

TABLE OF CONTENTS

ABSTRACT	Error! Bookmark not defined.
TABLE OF CONTENTS	1
LIST OF TABLES	Error! Bookmark not defined.
CHAPTER Error! Bookmark not defined. INTRODUCTION	Error! Bookmark not defined.
1.1. Background of the Problem	Error! Bookmark not defined.
1.2. Problem Formulation	Error! Bookmark not defined.
1.3. Research Objectives	Error! Bookmark not defined.
1.4. Hypotheses	Error! Bookmark not defined.
1.5. Research Benefits	Error! Bookmark not defined.
1.6. Research Scope	Error! Bookmark not defined.
1.7. Research Contribution	Error! Bookmark not defined.
CHAPTER II LITERATURE REVIEW	Error! Bookmark not defined.
2.1. Research Gap and Novelty	Error! Bookmark not defined.
CHAPTER III THEORETICAL BACKGROUND	Error! Bookmark not defined.
3.1. Electronic Nose (E-Nose)	Error! Bookmark not defined.
3.1.1. Working Principle of E-Nose	Error! Bookmark not defined.
3.1.2. Operating Principle of Gas Sensor	Error! Bookmark not defined.
3.1.3. Properties of Gas Sensor Array	Error! Bookmark not defined.
3.2. Sensor Interface Circuit	Error! Bookmark not defined.
3.3. Signal Conditioning	Error! Bookmark not defined.
3.4. Signal Pre-processing	Error! Bookmark not defined.
3.5. Pattern recognition	Error! Bookmark not defined.
3.5.1. Feature Extraction	Error! Bookmark not defined.
3.5.2. Normalization	Error! Bookmark not defined.
3.5.3. Feature selection	Error! Bookmark not defined.
3.6. Machine Learning Analysis	Error! Bookmark not defined.
3.7. Evaluation Stage	Error! Bookmark not defined.
3.7.1. Confusion Matrix Values	Error! Bookmark not defined.
3.7.2. ROC curve analysis	Error! Bookmark not defined.
3.8. Neonatal sepsis	Error! Bookmark not defined.
3.9. Blood culture	Error! Bookmark not defined.
3.10. Gas Chromatography-Mass Spectrometry (GC-MS)	Error! Bookmark not defined.
CHAPTER IV RESEARCH METHODS	Error! Bookmark not defined.
4.1. Ethical Approval	Error! Bookmark not defined.
4.2. Time, Sample, and Research Location ...	Error! Bookmark not defined.

4.4. cNose device	Error! Bookmark not defined.
4.4.1. cNose Hardware	Error! Bookmark not defined.
4.4.2. cNose Software	Error! Bookmark not defined.
4.4.3. Plastic container and hand-stop valve .	Error! Bookmark not defined.
not defined.	
4.4.4. Scale Balance	Error! Bookmark not defined.
4.6. Multivariate Data Analysis	Error! Bookmark not defined.
4.6.2. Normalization.....	Error! Bookmark not defined.
4.6.1. Feature Extraction	Error! Bookmark not defined.
4.6.4. Feature Selection.....	Error! Bookmark not defined.
4.6.5. Data Division	Error! Bookmark not defined.
4.6.6. Model Development and Parameter Tuning	Error!
Bookmark not defined.	
4.7. Analysis of Fecal VOCs	Error! Bookmark not defined.
4.8. Evaluation Design.....	Error! Bookmark not defined.
4.8.1. Cross-validation Method	Error! Bookmark not defined.
4.8.2. Performance Protocols ...	Error! Bookmark not defined.
4.8.3. Performance Time.....	Error! Bookmark not defined.
CHAPTER V RESULTS AND DISCUSSION	Error! Bookmark not defined.
5.1. cNose device.....	Error! Bookmark not defined.
5.2. cNose Sensor Response Characteristics and Pre-Processing Methods.....	Error! Bookmark not defined.
5.3. PCA and LDA Clustering of cNose Data for Positive and Negative Sepsis Fecal Data.....	Error! Bookmark not defined.
5.4. Performance of Different Models Based on Different Feature Extraction Methods	Error! Bookmark not defined.
5.5. Performance of Different Models Based on Average Value Parameters	Error! Bookmark not defined.
5.6. Filter Selection Method in Optimizing cNose Device to Differentiate Positive and Negative Sepsis Fecal Samples	Error! Bookmark not defined.
5.6.1. Application of Filter Selection Method in Classifying Positive and Negative Sepsis Fecal Data using cNose Device	Error! Bookmark not defined.
5.7. Metabolomic analysis using GC-MS.....	Error! Bookmark not defined.
defined.	
5.8. Challenges in Detecting Fecal Samples and Future Improvement	Error! Bookmark not defined.
5.9. Study Limitations	Error! Bookmark not defined.
CHAPTER VI CONCLUSION AND RECOMMENDATION	Error! Bookmark not defined.
not defined.	
6.1. Conclusion	Error! Bookmark not defined.
6.2. Recommendation	Error! Bookmark not defined.
REFERENCES.....	Error! Bookmark not defined.