# COMP24112 Lab Report

Licheng Chen

May 3, 2024

## 1 Linear Classification via Gradient Descent

### 1.1 Derivation of the training objection function

$$O = C\sum_{i=1}^{N}\max\left(0, 1 - y_i\left(\mathbf{w}^T\mathbf{x}_i + w_0\right)\right) + \frac{1}{2}\mathbf{w}^T\mathbf{w}.$$

### 1.2 Model Training and Testing

### 1.3 Learning Rate Analysis

## 2 Air Quality Analysis by Neural Network

### 2.1 Model Selection

### 2.2 Training Algorithm Comparison: SGD and ADAM

## 3 Building A Robust MLP Regressor