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**A ROBOTIC CHEWING DEVICE FOR FOOD
EVALUATION**

A thesis presented in partial fulfilment of the
requirements for the degree of

Master of Engineering
in
Mechatronics

at
Massey University,
Palmerston North, New Zealand

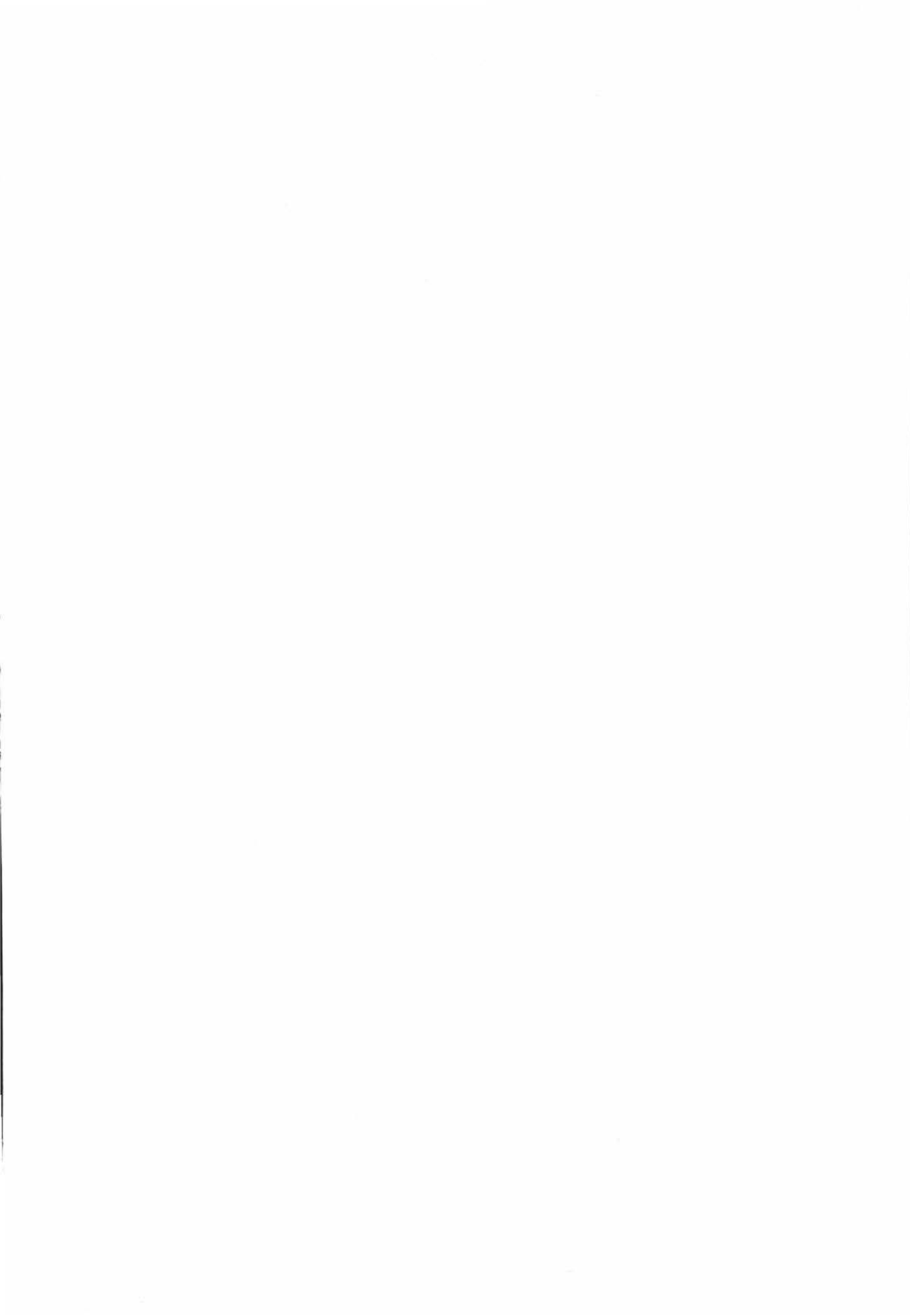
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2006



