

Table of Contents

Chapter 1: Introduction	1
1.1 Research Area	1
1.2 General Objectives	4
1.3 Specific Objectives	4
1.4 Thesis Structure	4
Chapter 2: Theoretical Background	5
2.1 Dataset Structure	5
2.2 Standard Data Processing Workflow	6
2.2.1 Data Cleaning & Preparation	6
2.2.2 Data Analysis	7
2.2.3 Data Modelling: Machine Learning	8
2.2.4 Data Modelling: Deep Learning	9
2.3 Supervised vs. Unsupervised Learning	10
Chapter 3: Methodology	12
Chapter 4: Proposed Framework: Deep Learning Hub	14
4.1 Deep Learning Frameworks	14
4.2 The Proposed Framework	15
4.3 Requirements	17
4.4 Authentication	18
4.5 Gateway Management	19
4.6 Projects	21
4.7 Preparing Datasets	22
4.8 Layers Architecture	28
4.9 Compiling Models	31
4.10 Organizing Runtime Tasks	32

4.11 Running Tasks	37
Chapter 5: Advanced ANN Architectures	40
5.1 Convolutional Neural Networks (CNNs)	40
5.2 Autoencoders (AEs)	41
5.3 Variational Autoencoders (VAEs)	45
5.4 Generative Adversarial Networks (GANs)	48
Chapter 6: Case Study	53
6.1 Problem Description	53
6.2 Data Cleaning & Preprocessing	55
6.3 Dataset Preparation	58
6.4 Data Modelling	60
6.5 Anomaly Detection	61
Chapter 7: Discussion & Conclusions	67
7.1 Summary	67
7.2 Conclusions	67
7.3 Future Work	69
Bibliography	70