

# Simulation from Sheryl on 2019.11.27

```
import numpy as np
import pandas as pd # data processing, csv file I/O (e.g. pd.read_csv)
import warnings
warnings.filterwarnings('ignore')
import matplotlib
import matplotlib.pyplot as plt
%matplotlib inline

def simulations(pi_1, mu_1, mu_0, dim, sigma_1, sigma_0, N):
    """
    generate simulated data points

    X, y = simulations(pi, mu_1, mu_0, dim, sigma_1, sigma_0, N = 1000)

    Inputs:
        pi_1: prior probability for Y = 1
        mu_1, mu_0: means for X|Y=1 and X|Y=0
        dim: dimension of the feature space of x
        sigma_1, sigma_0: standard deviations for X|Y=1 and X|Y=0
        N: number of data points

    Outputs:
        x: data points with features
        y: classification results
    """
    # generate y from Bernoulli(pi) as a vector with N entries
    y = np.random.binomial(1, pi_1, N)
    X = np.zeros([N, dim]) # initialize X
    num_1 = np.sum(y == 1)
    num_0 = np.sum(y == 0)
    X[y == 1] = np.random.multivariate_normal(mean = mu_1, cov = sigma_1, size =
num_1)
    X[y == 0] = np.random.multivariate_normal(mean = mu_0, cov = sigma_0, size =
num_0)
    return X, y

# import baseline models
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from sklearn import metrics
from sklearn.ensemble import RandomForestClassifier
from sklearn import model_selection
from sklearn.metrics import accuracy_score
from sklearn.linear_model import LogisticRegression
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.naive_bayes import GaussianNB
from sklearn.svm import SVC
```

```

from sklearn.ensemble import AdaBoostClassifier
from imblearn.over_sampling import SMOTE
from imblearn.pipeline import Pipeline as Pipeline
from sklearn.datasets import make_classification
from sklearn.model_selection import (GridSearchCV, StratifiedKFold)
# scale and split
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()

```

```

def Find_Optimal_Cutoff(target, predicted):
    """ Find the optimal probability cutoff point for a classification model
    related to event rate

    Parameters
    -----
    target : Matrix with dependent or target data, where rows are observations

    predicted : Matrix with predicted data, where rows are observations

    Returns
    -----
    list type, with optimal cutoff value
    """
    fpr, tpr, threshold = roc_curve(target, predicted)
    i = np.arange(len(tpr))
    roc = pd.DataFrame({'tf' : pd.Series(tpr-(1-fpr), index=i), 'threshold' :
pd.Series(threshold, index=i)})
    roc_t = roc.ix[(roc.tf-0).abs().argsort()[:1]]

    return list(roc_t['threshold'])

```

```

def Bayes_proba(x, pi_1, mu_0, mu_1, Sigma):
    tmp = np.exp((mu_0[:,None] - mu_1[:,None]).T @ np.linalg.solve(Sigma, (x.T -
(mu_0[:,None] + mu_1[:,None])/2)))
    return (pi_1/(pi_1 + (1 - pi_1) * tmp))[0,:]

```

```

from sklearn.metrics import roc_auc_score, average_precision_score, f1_score,
log_loss, recall_score, precision_recall_curve, auc
from sklearn.metrics import roc_curve, accuracy_score
seed=7
models = [] # Here I will append all the algorithms that I will use. Each one
will run in all the created datasets.
models.append(('LR', LogisticRegression()))
models.append(('LDA', LinearDiscriminantAnalysis()))
models.append(('KNN', KNeighborsClassifier()))
models.append(('CART', DecisionTreeClassifier()))
models.append(('NB', GaussianNB()))
models.append(('RF', RandomForestClassifier()))
#models.append(('SVM', SVC()))
models.append(('AdaBoost', AdaBoostClassifier()))

```

```

def simulation_results(pi_1, mu, dim, N):
    """
    generate simulated data points, then get scores and plots
    """