Abstract

The aim of this masters project was to design and develop a prototype of robotic chewing device. This project was required for use in food evaluation as it can provide standardised chewing. The chewing device was required to follow chewing trajectories of a human and apply the same forces that humans apply during chewing. This was achieved by the use of a robotic system that incorporated a mechanical linkage, supporting software and electronics to control it and therefore ensure correct operation. The mechanical linkage used is based on a four-bar linkage mechanism that can closely approximate human chewing trajectories. The linkage also has the ability to be adjusted to achieve a range of chewing trajectories for different food types. This is due to the fact that humans chew foods with different properties differently. The linkage is driven by a single DC motor that is controlled by a control card and a supervisory software program on a computer. This ensures that chewing is performed at the correct speed in the different phases of the chewing cycle and also provides all the necessary controls for operation of the device. Anatomically correct teeth were also used to help closely match the particle size reduction of the human system, while a food retention device was made to keep the food particles on the teeth while chewing.



Acknowledgements

I would first of all like to thank my supervisors Dr. John Bronlund, Assoc. Prof. Peter Xu and Dr. Kylie Foster who have guided me throughout this project and help make it a success.

The technicians at the Massey University Institute of Technology and Engineering workshop for their help and support.

Christine Lawrence from Massey University Auckland for her help.

Prof. Jules Kieser, Ionut Ichim and Neil Waddell from the School of Dentistry at the University of Otago for their guidance on the function of teeth.

Flanders, Sebastian, Jonathan for their help and friendliness throughout the year.

And finally Crop and Food New Zealand for funding this project.



Table of contents

LIST OF FIGURES.....	9
LIST OF TABLES	13
1 INTRODUCTION.....	15
2 LITERATURE REVIEW	17
2.1 INTRODUCTION.....	17
2.2 HUMAN MASTICATORY SYSTEM.....	17
2.2.1 <i>Overview</i>	17
2.2.2 <i>Jaw geometry</i>	19
2.2.3 <i>Teeth shape</i>	21
2.2.4 <i>Forces on teeth</i>	23
2.2.5 <i>Jaw trajectories during chewing</i>	23
2.3 CONCLUSION	30
3 POSSIBLE DESIGN APPROACHES.....	33
3.1 INTRODUCTION.....	33
3.2 THE FOUR-BAR LINKAGE	33
3.3 CAM TRAJECTORY SYSTEM	34
3.4 TWO-AXIS TRAJECTORY SYSTEM	36
3.5 PLATFORM ROBOT	36
3.6 ROBOTIC SYSTEM EVALUATION.....	37
4 FOUR-BAR LINKAGE MECHANISM DESIGN	39
4.1 INTRODUCTION.....	39
4.2 SPECIFICATIONS.....	39
4.3 LINKAGE DESIGN.....	39
4.3.1 <i>Constraints</i>	39
4.3.2 <i>Design approaches</i>	40
4.3.3 <i>The four-bar design</i>	42
4.4 MECHANICAL DESIGN	50
4.4.1 <i>The basic mechanical design</i>	50
4.4.2 <i>The six-bar linkage design</i>	52
4.4.3 <i>Stress analysis</i>	54
4.4.4 <i>Six-bar linkage kinematics</i>	56
4.4.5 <i>Six-bar linkage dynamics</i>	63
4.5 MOTOR SELECTION	69
4.6 CONSTRUCTION	73
4.7 RESULTS	73
4.7.1 <i>Force measurement</i>	74
4.7.2 <i>Trajectory measurement</i>	76
4.8 CONCLUSIONS	77
5 SUPPORTING DESIGN	79
5.1 INTRODUCTION.....	79
5.2 THE FORCE CONTROL.....	79
5.3 THE CHEWING DEVICE ENCLOSURE	86
5.4 THE TEETH LOCKING MECHANISMS.....	88
5.4.1 <i>The lower teeth locking mechanism</i>	89
5.4.2 <i>The upper teeth locking mechanism</i>	90
5.5 TEETH, FOOD RETENTION AND REPOSITIONING.....	92
5.5.1 <i>The teeth</i>	92

