the project.>*

# Appendix A External Materials

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# Appendix B Ethical Issues Addressed

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