```

```

simulation_results(dim = 10, mu = 1)

Inputs:
    pi_1: prior probability for Y = 1
    mu:   means for X|Y=1 and X|Y=0 are (mu, 0, ...,0) and (-mu, 0,
...,0) respectively
        dim:   dimension of the feature space of X
        N: number of data points

Outputs:
    X: data points with features
    y: classification results
    ....
# initialization
mu_1 = np.zeros(dim,)
mu_1[0] = mu
mu_0 = np.zeros(dim,)
mu_0[0] = -mu
sigma_1 = np.identity(dim)
sigma_0 = np.identity(dim)
X, y = simulations(pi_1, mu_1, mu_0, dim, sigma_1, sigma_0, N)
# class distribution
ratio = y.sum()/len(y)
print('Positive ratio for pi_1 =',pi_1, ', mu =', mu, ', dim =',dim,
is',ratio,'.')
# scale and fit
scaler.fit(X)
X_scaled = scaler.transform(X)
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.33, random_state=444, stratify=y)
# compare different classifiers
results_accuracy=[]
results_auroc=[]
results_average_precision=[]
results_neg_log_loss=[]
results_f1 = []
results_recall =[]
names=[]
fpr_full = []
tpr_full = []
thresholds_roc_full = []
precision_full = []
recall_full = []
thresholds_prc_full = []
measures =
['AUROC', 'AUPRC', 'accuracy_best_threshold', 'accuracy', 'average_precision', 'f1',
'log_loss_score', 'recall']
scores_table = np.zeros([9,8])
roc_cut = np.zeros([8,]).astype(int) # cut points for fpr, tpr, thresholds
for ROC curve of each model
    prc_cut = np.zeros([8,]).astype(int) # cut points for precision, recall,
thresholds for PRC curve of each model
    i = 0 # looping index
    for name, model in models:
        y_pred_proba = model.fit(X_train, y_train).predict_proba(X_test)[:,  

1]
        fpr, tpr, thresholds = roc_curve(y_test, y_pred_proba)
        fpr_full = np.concatenate((fpr_full, fpr))

```

```

        tpr_full = np.concatenate((tpr_full, tpr))
        thresholds_roc_full = np.concatenate((thresholds_roc_full,
thresholds))
        roc_cut[i + 1] = roc_cut[i] + fpr.shape[0]
#Area under ROC curve
        auroc = roc_auc_score(y_test,y_pred_proba)
        precision, recall, thresholds =
precision_recall_curve(y_test,y_pred_proba)
        precision_full = np.concatenate((precision_full, precision))
        recall_full = np.concatenate((recall_full, recall))
        thresholds_prc_full = np.concatenate((thresholds_prc_full,
thresholds))
        prc_cut[i + 1] = prc_cut[i] + recall.shape[0]
# area under PRC curve
        auprc = auc(recall, precision)

        threshold = Find_Optimal_Cutoff(y_test,y_pred_proba)
        y_pred = y_pred_proba>threshold
        accuracy_best_threshold = accuracy_score(y_test, y_pred)
        accuracy = accuracy_score(y_test, model.predict(X_test))
        average_precision = average_precision_score(y_test,
model.predict(X_test))
        f1 = f1_score(y_test, model.predict(X_test))
        log_loss_score = log_loss(y_test, model.predict(X_test))
        recall = recall_score(y_test, model.predict(X_test))
        names.append(name)

# report of scores
        scores_table[i, 0] = auroc
        scores_table[i, 1] = auprc
        scores_table[i, 2] = accuracy_best_threshold
        scores_table[i, 3] = accuracy
        scores_table[i, 4] = average_precision
        scores_table[i, 5] = f1
        scores_table[i, 6] = -log_loss_score
        scores_table[i, 7] = recall
        print(name,': AUROC = {:.3f}, AUPRC = {:.3f}, average precision =
{:.3f}, '.format(auroc,auprc,average_precision),
            '\nBest threshold for ROC = {:.3f},'.format(threshold[0]),
'accuracy for the best ROC threshold is then {:.3f},'
            .format(accuracy_best_threshold), 'accuracy = {:.3f}.'.format(accuracy),
            '\nF1 score = {:.3f},'.format(f1), 'log loss = {:.3f},'.format(log_loss_score),'recall = {:.3f}.'.format(recall))
        print ("--"*30)
        i = i + 1

# Bayes classifier
        y_pred_prob_Bayes = Bayes_proba(X_test, pi_1, mu_0, mu_1, sigma = sigma_1)
        fpr, tpr, thresholds = roc_curve(y_test, y_pred_proba)
#Area under ROC curve
        auroc = roc_auc_score(y_test,y_pred_prob_Bayes)

        precision, recall, thresholds =
precision_recall_curve(y_test,y_pred_prob_Bayes)
        auprc = auc(recall, precision)