5.5.2	<i>The food retention system</i>	93
5.5.3	<i>The food repositioning system</i>	94
5.6	CONSTRUCTION	94
5.7	CONCLUSIONS	99
6	CONTROL	101
6.1	INTRODUCTION.....	101
6.2	COMPUTER/MOTOR INTERFACE.....	101
6.2.1	<i>The control card</i>	101
6.2.2	<i>The line driver circuit</i>	102
6.2.3	<i>Computer I/O</i>	103
6.3	THE SOFTWARE FUNCTIONS.....	104
6.3.1	<i>Set to lower position</i>	105
6.3.2	<i>Set to top position</i>	108
6.3.3	<i>Start chewing</i>	108
6.3.4	<i>Single cycle</i>	116
6.3.5	<i>Low speed manual control</i>	117
6.3.6	<i>Master stop</i>	118
6.4	CONCLUSIONS	119
7	CONCLUSIONS AND FUTURE WORK.....	121
8	REFERENCES	125
9	APPENDIX A THE INSTRUCTION MANUAL.....	129
10	APPENDICES B-E.....	137
10.1	APPENDIX B C.A.D FILES	137
10.2	APPENDIX C LABVIEW FILES	137
10.3	APPENDIX D CONTROL CARD FILES	137
10.4	APPENDIX E CIRCUIT DESIGN.....	137

List of figures

Figure 2-1 The location of muscles that are used in chewing (adapted from Hannam 1997).....	18
Figure 2-2 The human mandible (adapted from Gray 1918).....	20
Figure 2-3 The curve of Wilson and the curve of Spee (taken from Palmer 2004).....	20
Figure 2-4 Teeth in the human mouth (taken from Oralb).....	21
Figure 2-5 Three point bending principle adapted to mastication for fracturing food (adapted from Ashby & Jones 1996).....	22
Figure 2-6 The masticatory sequence (taken from Lucas 2004b).....	24
Figure 2-7 Frontal and sagittal trajectories of a typical adult when chewing soft cheese on the right side (taken from Gibbs & Lundeen 1982).....	25
Figure 2-8 Sagittal and frontal trajectories of a typical adult when chewing carrot (taken from Gibbs & Lundeen 1982).....	25
Figure 2-9 Average frontal and sagittal trajectories for a typical adult when chewing hard and soft gum (adapted from Anderson et al, 2002).....	26
Figure 2-10 The decision of what teeth function to use (adapted from Lucas 2004c) ..	27
Figure 2-11 J.-S. Pap's SolidWorks model.....	28
Figure 2-12 Comparison between first molar and incisor chewing trajectories.....	29
Figure 3-1 The four-bar linkage (adapted from Thompson 1999a).....	33
Figure 3-2 The cam follower system (adapted from University of Limerick).....	34
Figure 3-3 VTEC system at low revs (taken from Honda marine).....	35
Figure 3-4 VTEC system at high revs (taken from Honda marine).....	35
Figure 3-5 A hexapod platform robot (taken from Physic Instrumente 1996-2005).....	37
Figure 4-1 Limit and dead configurations of a four-bar linkage (taken from Stanisic)...	41
Figure 4-2 The maximum and minimum transmission angles (taken from Stanisic).....	42
Figure 4-3 The four-bar linkage parameters (taken from Thompson 1999a).....	42
Figure 4-4 Candidate trajectories of the four-bar linkage (adapted from Thompson 1999b).....	43
Figure 4-5 Candidate trajectories when the ground length is reduced (adapted from Thompson 1999b).....	44
Figure 4-6 Simple model to evaluate different link lengths.....	45
Figure 4-7 Definition of parameters in Table 4.....	46
Figure 4-8 Sample trajectories that the four-bar linkage can achieve.....	47

Figure 4-9 Vertical trajectory as a function of crank angle with a 50mm ground 48

Figure 4-10 Horizontal trajectory as a function of crank angle with a 50mm ground..... 48

