

Contents

List of Tables	xi
List of Figures	xii
Introduction	1
0.1 Motivation	3
0.2 Objectives	4
0.2.1 Scope	5
1 Background and literature review	6
1.1 Maintenance vibration analysis and bearing	6
1.1.1 Lubricant Analysis	7
1.1.2 Vibration Analysis	7
1.2 Machine Learning, Deep Neural Networks, MLPs and GANs	9
1.2.1 CNN	9
1.2.2 Generative Adversarial Networks	10
1.2.3 StarGAN	12
1.2.4 Other Networks	15
2 Methodology	18
2.1 Procedures	18
2.2 Datasets	18
2.3 Classification	20
2.4 Signal Pre-processing	21
2.5 GAN Network	22
2.6 CNN Network	23
2.7 Evaluation Criteria	24
3 Results	25
3.1 CWR to MFPT	26
3.1.1 Scalograms	26
3.1.2 Spectrograms	27
3.2 MFPT to CWR	28
3.2.1 Scalograms	29
3.2.2 Spectrograms	30
4 Result Analysis	32

5 Discussion & Future Works	34
Conclusion	35
6 Bibliography	38
7 Annex	40
7.1 GAN	40
7.2 CNN	57