```

```

    print('Bayes classifier has AUROC = {:.3f}, and AUPRC = {:.3f}'.format(auroc, auprc))
    scores_table[7, 0] = auroc # Bayes
    scores_table[7, 1] = auprc # Bayes
    scores_table[8, 0] = 0.5 # random guess
    scores_table[8, 1] = ratio # random guess
    #plot ROC
    plt.plot([0,1],[0,1],'k--')
    plt.plot(fpr,tpr)
    for i in range(7):
        plt.plot(fpr_full[roc_cut[i]:roc_cut[i + 1]],tpr_full[roc_cut[i]:roc_cut[i + 1]], label=name)
        plt.xlabel('fpr')
        plt.ylabel('tpr')
        title_name = 'pi_1' + str(pi_1) + '_mu' + str(mu) + '_dim' + str(dim) + ' ROC curve'
        plt.title(title_name)
        plt.legend(['random guess','Bayes','LR','LDA','KNN','CART','NB','RF','AdaBoost'])
        save_name = 'pi_1' + str(pi_1) + '_mu' + str(mu) + '_dim' + str(dim) + ' simulation ROC curve.png'
        plt.savefig(save_name)
        plt.show()

    # plot PRC
    plt.axhline(y=ratio, xmin=0, xmax=1,color='k', linestyle = '--')
    plt.plot(recall,precision, label=name)
    for i in range(7):
        plt.plot(recall_full[prc_cut[i]:prc_cut[i + 1]],precision_full[prc_cut[i]:prc_cut[i + 1]], label=name)
        plt.xlabel('recall')
        plt.ylabel('precision')
        title_name = 'pi_1' + str(pi_1) + '_mu' + str(mu) + '_dim' + str(dim) + ' PRC curve'
        plt.title(title_name)
        plt.legend(['random guess','Bayes','LR','LDA','KNN','CART','NB','RF','AdaBoost'])
        save_name = 'pi_1' + str(pi_1) + '_mu' + str(mu) + '_dim' + str(dim) + ' simulation PRC curve.png'
        plt.savefig(save_name)
        plt.show()

    for i in range(8):
        print('The best model measured by ',measures[i],'is ',names[np.argmax(scores_table[:,i])])
        csv_name = 'Simulation with pi_1' + str(pi_1) + '_mu' + str(mu) + '_dim' + str(dim) + '.csv'
        np.savetxt(csv_name, scores_table, delimiter=",")

```

```

# can tune parameters here and see different results
simulation_results(pi_1 = 0.5, mu = 1, dim = 10, N = 1000)

```

Positive ratio for pi\_1 = 0.5 , mu = 1 , dim = 10 is 0.508 .  
 LR : AUROC = 0.902, AUPRC = 0.909, average precision = 0.750, .  
 Best threshold for ROC = 0.506, accuracy for the best ROC threshold is then 0.800, accuracy = 0.803.

F1 score = 0.806, log loss = 6.803, recall = 0.804.

LDA : AUROC = 0.902, AUPRC = 0.909, average precision = 0.755, .

Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then 0.809, accuracy = 0.809.

F1 score = 0.813, log loss = 6.594, recall = 0.815.

KNN : AUROC = 0.873, AUPRC = 0.882, average precision = 0.735, .

Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then 0.782, accuracy = 0.791.

F1 score = 0.795, log loss = 7.222, recall = 0.798.

CART : AUROC = 0.721, AUPRC = 0.797, average precision = 0.664, .

Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then 0.491, accuracy = 0.721.

F1 score = 0.733, log loss = 9.629, recall = 0.750.

NB : AUROC = 0.902, AUPRC = 0.907, average precision = 0.748, ...

Best threshold for ROC = 0.524, accuracy for the best ROC threshold is then 0.803, accuracy = 0.803.

F1 score = 0.807, log loss = 6.803, recall = 0.810.

RF : AUROC = 0.840, AUPRC = 0.821, average precision = 0.739, .

Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then 0.785. accuracy = 0.785.

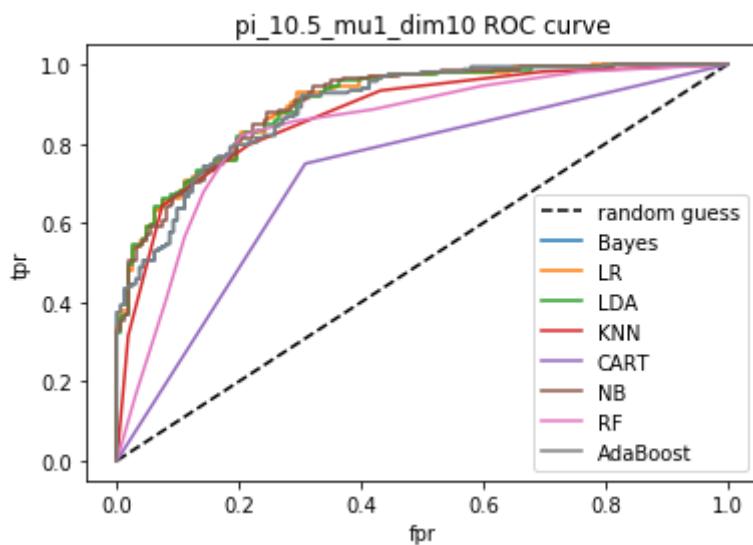
F1 score = 0.777, log loss = 7.431, recall = 0.738.

