

Interim Report

The University of New South Wales

ZEIT4500: Engineering Research Project A

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**Executive Summary**

**Contents**

**Nomenclature**

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| --- | --- |
| Acronym | Expanded Form |
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**1.0 Introduction**

Opening statement – something to do with the purpose of the report:

Importance of the topic:

**1.1. Industry 4.0, Predictive Maintenance & False Data Injection Attacks**

Overview of industry 4.0:

Overview of predictive maintenance:

Discuss benefits

Predictive Maintenance context:

Discuss how it’s a component of industry 4.0

**1.2. Research Focus**

Deep learning and transformers

State objectives:

**1.3. Expected Outcomes**

Contribution to knowledge

Practical implications

Provide a closing statement that just briefly overviews the structure of the report etc.

* 1. **Aim**

List the main questions the literature review aims to answer

State any hypothesis

* 1. **Scope**

Mention the literature review

Mention the methodical approach

**2.0 Literature Review**

**2.1. Industry 4.0**

Definition:  
  
Evolution:

Core Technologies:

Impact on manufacturing:

**2.2. Predictive Maintenance**

Basic Concepts and Definitions:

Importance in industry 4.0:

Technological foundations:

**2.3. Machine Learning**

Fundamentals of Machine Learning:

Advantages over traditional methods

**2.4. Deep Learning**

Definition:

CNN:

RNN:

LSTM:

Applications to PDM Tasks

**2.5. Transformer Models**

Transformer Architecture:

Application in time series forecasting:

Case studies and reports:

**2.6. Data Handling & Analysis**

Data Collection:

Data pre-processing:

Real time data processing:

**2.7. Security and Reliability**

Cyber-security concerns:

Strategies for enhancing security:

Reliability of predictive models:

**2.8. Challenges**

Current Limitations:

Emerging Technologies  
  
Future trends

**2.9. Knowledge Gaps**

**3.0 Approach**

**3.1. Overview**

Purpose of the approach section

Connection to literature review

**3.2. System Architecture and Model Development**

System architecture overview

Model selection and rational

**3.3. Data Collection and Preparation**

Input Data

Data processing algorithms

**3.4. Model Training and Validation**

Neural Network Architecture

Training Process

Validation and testing

**3.5. Implementation and Performance Evaluation**

Implementation Strategy

Performance Metrics

Benchmarking

**3.6. Feedback and iterative improvement**

Feedback Mechanisms

Iterative improvement

**4.0 Results**

**4.1. Model Evaluation and Performance Metrics**

**4.1.1. Initial Neural Network Testing**

Purpose and setup

Performance analysis

Learning rate optimization

**4.1.1. Advanced Model Performance**

**5.0 Future Work**

**6.0 Conclusion**

**7.0 References**