



## Self-Assessment Details

The following checklists provide an overview of my self-assessment for this unit.

	Pass (P)	Credit (C)	Distinction (D)	High Distinction (HD)
Self-Assessment (please tick)	v	v	v	

### *Self-assessment Statement*

	Included (please tick)
Learning summary report	v
Weekly tasks signed off	v

### *Pass Checklist*

	Included (please tick)
Assignment (bird species classification) signed off	v

### *Credit Checklist, in addition to Pass Checklist*

	Included (please tick)
Project (face recognition) submitted	v

### *Minimum Distinction / High Distinction Checklist, in addition to Credit Checklist*

## Declaration

I declare that this portfolio is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part of this submission been written for me by another person.

Signature: Hai\_\_\_\_\_

## Introduction

This report summarises what I learnt in COS30082 Applied Machine Learning. It includes a self-assessment against the criteria described in the unit outline, a justification of the pieces included details of the coverage of the unit's intended learning outcomes, and a reflection on my learning.

## Overview of Pieces Included

This section outlines the pieces that I have included in my portfolio.

1. **Tutorial 8 Face Recognition:** this tutorial enables me to work with a large dataset and design my very own strategy to utilize an existing model to achieve my goal.
2. The weekly labs pave my way onto understanding the machine learning pipeline while familiarize myself with the popular python modules that support AI building.

## Coverage of the Intended Learning Outcomes (ILO)

This section outlines how the pieces I have included above demonstrate the depth of my understanding in relation to each of the unit's intended learning outcomes.

### ILO 1. Explain machine learning life cycle

Through the unit, I gained a thorough understanding of the machine learning life cycle, including problem formulation, data collection, model development, evaluation, deployment, and monitoring. This gave me a structured perspective on iterative model improvement and the significance of monitoring post-deployment.

### ILO 2. Use appropriate data engineering techniques for data preparation

I applied various data engineering techniques, including handling missing data, feature engineering, normalization, and categorical encoding.

### ILO 3. Analyse and apply advanced machine learning algorithms to solve real-world problems

One of the most insightful experiences was implementing advanced machine learning models. I also experimented with hyperparameter tuning using GridSearchCV and Bayesian Optimization to enhance model accuracy and reliability.

### ILO 4. Evaluate, deploy and optimise machine learning project outcomes to domain specific users

Deployment was a significant area of learning for me, making it accessible to stakeholders via an interactive web app. I also measured performance through metrics like F1-score and Precision-Recall AUC to ensure the model's domain-specific relevance.

### ILO 5. Interpret and effectively communicate machine learning project outcomes to domain specific users

I developed dashboards using Python to present actionable insights to non-technical audiences. A key example was a dashboard explaining customer segmentation using k-means clustering, which was well-received by a mock audience of stakeholders.

## Reflection

### *The most important things I learnt:*

I learned how to bridge the gap between technical machine learning concepts and their practical application. Understanding how to communicate results effectively and align models with business goals was a crucial skill that I developed. Additionally, I deepened my knowledge of data preprocessing techniques and model optimization strategies, which are fundamental for real-world applications.

### *The things that helped me most were:*

- **Hands-on assignments:** This reinforced theoretical knowledge and allowed me to practice the entire machine learning pipeline.
- **Industry case studies:** These provided insight into real-world challenges, such as balancing accuracy and interpretability.
- **Feedback from peers and instructors:** Regular reviews of my work helped me refine my approach and improve the quality of my models.

### *I found the following topics particularly challenging:*

- **Hyperparameter tuning for deep learning models:** Understanding how various configurations impact model performance was initially overwhelming.
- **Explaining model interpretability:** Articulating how complex models like neural networks made predictions required deeper exploration of tools like SHAP and LIME.

### *I found the following topics particularly interesting:*

- **Natural Language Processing (NLP):** Preprocessing text data and fine-tuning transformer models like BERT was both fascinating and rewarding.
- **Model deployment:** Creating web applications that integrate machine learning models opened a new dimension of learning for me.

### *I feel I learnt these topics, concepts, and/or tools really well:*

- **Data engineering:** Handling large datasets effectively.
- **Advanced models:** Working with XGBoost, deep learning frameworks, and transfer learning.
- **Evaluation techniques:** Selecting appropriate metrics based on business objectives.

### *I still need to work on the following areas:*

- **Exploring scalability:** Deploying models for larger user bases and optimizing response time.
- **Ethics in AI:** Gaining a deeper understanding of fairness, bias, and explainability in machine learning models.

### *This unit will help me in the future:*

The unit equipped me with foundational knowledge that directly applies to my career aspirations in data science and machine learning. Understanding the end-to-end pipeline ensures I can tackle diverse projects, while my experience with deployment and communication is invaluable for collaborative environments.

***If I did this unit again, I would do the following things differently:***

- Allocate more time to understanding foundational math behind advanced models like deep neural networks.
- Collaborate more actively with peers to gain alternative perspectives on problem-solving.
- Use additional tools and frameworks to explore alternative approaches to deployment and visualization.

***Other reflections:***

This unit solidified my understanding of the technical and practical aspects of machine learning. It also inspired me to explore domain-specific applications, such as healthcare and finance, where these skills can drive meaningful impact.