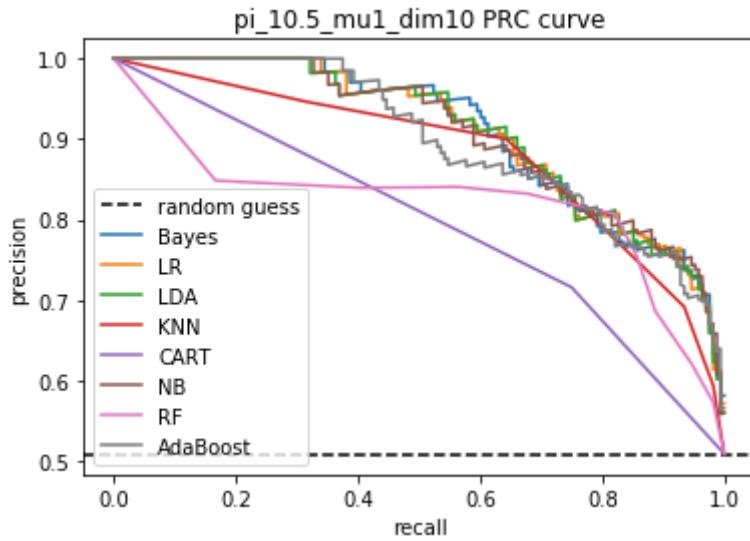
AdaBoost : AUROC = 0.893, AUPRC = 0.899, average precision = 0.731, ...

Best threshold for ROC = 0.502, accuracy for the best ROC threshold is then 0.800. accuracy = 0.791.

F1 score = 0.800, log loss = 7.222, recall = 0.821.

Bayes classifier has AUROC = 0.902, and AUPRC = 0.909.





```

The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LDA
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is AdaBoost

```

```

# can tune parameters here and see different results
for pi_1 in [0.1, 0.2, 0.3, 0.4, 0.5]:
    for mu in [0.2, 0.4, 0.6, 0.8, 1]:
        for dim in [2, 4, 6, 8, 10]:
            simulation_results(pi_1, mu, dim, N = 1000)

```

```

Positive ratio for pi_1 = 0.1 , mu = 0.2 , dim = 2  is 0.094 .
LR : AUROC = 0.595, AUPRC = 0.176, average precision = 0.094, .
Best threshold for ROC = 0.085, accuracy for the best ROC threshold is then
0.536, accuracy = 0.906.
F1 score = 0.000, log loss = 3.245, recall = 0.000.
-----
LDA : AUROC = 0.595, AUPRC = 0.176, average precision = 0.094, .
Best threshold for ROC = 0.082, accuracy for the best ROC threshold is then
0.536, accuracy = 0.906.
F1 score = 0.000, log loss = 3.245, recall = 0.000.
-----
KNN : AUROC = 0.509, AUPRC = 0.130, average precision = 0.099, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.864, accuracy = 0.900.
F1 score = 0.057, log loss = 3.454, recall = 0.032.
-----
CART : AUROC = 0.499, AUPRC = 0.122, average precision = 0.094, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.906, accuracy = 0.852.
F1 score = 0.075, log loss = 5.129, recall = 0.065.
-----
NB : AUROC = 0.591, AUPRC = 0.189, average precision = 0.094, .

```

```
Best threshold for ROC = 0.080, accuracy for the best ROC threshold is then  
0.552, accuracy = 0.906.
```

```
F1 score = 0.000, log loss = 3.245, recall = 0.000.
```

---

```
RF : AUROC = 0.454, AUPRC = 0.085, average precision = 0.094, .
```

```
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then  
0.712, accuracy = 0.876.
```

```
F1 score = 0.047, log loss = 4.291, recall = 0.032.
```

