

# Methods for the Efficient Deployment and Coordination of Swarm Robotic Systems

## List of Corrections

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# List of Corrections

The following table summarises the corrections proposed to my thesis in response to the examiners and my supervisors suggestions. In this table we adopt the following notations and assumptions:

- ID stands for the number of a proposed correction.
- PJ, KS, NE shown between the two brackets refer to the examiners (Dr Peter Jancovic, Dr Konstantinos Sirlantzis) who have suggested the corrections, respectively. NE refers to Neil Eliot, the author.
- In the table of each correction, the first row shows a short description of the proposed correction according to the page number of the original thesis; the second row shows the action made for the correction according to the page number of the old thesis.

## 1.1 General Corrections

ID:(KS)	Short description of a proposed correction.
	Action taken to resolve proposed correction.
1:(KS)	Use of the word chaotic/chaos could be confusing.
	Renamed initial phase of the swarms development to 'disorganised' throughout.
2:(KS)	Context of chapter 3 could be moved to end of chapter 2 and the data analysis section moved to an appendix.
	Moved simulation implementation from chapter 3 into Chapter 2. Moved data aggregation component into a new appendix.
3:(PJ & KS)	Several references are showing journal/publication title followed by ' <i>Proceedings of</i> ' or ' <i>Transaction on</i> '. All titles need to be made consistent - 6, 7, 9, 10, 11, 12, 14, 15, 16, 18, 20, 24, 25, 28, 33, 37, 41, 47, 50, 52, 54, 55, 56, 58, 59, 61, 65, 67, 69, 71, 74, 76, 77, 78, 79, 82, 86, 90, 93, 94, 96, 98, 100, 113, 118, 126, 127, 130, 137, 139, 140, 141, 142, 146, 147, 150, 151, 152, 154, 155, 156, 157, 158, 161
	Bibtex data file updated by restructuring the title text.
4:(KS)	References require publication date - 21, 60, 70, 75, 92, 135
	Bibtex data file updated to include publication dates.
5:(KS)	References with no publisher - 27, 30, 36, 49, 60, 101, 108, 115, 132, 148, 149
	Bibtex data file updated to include publishers.

6:(KS)	Reference apostrophe missing from name - 115
	Bibtex data file updated.
7:(KS)	References with capitalised Author - 88, 149
	Bibtex data file updated.
8:(KS)	Reference requiring page numbers - 117
	Bibtex data file updated.
9:(PJ)	Citations in sections 2.1 and 2.7 need to be separate out to the relevant authors rather than a single list.
	References split out from Barnes and Bennet appropriately.
10:(PJ)	Formulae 2.1, 2.3, 2.4 4.2, 4.3, 4.4, 4.6, 4.7, 4.8 - Formula notation for cardinality needs to be reviewed.
	Cardinality notation changed to use $ \cdot $ for magnitude and $\ \cdot\ $ for cardinality in both formulae and inline equations e.g. $nbr(b) \triangleq \{b' \in S : \ bb'\  \leq C_b\}$ $R(b) = \{b' \in S : \ bb'\  \leq R_b\}$ $v_r(b) = -\frac{1}{ R(b) } \left( \sum_{b' \in R(b)} \left(1 - \frac{\ bb'\ }{R_b}\right) bb' \right)$ $\{o \in O : \ bo\  \leq O_b\}$
11:(PJ)	Several spelling errors of <i>stabalise</i> .
	Global replacement to <i>stabilise</i> .
12:(KS)	Several apostrophe errors on swarms
	Global check and replacement of references to swarm's where appropriate
13:(PJ)	Figs 6.4, 6.28, 6.29 needs to indicate starting point of simulation.
	Updated graphs by adding "Start Point" and arrows to graphs.

