

TABLE OF CONTENTS

| | |
|---|-------------|
| ABSTRACT | i |
| FOREWORD | ii |
| THANK-YOU NOTE | iii |
| TABLE OF CONTENTS | iv |
| LIST OF FIGURES | vi |
| LIST OF TABLES | viii |
| CHAPTER I INTRODUCTION | 1 |
| 1.1. Background..... | 1 |
| 1.2. Formulation of the Problem..... | 2 |
| 1.3. Objectives | 2 |
| 1.4. Scope of Problem | 3 |
| 1.5. Research Methods | 3 |
| 1.6. Implementation Schedule | 4 |
| CHAPTER II LITERATURE REVIEW | 5 |
| 2.1. Solution Concept Design..... | 5 |
| 2.2. Related Research | 6 |
| 2.3. Condition-Based Predictive Maintenance | 8 |
| 2.3.1. Predictive Maintenance..... | 8 |
| 2.3.2. Condition Based Maintenance | 9 |
| 2.3.3. Long Short Term Memory | 9 |
| 2.4. Clinical Mechanical Ventilator..... | 11 |
| 2.5. Volume Control Mode..... | 11 |
| 2.6. Pressure Control Mode | 12 |
| 2.7. PEEP Pressure | 13 |
| 2.8. Ventilator Minimum Parameter Setting | 14 |
| 2.9. Main Ventilation Specification..... | 16 |

| | |
|---|-----------|
| 2.10. Ventilator Working System..... | 18 |
| 2.11. Remaining Useful Life | 19 |
| CHAPTER III SYSTEM PLANNING..... | 21 |
| 3.1. System Design | 21 |
| 3.1.1. Block Diagram | 21 |
| 3.1.2. Flow Chart..... | 22 |
| 3.1.3. Functions and Features..... | 23 |
| 3.2. Hardware Design | 24 |
| 3.2.1. Component Specification | 24 |
| 3.3. Software Design | 32 |
| 3.4. Test Method..... | 33 |
| CHAPTER IV CONTENTS & DISCUSSION..... | 34 |
| 4.1. Sensor MPXV7002DP and MPX5010 Testing..... | 35 |
| 4.2. Hamilton Flow Sensor Testing..... | 37 |
| 4.3. System Modeling..... | 39 |
| 4.4. System Modeling Analysis..... | 41 |
| 4.5. Firebase Database Configuration | 43 |
| 4.6. LSTM Algorithm Application Experiment and Analysis | 45 |
| CHAPTER V CONCLUSION & SUGGESTION | 54 |
| 5.1. Conclusion..... | 54 |
| 5.2. Suggestion | 55 |
| REFERENCES..... | 56 |
| ATTACHMENT..... | 58 |