

INDEX

Contents	Page No.
ABSTRACT	1
1. INTRODUCTION	2
1.1 Background of Robotics	2
1.2 Problem Statement	2
1.3 Objective	3
1.4 Scope of the Study	3
2. LITERATURE REVIEW	5
2.1 Gesture-Controlled Robotics	5
2.2 Previous Gesture-Controlled Systems	5
2.3 Feasibility and Challenges	6
2.4 Applications of Gesture-Controlled Robots	6
3. SYSTEM ANALYSIS & DESIGN	7
3.1 System Overview	7
3.2 System Design Flow	7
3.2.1 Context Level Diagram	9
3.2.2 Data Flow Diagram (DFD)	10
3.2.3 Entity-Relationship Diagram (ERD)	11
4. IMPLEMENTATION	12
4.1 Hardware Components	12
4.1.1 Accelerometer	12
4.1.2 Arduino Uno	12
4.1.3 Motor Driver (L293D)	13
4.1.4 Robot Chassis	13
4.1.5 DC Motors	14

4.2 Software Implementation	14
4.2.1 Reading Accelerometer Data	14
4.2.2 Mapping Accelerometer Data	14
4.2.3 Command Processing and Motor Control	15
4.2.4 Wireless Communication (Future Work)	15
4.3 Testing and Calibration	15
4.3.1 Accelerometer Calibration	16
4.3.2 Testing Movements	16
4.3.3 Performance Testing	16
5. METHODOLOGIES	18
5.1 Hardware Design and Integration	18
5.2 Software Development	18
5.2.1 Testing and Calibration	19
5.2.2 Performance Evaluation	19
6. RESULTS AND DISCUSSION	20
6.1 Hardware Components	20
6.1.1 Testing Outcomes	20
6.1.2 Stop Condition Test	20
6.1.3 Backward Tilt Test	21
6.1.4 Left and Right Tilt Tests	21
6.1.5 Overall Movement Performance	21
6.2 Challenges Encountered	22
6.2.1 Sensor Drift and Calibration Issues	22
6.2.2 Lighting and Environmental Interference	22
6.2.3 Latency in Gesture Detection	22

6.3 Real-World Applications	23
6.3.1 Assistive Technology for Disabled Individuals	24
6.3.2 Industrial Automation	24
6.3.3 Military and Defense Applications	24
6.3.4 Rescue Operations	24
6.4 System Limitations	24
7. CONCLUSION & FUTURE SCOPE	27
7.1 Summary of Achievements	27
7.2 Future Work	28
7.2.1 Wireless Communication	28
7.2.2 Enhanced Gesture Recognition	28
7.2.3 Improved Sensor Accuracy and Stability	29
7.2.4 Multiple Gesture Support	29
7.2.5 Integration with Other Sensors and Actuators	29
7.2.6 Improved User Interface	30
7.3 Limitations	30
7.4 Conclusion	31
8. PAPER PUBLICATION	32
9. BIBLIOGRAPHY	33
9.1 Books	33
9.2 Research Papers	33
9.3 Websites	33

LIST OF FIGURES

Contents	Page No.
1.4 Scope of the Study	4
3.2 System Design Flow	8
3.2.2 Data Flow Diagram (DFD)	10
4.3.3 Performance Testing	17
6.3 Real-World Applications	23
6.4 System Limitations	25