## 1.2 Specific Corrections

14:(KS)	Page (Abstract) Line 14 - Use of the term nodes needs to be made consistent with the rest of the thesis.
	Following abstract updates the section which mentions nodes is no longer present.
15:(KS)	Page 2 Line 24 - Explain <i>boid-based</i> .
	Page 2 Line 24 - Paragraph extended to include reference to seminal paper by Reynolds and comparison added to highlight similarity.

16:(KS)	Page 6 Line 21 - Typo - “fire service [111], as...”
	Page 6 Line 21 - Updated to “fire service [111] as...”
17:(KS)	Page 8 Line 30 - typo - anomalies ‘healing’
	Page 8 Line 30 - Updated to “anomalies thus ‘healing’”
14:(KS)	Page 9 Line 6 - Reference to Hoff paper requires clarification.
	Page 9 Line 6 - Extended sentence to include message propagation reduction issue identified by Hoff.
19:(PJ)	Page 12 Line 9 - Description of the coordinates needs to be made clearer - <i>The coordinates of an agent...</i>
	Page 12 Line 9 - Re-worded section - <i>The position vector is given by the coordinates of an agent...</i> Also added back reference to appropriate section.
20:(KS)	Page 14 Line 5 - Explanation of vectors needs to be added as well as the back reference.
	Page 14 Line 5 - Paragraph extended to include vector description.
21:(PJ/KS)	Page 13 Line 18 - Typo error - <i>interction</i>
	Page 13 Line 18 - Updated to <i>interaction</i>
22:(KS)	Page 24 Line 21 - Referencing error - (Figures 2.10, 2.10, 2.11)...
	Page 24 Line 21 - Updated to ( <i>Figures 2.10, 2.11, 2.12</i> )...
23:(PJ)	Page 18 Line 13 - Sentence restructure required - <i>moves an obstacles...</i>
	Page 18 Line 13 - Updated to <i>moves it may enter an obstacle’s...</i>
24:(PJ)	Page 21 Line 17 - Internal reference error.
	Page 21 Line 17 - Latex block error corrected - <i>Equation 2.7</i> becomes <i>Equation 2.8</i> .
25:(PJ)	Page 71 Line 1 - (Static Swarm conclusion) There needs to be a mention of the current work and the usage of the distance metric.
	Page 65 Line 1 - Added a discussion of current work (with references).
26:(PJ)	Page 18/19 - Section 2.6 uses unexplained notation.
	Page 19 Line 13 - $\hat{\cdot}$ , explained in section 2.9. Explanation moved back to 2.6 for clarity.
27:(PJ)	Page 22 Line 10 - Section 2.9 uses inline formulae for movement.
	Page 22 Line 7 - Equation broken out and referenced. Component parts of the equation discussed.

28:(PJ)	Page 26 - 39 - There needs to be consistency in capitalisation of Player/Stage
	Page 26 - 39 - Update all uses to <i>Player/Stage</i> (as used in other papers i.e. <i>Player/Stage simulation of olfactory experiments</i> and <i>The simulation scenario for swarm robots based on open-source software Player/Stage</i> ).
29:(KS)	Page 41 Table 4.1 - Explain parameters for <i>Hexagonal Swarm</i>
	Modified labels and altered section to highlight that the parameters are arbitrary as they are only required to create a swarm to highlight the inter-agent relationships that exist. Any parameter combination will work so long as the cohesion potential field is greater than the repulsion potential field.
30:(PJ)	Page 42 - 45 - Table 4.2 - 4.5 Explain Labels <i>Log</i> , <i>Id</i> , <i>N.Id</i>
	Page 36 - Labels expanded in text with descriptions
31:(PJ)	Page 43 Line 6 - Error in text layout ( <i>vectorTable 4.4...</i> )
	Page 37 Line 8 - Sentence updated to <i>vector. Table 3.4...</i>
32:(PJ)	Page 45 Line 12 - Punctuation error “= 0) The ...”
	Page 39 Line 12 - Updated document “= 0). The ...”
33:(PJ)	Page 46 - Figure 4.7 - Label error.
	Page 40 - Figure 3.7 - Changed labels referring to <i>bot</i> to <i>agent</i>
34:(KS)	Page 48 Line 15 - Typographical error.
	Page 42 Line 14 - “ <i>described is here.</i> ” changed to “ <i>described here.</i> ”
35:(PJ)	Page 53 Line 3 - Typo in introduction.
	Page 47 Line 3 - changed “ <i>is a swarm.</i> ” to “ <i>in a swarm.</i> ”
36:(PJ)	Page 54 Table 5.1 - Explain parameter requirements
	Page 47 Line 23 - Paragraph extended to include an explanation of the parameters and the type of swarm they create.
37:(NE)	Page 54 Table 5.1 - Labels in Weight component refer to neighbour and agent and should be inline with original concepts.
	Page 48 Table 4.1 - Altered labels for field potentials to <i>Cohesion field</i> and <i>Repulsion field</i> .
38:(PJ)	Page 55 Figure 5.1 - Clarify graph mean
	Page 49 Line 1 - Paragraph extended to explain the concept in the graph.

