

# C1\_W3\_Lab08\_Overfitting\_Soln

October 24, 2024

## 1 Ungraded Lab: Overfitting

### 1.1 Goals

In this lab, you will explore: - the situations where overfitting can occur - some of the solutions

```
[1]: %matplotlib widget
import matplotlib.pyplot as plt
from ipywidgets import Output
from plt_overfit import overfit_example, output
plt.style.use('./deeplearning.mplstyle')
```

## 2 Overfitting

The week's lecture described situations where overfitting can arise. Run the cell below to generate a plot that will allow you to explore overfitting. There are further instructions below the cell.

```
[2]: plt.close("all")
display(output)
ofit = overfit_example(False)
```

Output()

Canvas(toolbar=Toolbar(toolitems=[('Home', 'Reset original view', 'home', 'home'), ('Back', 'B

In the plot above you can: - switch between Regression and Categorization examples - add data - select the degree of the model - fit the model to the data

Here are some things you should try: - Fit the data with degree = 1; Note 'underfitting'. - Fit the data with degree = 6; Note 'overfitting' - tune degree to get the 'best fit' - add data: - extreme examples can increase overfitting (assuming they are outliers). - nominal examples can reduce overfitting - switch between **Regression** and **Categorical** to try both examples.

To reset the plot, re-run the cell. Click slowly to allow the plot to update before receiving the next click.

Notes on implementations: - the ‘ideal’ curves represent the generator model to which noise was added to achieve the data set - ‘fit’ does not use pure gradient descent to improve speed. These methods can be used on smaller data sets.

## **2.1 Congratulations!**

You have developed some intuition about the causes and solutions to overfitting. In the next lab, you will explore a commonly used solution, Regularization.