

Measurements of $H \rightarrow b\bar{b}$ decays and VH production

Thomas Charman

Supervisor: Dr. Jonathan Hays



Queen Mary University of London

Submitted in partial fulfillment of the requirements of the Degree of
Doctor of Philosophy January 22, 2021.

I, Thomas Paul Charman, confirm that the research included within this thesis is my own work or that where it has been carried out in collaboration with, or supported by others, that this is duly acknowledged below and my contribution indicated. Previously published material is also acknowledged below.

I attest that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge break any UK law, infringe any third party's copyright or other Intellectual Property Right, or contain any confidential material.

I accept that the College has the right to use plagiarism detection software to check the electronic version of the thesis. I confirm that this thesis has not been previously submitted for the award of a degree by this or any other university.

The copyright of this thesis rests with the author and no quotation from it or information derived from it may be published without the prior written consent of the author.

Signature:

Date:

Details of collaboration and publications:

Contents

List of Figures	3
List of Tables	4
1 Machine Learning Theory	5
1.1 Boosted Decision Trees	5
1.2 Neural Networks	5
1.3 Parametrised Neural Networks	5
Bibliography	7

List of Figures

1.1 The structure of a decision tree.	5
1.2 A more complex neural network containing an input layer of d nodes corresponding to data of dimensionality d , n hidden layers of m hidden units each h_{ij} (where i indexes hidden layer and j indexes a particular unit) and an output layer of K predictive units y_k	6

1.3	A more complex neural network containing an input layer of d nodes corresponding to data of dimensionality d , n hidden layers of m hidden units each h_{ij} (where i indexes hidden layer and j indexes a particular unit) and an output layer of K predictive units y_k	6
-----	---	---

List of Tables

Chapter 1

Machine Learning Theory

1.1 Boosted Decision Trees

Decision trees have a structure as in figure 1.1.

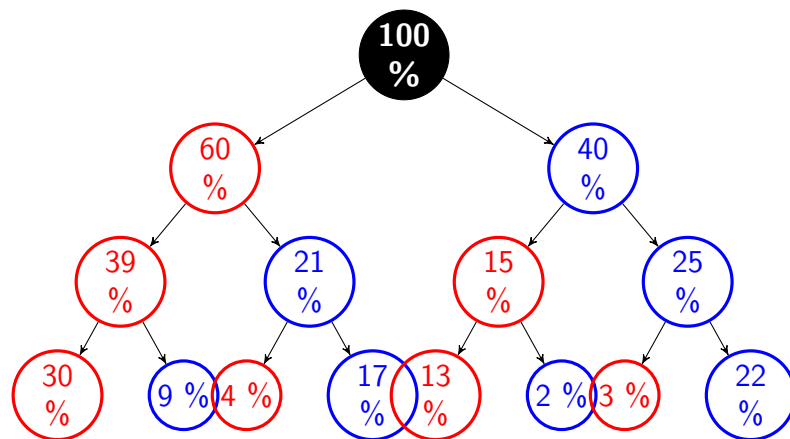


Figure 1.1: The structure of a decision tree.

1.2 Neural Networks

Neural networks have a structure as in figure 1.2.

1.3 Parametrised Neural Networks

Parametrised neural networks take extra inputs equal to the number of relevant parameters, as seen in figure 1.3.

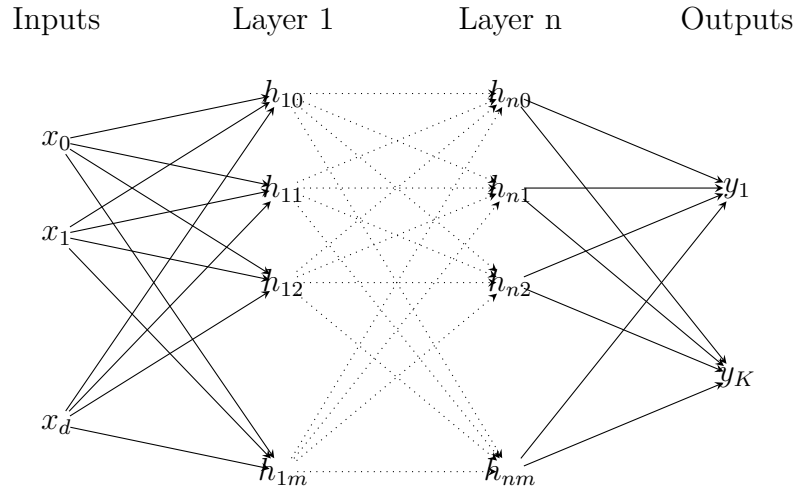


Figure 1.2: A more complex neural network containing an input layer of d nodes corresponding to data of dimensionality d , n hidden layers of m hidden units each h_{ij} (where i indexes hidden layer and j indexes a particular unit) and an output layer of K predictive units y_k .

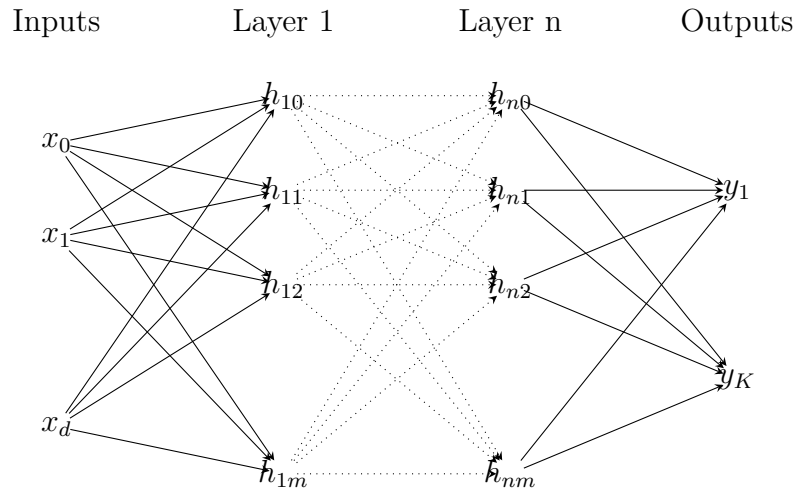


Figure 1.3: A more complex neural network containing an input layer of d nodes corresponding to data of dimensionality d , n hidden layers of m hidden units each h_{ij} (where i indexes hidden layer and j indexes a particular unit) and an output layer of K predictive units y_k .

Bibliography