39:(PJ)	Page 62 Line 1 - There needs to be an explanation of what a bi-modal distribution presents
	Page 56 Line 1 - Paragraph extended to explain the neighbour relationships that create the bi-modal effect when agents have extended visibility beyond the first neighbour.
40:(PJ)	Page 67 Line 2 - Punctuation error.
	Page 61 Line 7 - “ <i>metric Figure 5.21...</i> ” amended to “ <i>metric. Figure 4.21</i> ”
41:(PJ)	Page 71 Line 2 - Expand and clarify <i>identical</i> .
	Page 65/66 Line 2 - Description extended to explain the similarity in the graph profiles that are generated by the two metrics in a homogeneous swarm
42:(PJ)	Page 74 Line 5 - Punctuation error.
	Page 70 Line 5 - “ <i>applied. Partial..</i> ” amended to “ <i>applied, partial...</i> ”
43:(PJ)	Page 79 Line 15 - Typographical error.
	Page 74 Line 15 - “ <i>there</i> ” amended to “ <i>their</i> ”
44:(KS)	Page 95 Line 18 - Typographical error.
	Page 91 Line 4 - “ <i>problem can is...</i> ” amended to “ <i>problem is...</i> ”
45:(KS)	Page 96 Line 18 - Typographical error.
	Page 92 Line 7 - “ <i>algorithms selection...</i> ” amended to “ <i>algorithm’s selection...</i> ”
46:(PJ)	Page 99 Line 5 - Typographical error.
	“ <i>must are</i> ” amended to “ <i>are...</i> ”
47:(PJ)	Page 99 Line 8 - Typographical error.
	Page 94 Line 7 - “ <i>its a goal...</i> ” amended to “ <i>towards it’s goal...</i> ”
48:(KS)	Page 102 Line 6 - Typographical error.
	Page 97 Line 6 - “ <i>algorithm is produces...</i> ” amended to “ <i>algorithm produces...</i> ”
49:(KS)	Page 99 Line 17 - References are out of sequence
	Page 94 Line 17 - “ <i>6.23, 6.25, 6.24 and 6.26...</i> ” amended to “ <i>6.23, 6.24, 6.25 and 6.26...</i> ”
50:(KS)	Page 106 Line 12 - Typographical error.
	Page 101 Line 12 - “ <i>(Figure 6.30)</i> ” amended to “ <i>Figure 6.30</i> ”
51:(PJ)	Page 109 Figure 6.31 - Error in title description
	Page 104 Figure 5.31 - “ <i>speed</i> ” amended to “ <i>path</i> ”