---

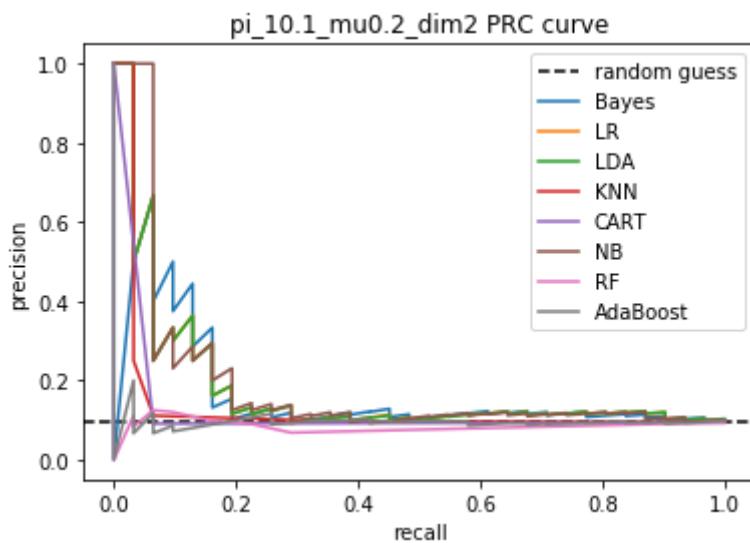
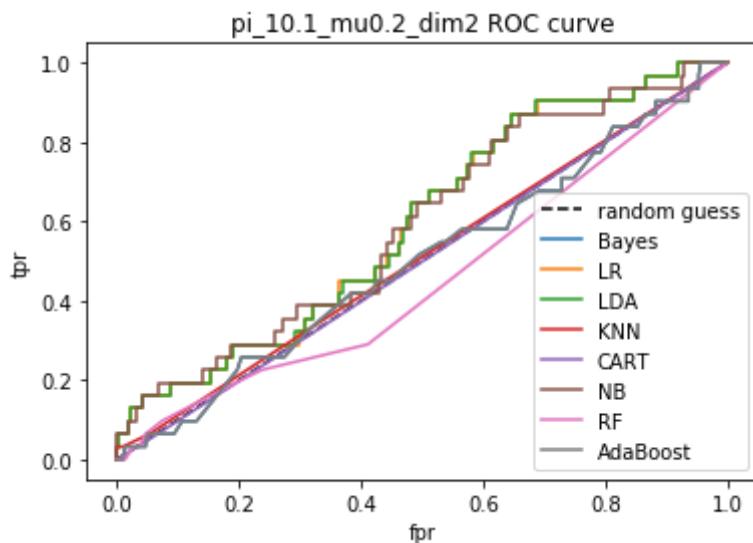
```
AdaBoost : AUROC = 0.500, AUPRC = 0.094, average precision = 0.094, .
```

```
Best threshold for ROC = 0.486, accuracy for the best ROC threshold is then  
0.542, accuracy = 0.897.
```

```
F1 score = 0.000, log loss = 3.559, recall = 0.000.
```

---

```
Bayes classifier has AUROC = 0.596, and AUPRC = 0.160.
```



```
The best model measured by AUROC is LR
```

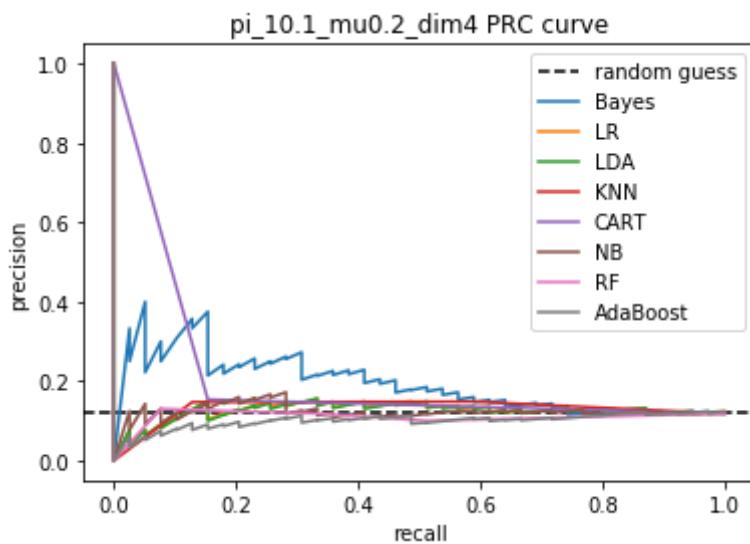
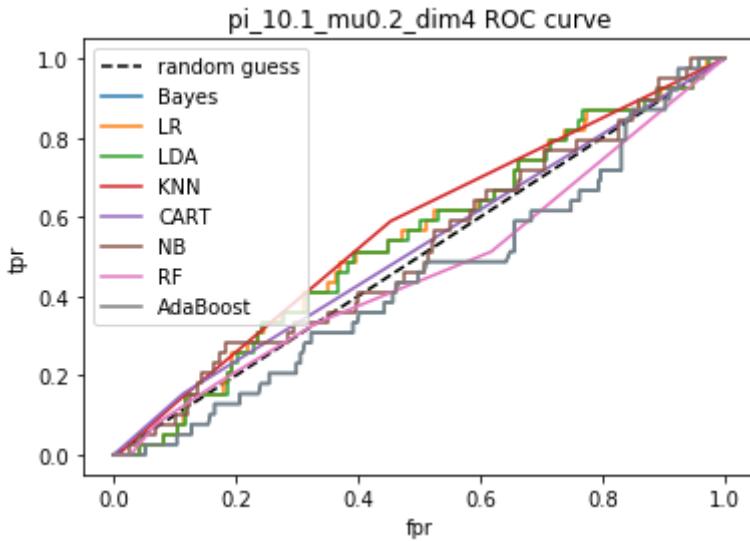
```
The best model measured by AUPRC is NB
```

```
The best model measured by accuracy_best_threshold is CART
```

```
The best model measured by accuracy is LR
```

```
The best model measured by average_precision is KNN
```

```
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.2 , dim = 4 is 0.119 .
LR : AUROC = 0.541, AUPRC = 0.125, average precision = 0.118, .
Best threshold for ROC = 0.116, accuracy for the best ROC threshold is then
0.533, accuracy = 0.882.
F1 score = 0.000, log loss = 4.082, recall = 0.000.
-----
LDA : AUROC = 0.539, AUPRC = 0.124, average precision = 0.118, .
Best threshold for ROC = 0.114, accuracy for the best ROC threshold is then
0.545, accuracy = 0.882.
F1 score = 0.000, log loss = 4.082, recall = 0.000.
-----
KNN : AUROC = 0.567, AUPRC = 0.132, average precision = 0.118, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.809, accuracy = 0.876.
F1 score = 0.000, log loss = 4.291, recall = 0.000.
-----
CART : AUROC = 0.520, AUPRC = 0.204, average precision = 0.124, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.882, accuracy = 0.800.
F1 score = 0.154, log loss = 6.908, recall = 0.154.
-----
NB : AUROC = 0.516, AUPRC = 0.122, average precision = 0.118, .
Best threshold for ROC = 0.108, accuracy for the best ROC threshold is then
0.488, accuracy = 0.882.
F1 score = 0.000, log loss = 4.082, recall = 0.000.
-----
RF : AUROC = 0.466, AUPRC = 0.110, average precision = 0.118, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.627, accuracy = 0.873.
F1 score = 0.000, log loss = 4.396, recall = 0.000.
-----
AdaBoost : AUROC = 0.442, AUPRC = 0.100, average precision = 0.118, .
Best threshold for ROC = 0.487, accuracy for the best ROC threshold is then
0.488, accuracy = 0.855.
F1 score = 0.000, log loss = 5.024, recall = 0.000.
-----
Bayes classifier has AUROC = 0.607, and AUPRC = 0.189.
```



```

The best model measured by AUROC is KNN
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.2 , dim = 6 is 0.105 .
LR : AUROC = 0.563, AUPRC = 0.129, average precision = 0.106, .
Best threshold for ROC = 0.094, accuracy for the best ROC threshold is then
0.521, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

-----
LDA : AUROC = 0.563, AUPRC = 0.128, average precision = 0.106, .
Best threshold for ROC = 0.091, accuracy for the best ROC threshold is then
0.521, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

-----
KNN : AUROC = 0.514, AUPRC = 0.128, average precision = 0.107, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.806, accuracy = 0.879.
F1 score = 0.048, log loss = 4.187, recall = 0.029.

