

Discriminant analysis

Examples

1. 2D Data Separation (RBF)

<http://134.208.26.59/MathProgramming2010/Lecture10/Lecture10III.files/frame.htm>

<http://134.208.26.59/MathProgramming2010/Lecture10/Lecture10III.pdf>

2 Hill and Valley (MLP)

<http://134.208.26.59/INA/Discriminant%20analysis.files/frame.htm>

<http://134.208.26.59/INA/Discriminant%20analysis.pdf>

3. Hand written character recognition

<http://134.208.26.59/INA/PenWriting.files/frame.htm>

4. Breast cancer diagnosis

http://134.208.26.59/INA/Cancer_Diagnosis.files/frame.htm

UCI Machine Learning Repository
Center for Machine Learning and Intelligent Systems

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Welcome to the UC Irvine Machine Learning Repository!

We currently maintain 211 data sets as a service to the machine learning community. You may [view all data sets](#) through our searchable interface. Our [FAQ](#) is still available, for those who prefer the old format. For a general overview of the Repository, please visit our [About Us](#) page. For information about citing data sets in publications, please read our [citation policy](#). If you wish to donate a data set, please consult our [donation policy](#). For any other questions, feel free to contact the [Repository Staff](#). We have also set up a [wiki](#) site for the Repository.

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Latest News:	Newest Data Sets:	Most Popular Data Sets (since 2007):
<p>2010-03-01: Note from donor regarding Higgs data</p> <p>2009-10-16: Two new data sets have been added.</p> <p>2009-09-14: Several data sets have been added.</p> <p>2009-07-23: Repository mirror has been set up.</p> <p>2008-03-24: New data sets have been added!</p> <p>2007-06-29: Two new data sets have been added: UCI Pen Characters, NISTSD German Telephones</p> <p>2007-04-13: Research papers that cite the repository have been associated to specific data sets.</p>	<p>2010-06-13: Amazon Access Services</p> <p>2010-06-09: YachtRaid Dataset</p> <p>2010-07-27: Vowel_Physical_Action_Data_Set</p> <p>2010-07-27: EMG_Physical_Action_Data_Set</p> <p>2010-07-26: GutBank_Review_Dataset</p> <p>2010-07-27: Relative location of CT slices on breast sets</p> <p>2010-06-13: Amazon Commerce reviews</p>	<p>281058: tic</p> <p>204823: Adult</p> <p>118344: tic</p> <p>142877: Breast_Cancer_Wisconsin_Diagnostic</p> <p>124879: Car_Evaluation</p> <p>112147: Abalone</p> <p>104188: Fiber_Hand</p>

Featured Data Set: Internet Advertisements

Task: Classification
Data Type: Multivariate
Attributes: 1036
Instances: 3279

Exercise

1. A simple approach for supervised learning of a network of radial basis functions subject to paired training data has been introduced. Two cascaded steps respectively apply the K-means method and the hyperplane fitting method to find proper centers of predictors and posterior weights. Please implement the learning method for function approximation.

2. Please revise the toolkit of data separation

<http://134.208.26.59/AdvancedNA/Lecture6/Lecture62.files/frame.htm>

- Apply supervised learning of radial basis functions
- Apply supervised learning of simple perceptrons

Support Vector Machine

$$S = \{(x_i, y_i)\}$$

$$f(x) = \sum_i \alpha_i (x_i^T x + 1)^p y_i$$

$$\alpha_i \in \{0, 1\}$$

$$Da = y$$

$$D, y \Rightarrow a_{k,1}$$

$$\wedge$$
$$k \times k$$

$$\oplus a = \text{inv}(D)$$

$$\oplus N \times K$$
$$\oplus$$

$$\times y$$

$\circ N(0, 1)$

\circ

\circ

$$\begin{aligned} \therefore AS + b &\Rightarrow X \in \mathbb{R}^2 \\ \therefore \underbrace{\mathbb{R}^{100}}_{\text{}} &\underbrace{\{X \in \mathbb{R}^2\}}_{\text{}} \end{aligned}$$

$$\circ \ell = 100 \Rightarrow A_{100 \times 3}$$