52:(PJ)	Page 118 Line 1 - Refer to tables by reference not as <i>above</i> .
	Page 113 Line 1 - Added references “5.8, 5.9 and 5.10”
53:(PJ)	Page 119 Figure 6.42 - Increase font size of agent labels ( $n_{1-7}$ )
	Page 114 Figure 5.42 - Font increased
54:(PJ)	Page 120 - Conclusion section missing.
	Page 115 - Added conclusion to chapter.
55:(PJ)	Page 121 Line 10 - Sentence duplicates explanation.
	Page 116 - Sentence removed - <i>Depending upon...</i>
56:(PJ)	Page 126 Line 3 - Explanation needs to be expanded as to what circumstances concave reduction effects a swarm.
	Page 121 Paragraph 2 - “ <i>In some circumstances...</i> ” amended to include an explanation of the effect.
57:(PJ)	Page 130 Line 22 - Error in table reference.
	Page 126 Line 6 - “ <i>Table 8.4...</i> ” amended to “ <i>Table 6.1</i> ” - Error caused by latex label not in block.
58:(PJ)	Page 135/136 Figures 7.12 and 7.13 - Title clarification required.
	Page 130/131 Figures 6.12 and 6.13 - <i>Baseline/Concave path effect</i> amended to <i>Baseline/Concave path effect (after 600 iterations / 60s)</i>
59:(PJ)	Pages 138, 139, 140 and 141 Figures 7.14, 7.15, 7.16, 7.18 and 7.19 - Title needs to have clarification of the bracketed numbers
	Page 133, 134, 135 and 136 Figures 6.14, 6.15, 6.16, 6.18 and 6.19 “(80/60)” amended to “(cohesion field 80 / repulsion field 60)”
60:(PJ)	Page 141 Table 7.3 - Location of Table 7.3 needs to be closer to Figure 7.19
	Page 134 Table 6.3 Moved to below 6.16 and referenced.
61:(PJ)	Page 143 Line 1 - Incorrect internal reference.
	Page 137 Line 11 “ <i>Figure 7.32</i> ” amended to “ <i>Figure 6.21</i> ” - Incorrect latex label Corrected
62:(PJ)	Page 143 Line 7 - Typographical error.
	Page 138 Line 7 - section 7(6).4 “ <i>seem</i> ” amended to “ <i>seen</i> ”
63:(PJ)	Pages 159, 160 Figures 7.38, 7.39 - Clarify <i>60 Obstacle</i>
	Pages 154, 155 Figures 6.38, 6.39 - Figure titles expanded to clarification repulsion field 60 units for obstacles.

64:(PJ)	Page 167 line 3 - Typographical error.
	Page 162 Line 3 - “ <i>rseultant</i> ” amended to “ <i>resultant</i> ”
65:(PJ)	Page 168 Line 7 - Typographical error.
	Page 163 Line 7 - “ <i>space. each...</i> ” amended to “ <i>space. Each...</i> ”
66:(PJ)	Page 169 Line 1 - Typographical error.
	Page 164 Line 1 - “ <i>seconds. between...</i> ” amended to “ <i>seconds. Between...</i> ”
67:(PJ)	Page 169 Line 2 - Spelling error.
	Page 164 Line 2 - <i>feild</i> amended to <i>field</i>
68:(PJ)	Page 186 Line 32 - Sentence requires restructuring.
	Page 181 Line 32 - Restructured sentence <i>swarm that utilises...</i> to <i>uses both...</i>
69:(PJ)	Page 30 line 13 - Spelling error.
	Page 30 Line 7 - “ <i>thier</i> ” amended to “ <i>their</i> ”
70:(PJ)	Page 173 line 15 - Spelling error.
	“ <i>thier</i> ” amended to “ <i>their</i> ”
71:(PJ)	Page 176 line 7 - Spelling error.
	Page 171 Line 7 - “ <i>distrurbance</i> ” amended to “ <i>disturbance</i> ”
72:(NE)	Page 49 Equation 4.4 - Formula error.
	Page 43 Equation 3.4 - “ <i>b'</i> ” amended to “ <i>b</i> ”