```

```

CART : AUROC = 0.483, AUPRC = 0.146, average precision = 0.103, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.894, accuracy = 0.773.
F1 score = 0.096, log loss = 7.850, recall = 0.114.

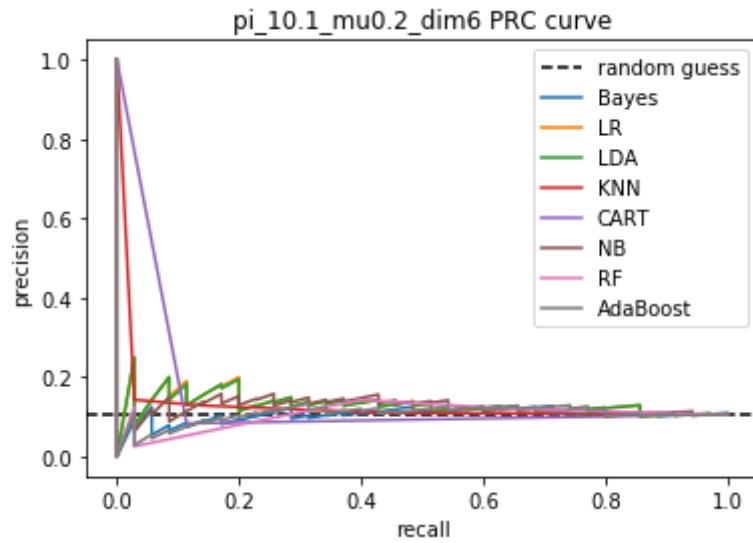
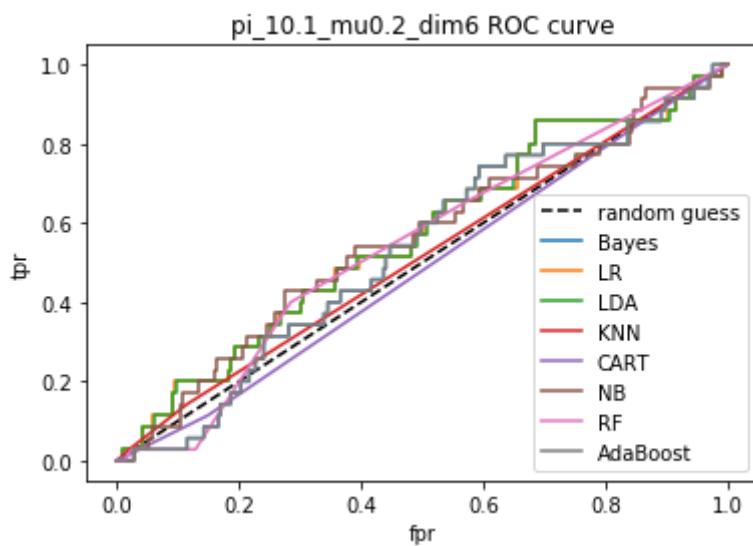
NB : AUROC = 0.554, AUPRC = 0.122, average precision = 0.106, .
Best threshold for ROC = 0.093, accuracy for the best ROC threshold is then
0.521, accuracy = 0.891.
F1 score = 0.000, log loss = 3.768, recall = 0.000.

RF : AUROC = 0.542, AUPRC = 0.105, average precision = 0.106, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.682, accuracy = 0.882.
F1 score = 0.000, log loss = 4.082, recall = 0.000.

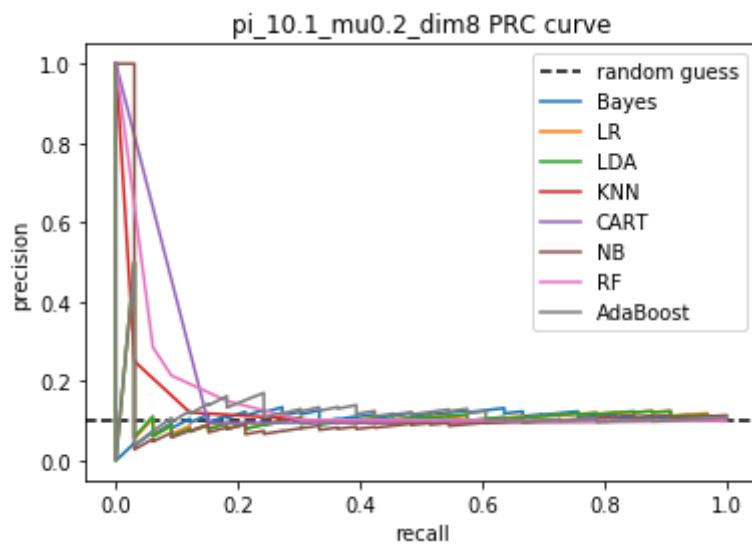
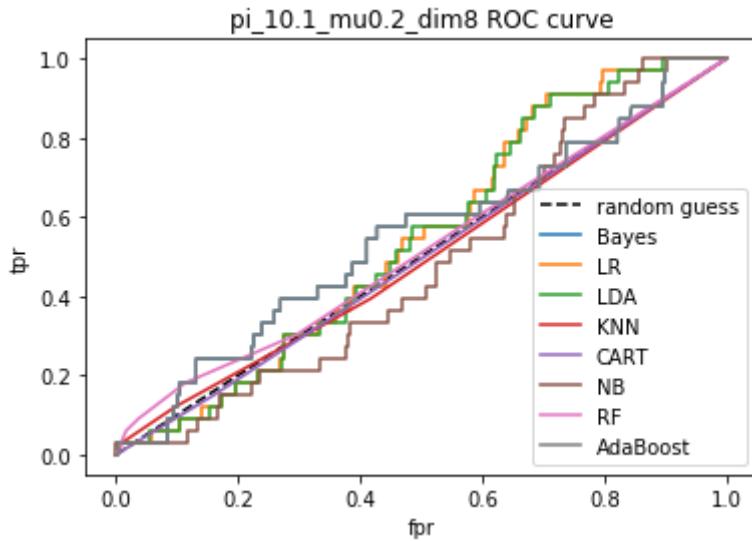
AdaBoost : AUROC = 0.528, AUPRC = 0.107, average precision = 0.106, .
Best threshold for ROC = 0.482, accuracy for the best ROC threshold is then
0.545, accuracy = 0.867.
F1 score = 0.043, log loss = 4.605, recall = 0.029.

Bayes classifier has AUROC = 0.523, and AUPRC = 0.105.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is KNN
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.2 , dim = 8 is 0.099 .
LR : AUROC = 0.546, AUPRC = 0.108, average precision = 0.100, .
Best threshold for ROC = 0.094, accuracy for the best ROC threshold is then
0.530, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.
-----
LDA : AUROC = 0.544, AUPRC = 0.107, average precision = 0.100, .
Best threshold for ROC = 0.090, accuracy for the best ROC threshold is then
0.521, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.
-----
KNN : AUROC = 0.495, AUPRC = 0.124, average precision = 0.105, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.824, accuracy = 0.894.
