Assignment 5

The data file for submitting this assignment has passed.

For the data set [X], consider the following questions.

6. Consider the following data set.

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>X3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

(a) Calculate the mean of the data set.

(b) Calculate the variance of the data set.

(c) Calculate the covariance matrix of the data set.

(d) Calculate the principal component analysis (PCA) of the data set.

(e) Plot the first two principal components.

(f) Calculate the eigenvalues and eigenvectors of the covariance matrix.

(g) Interpret the results of the PCA.

(h) Use the results of the PCA to reduce the dimensionality of the data set.

(i) Plot the reduced data set.

(j) Calculate the Mahalanobis distance of each data point.

(k) Calculate the nearest neighbor classification of the data set.

(l) Calculate the leave-one-out cross-validation error of the data set.

(m) Calculate the support vector machine (SVM) classification of the data set.

(n) Calculate the decision tree classification of the data set.

(o) Calculate the random forest classification of the data set.

(p) Calculate the neural network classification of the data set.

(q) Calculate the gradient boosting classification of the data set.

(r) Calculate the deep learning classification of the data set.

(s) Calculate the ensemble classification of the data set.

(t) Calculate the boosting classification of the data set.

(u) Calculate the bagging classification of the data set.

(v) Calculate the stacking classification of the data set.

(w) Calculate the Voting classification of the data set.

(x) Calculate the Stacking of Models classification of the data set.

(y) Calculate the Boosting of Models classification of the data set.

(z) Calculate the Bagging of Models classification of the data set.

{The above questions are examples and should be replaced with actual questions related to the data file.}