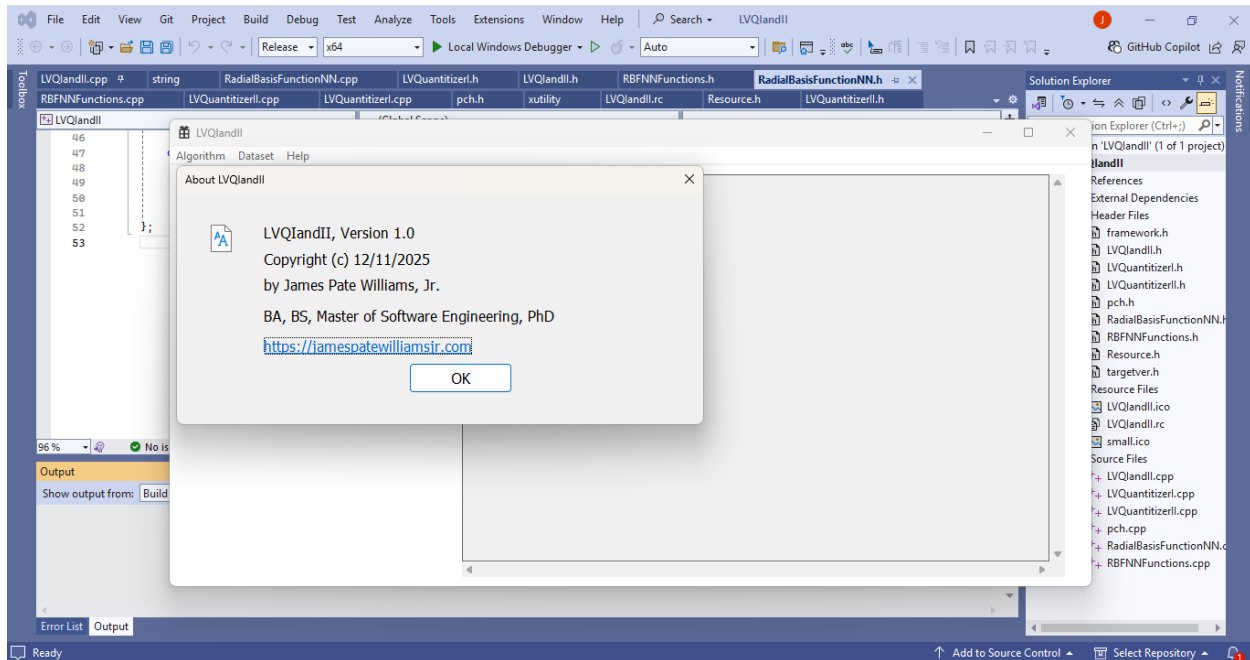


Blog Entry © Tuesday, December 16, 2025, by James Pate Williams, Jr., Machine Learning the Abalone and Hill-Valley Datasets Using Learning Vector Quantization I and II, and the Radial Basis Function Neural Network

Reference for Radial Basis Function Neural Network: "Computational Intelligence an Introduction" © November 2005 by Andries P. Engelbrecht Section 5.2 Radial Basis Function Neural Networks Learn the centroids using LVQ-I. Also, LVQ-I and II are discussed in the same textbook.



Abalone Dataset

Learning Vector Quantization I

Eta (Learning Rate): 0.100000
 # Training Epochs : 1
 % Correct Training : 12
 % Correct Test : 23
 RMS Error Training : 1.076125
 RMS Error Test : 0.989901
 Runtime (s) : 0.002000

Abalone Dataset

Learning Vector Quantization I

Eta (Learning Rate): 0.100000
 # Training Epochs : 5
 % Correct Training : 13
 % Correct Test : 25
 RMS Error Training : 1.054850
 RMS Error Test : 0.974311
 Runtime (s) : 0.006000

Abalone Dataset

Learning Vector Quantization I

Eta (Learning Rate): 0.100000
Training Epochs : 10
% Correct Training : 12
% Correct Test : 24
RMS Error Training : 1.071517
RMS Error Test : 0.982624
Runtime (s) : 0.013000

Hill-Valley Dataset

Learning Vector Quantization I

Eta (Learning Rate): 0.100000
Training Epochs : 1
% Correct Training : 44
% Correct Test : 45
RMS Error Training : 0.982221
RMS Error Test : 1.048181
Runtime (s) : 0.003000

Hill-Valley Dataset

Learning Vector Quantization II

Eta (Learning Rate): 0.100000
Training Epochs : 1
% Correct Training : 42
% Correct Test : 44
RMS Error Training : 2.520536
RMS Error Test : 2.638051
Runtime (s) : 0.004000

Hill-Valley Dataset

Radial Basis Function Neural Network

Eta (Learning Rate): 0.100000
Training Epochs : 1
% Correct Training : 72
% Correct Test : 68
RMS Error Training : 0.555032
RMS Error Test : 0.601896
Runtime (s) : 0.191000

Hill-Valley Dataset

Random Coin-Flip Guessing

Train Examples : 454
Test Examples : 152
%Correct Training : 46
%Correct Test : 58

Hill-Valley Dataset

Learning Vector Quantization I

Eta (Learning Rate): 0.100000
Training Epochs : 5

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% Correct Training : 44
% Correct Test      : 45
RMS Error Training  : 1.072278
RMS Error Test      : 1.115088
Runtime (s)         : 0.013000
Hill-Valley Dataset
Learning Vector Quantization II
Eta (Learning Rate): 0.100000
# Training Epochs   : 5
% Correct Training  : 40
% Correct Test      : 42
RMS Error Training  : 3.181343
RMS Error Test      : 3.330837
Runtime (s)         : 0.007000
Hill-Valley Dataset
Radial Basis Function Neural Network
Eta (Learning Rate): 0.100000
# Training Epochs   : 5
% Correct Training  : 86
% Correct Test      : 85
RMS Error Training  : 0.657993
RMS Error Test      : 0.683020
Runtime (s)         : 0.654000
Hill-Valley Dataset
Learning Vector Quantization I
Eta (Learning Rate): 0.100000
# Training Epochs   : 10
% Correct Training  : 44
% Correct Test      : 46
RMS Error Training  : 1.131254
RMS Error Test      : 1.203066
Runtime (s)         : 0.017000
Hill-Valley Dataset
Learning Vector Quantization II
Eta (Learning Rate): 0.100000
# Training Epochs   : 10
% Correct Training  : 39
% Correct Test      : 42
RMS Error Training  : 3.691707
RMS Error Test      : 3.869456
Runtime (s)         : 0.015000
Hill-Valley Dataset
Radial Basis Function Neural Network
Eta (Learning Rate): 0.100000
# Training Epochs   : 10
% Correct Training  : 91
% Correct Test      : 90
```

RMS Error Training : 0.655170
RMS Error Test : 0.690865
Runtime (s) : 1.245000

