

# Multi-Layer Perceptron

Christopher Parker  
Biologically Inspired Computing  
University of Oslo  
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**Abstract**—I developed a single hidden layer perceptron classifier, hereafter referred to as a 'network', applied to control of a prosthesis. The input was provided as a time series of 10 samples of 4 sensors, yielding a 40-dimensional input vector. The output was 8 dimensional, and its argmax corresponded to the classification result. Test error of 2.6% was achieved in under on minute of training. This was comparable to results using reference implementations of the support vector classifiers in the Scikit-Learn package. Hill climbing was used for parameter tuning, though I discuss that this could have been significantly improved through genetic search.

The relevant code & example output images may be found at:  
[github.com/csp256/INF3490\\_Homework\\_2](https://github.com/csp256/INF3490_Homework_2)

## I. INTRODUCTION

## II. THEORY & ALGORITHM SPECIFICATION

seeding and reproducibility Data Starvation SVC Hill Climbing Low pass filter Batching 6th order one sided finite derivative bias learning towards discriminating difficult cases manifold hypothesis confusion matrix, conditional probabilities updated validation error

- A. *Paths and Lengths*
- B. *Exhaustive Search*
- C. *Greedy Search (Hill Climbing)*
- D. *Genetic Search*

## III. RESULTS

- A. *Exhaustive Search*
- B. *Greedy Search*
- C. *Genetic Search*

## IV. FUTURE WORK

## V. CONCLUSION