Figure 4-11 Transmission angle when ground length is 50mm 49

Figure 4-12 Transmission angle when ground length is 38mm 49

Figure 4-13 The ground link 50

Figure 4-14 The basic design of the four-bar linkage 51

Figure 4-15 The assembly of the four-bar linkage 52

Figure 4-16 The six-bar linkage 53

Figure 4-17 The final six bar linkage design..... 54

Figure 4-18 The stress analysis of the four-bar linkage..... 55

Figure 4-19 The deflection analysis of the four-bar linkage 56

Figure 4-20 The co-ordinate system for the kinematics..... 57

Figure 4-21 The angular displacement of the follower..... 58

Figure 4-22 The angular velocity of the follower..... 58

Figure 4-23 The angular acceleration of the follower..... 58

Figure 4-24 The linear displacement of the slider in the 'X' direction..... 59

Figure 4-25 The linear displacement of the slider in the 'Y' direction..... 59

Figure 4-26 The linear displacement of the slider in the 'Z' direction 60

Figure 4-27 The velocity of the slider in the 'X' direction 60

Figure 4-28 The velocity of the slider in the 'Y' direction 61

Figure 4-29 The velocity of the slider in the 'Z' direction..... 61

Figure 4-30 The acceleration of the slider in the 'X' direction 62

Figure 4-31 The acceleration of the slider in the 'Y' direction 62

Figure 4-32 The acceleration of the slider in the 'Z' direction 62

Figure 4-33 The joints of interest in the dynamic analysis 63

Figure 4-34 The crank torque of the six-bar linkage 64

Figure 4-35 'X' direction force in crank-coupler joint..... 64

Figure 4-36 'Y' direction force in crank-coupler joint..... 65

Figure 4-37 'X' direction force in follower-ground joint..... 66

Figure 4-38 'Y' direction force in follower-ground joint..... 66

Figure 4-39 'X' direction force in follower-coupler joint 67

Figure 4-40 'Y' direction force in follower-coupler joint 67

Figure 4-41 'X' direction force in crank-ground joint 68

Figure 4-42 'Y' direction force in crank-ground joint 68

Figure 4-43 The torque required at the crank shaft 70

Figure 4-44 The weight concentration of the linkage	71
Figure 4-45 The location of the motor and the drive line	72
Figure 4-46 The six-bar linkage constructed.....	73
Figure 4-47 The force measuring device	75
Figure 4-48 Sample of force measuring program	76
Figure 4-49 The overlay comparing the achieved trajectory and desired trajectories... ..	77
Figure 5-1 The location of the shock absorber.....	81
Figure 5-2 The vertical velocity of the actuator	83
Figure 5-3 The response of the shock absorber when compressed at different velocities	83
Figure 5-4 The vertical acceleration of the actuator	85
Figure 5-5 The force response of the shock absorber	86
Figure 5-6 The enclosure of the chewing device	88
Figure 5-7 Exploded view of lower teeth locking mechanism.....	89
Figure 5-8 The upper teeth locking mechanism.....	90
Figure 5-9 The enclosure showing the location of the six-bar linkage and the teeth locking mechanisms	91
Figure 5-10 The plaster moulds of the upper and lower jaws.....	93
Figure 5-11 The final resin mould of the upper jaw with the teeth in place	93
Figure 5-12 The food retention system.....	94
Figure 5-13 The chewing device enclosure	95
Figure 5-14 The six-bar linkage	96
Figure 5-15 The upper teeth locking mechanism.....	96
Figure 5-16 The lower teeth locking mechanism	96
Figure 5-17 The final assembled SolidWorks model of the chewing device.....	97
Figure 5-18 The constructed chewing device	98
Figure 6-1 The line driver circuit showing the line driver chip in the centre and the connectors on either side.	103
Figure 6-2 The circuit board design (Board dimensions 22x15mm).....	103
Figure 6-3 The software functions on the GUI	105
Figure 6-4 The Hall Effect sensing circuit	106
Figure 6-5 The Hall Effect circuit board	106
Figure 6-6 Example of accessing the parallel port in Labview	107
Figure 6-7 The general velocity profile of the chewing device.....	109
Figure 6-8 The occlusal phase definition	110

Figure 6-9 The trajectory profile	112
Figure 6-10 The velocity profile	112
Figure 6-11 The acceleration profile.....	113
Figure 6-12 The occlusal angle	114
Figure 6-13 The velocity control menu	116
Figure 6-14 The 'single cycle' Labview code	117
Figure 6-15 The 'low speed manual control' function	118
Figure 6-16 The 'master stop' function.....	119

List of tables

Table 1 Movement variables for vertical and horizontal chewing motions (adapted from Ogawa <i>et al.</i> 2001).....	29
Table 2 Frontal trajectory properties (adapted from Ogawa <i>et al</i> 2001)	31
Table 3 Evaluation of the different possible robotic systems.....	38
Table 4 Comparison between the designed four-bar linkage and the experimental data (adapted from Ogawa <i>et al</i> , 2004)	46
Table 5 Comparison of required and achievable specifications	73