F1 score = 0.054, log loss = 3.663, recall = 0.030.
-----
CART : AUROC = 0.495, AUPRC = 0.165, average precision = 0.099, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.900, accuracy = 0.770.
F1 score = 0.116, log loss = 7.955, recall = 0.152.
-----
NB : AUROC = 0.481, AUPRC = 0.118, average precision = 0.100, .
Best threshold for ROC = 0.080, accuracy for the best ROC threshold is then
0.473, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.
-----
RF : AUROC = 0.517, AUPRC = 0.149, average precision = 0.100, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.664, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.
-----
AdaBoost : AUROC = 0.547, AUPRC = 0.118, average precision = 0.105, .
Best threshold for ROC = 0.485, accuracy for the best ROC threshold is then
0.570, accuracy = 0.894.
F1 score = 0.054, log loss = 3.663, recall = 0.030.
-----
Bayes classifier has AUROC = 0.563, and AUPRC = 0.108.
```



```

The best model measured by AUROC is AdaBoost
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is KNN
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.2 , dim = 10  is 0.106 .
LR : AUROC = 0.474, AUPRC = 0.126, average precision = 0.106, .
Best threshold for ROC = 0.092, accuracy for the best ROC threshold is then
0.476, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

-----
LDA : AUROC = 0.471, AUPRC = 0.125, average precision = 0.106, .
Best threshold for ROC = 0.085, accuracy for the best ROC threshold is then
0.439, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

-----
KNN : AUROC = 0.443, AUPRC = 0.081, average precision = 0.106, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.809, accuracy = 0.882.
F1 score = 0.000, log loss = 4.082, recall = 0.000.

```

```

CART : AUROC = 0.505, AUPRC = 0.174, average precision = 0.107, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.894, accuracy = 0.791.
F1 score = 0.127, log loss = 7.222, recall = 0.143.

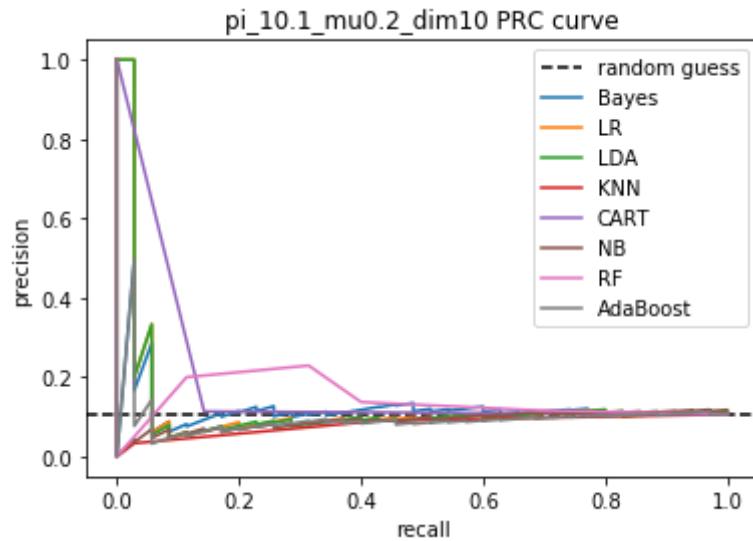
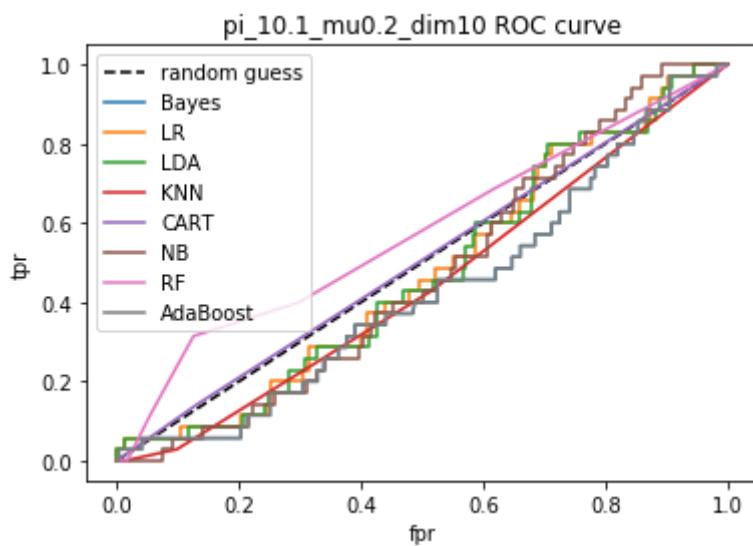
NB : AUROC = 0.467, AUPRC = 0.091, average precision = 0.106, .
Best threshold for ROC = 0.086, accuracy for the best ROC threshold is then
0.455, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

RF : AUROC = 0.575, AUPRC = 0.141, average precision = 0.106, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.815, accuracy = 0.885.
F1 score = 0.000, log loss = 3.977, recall = 0.000.

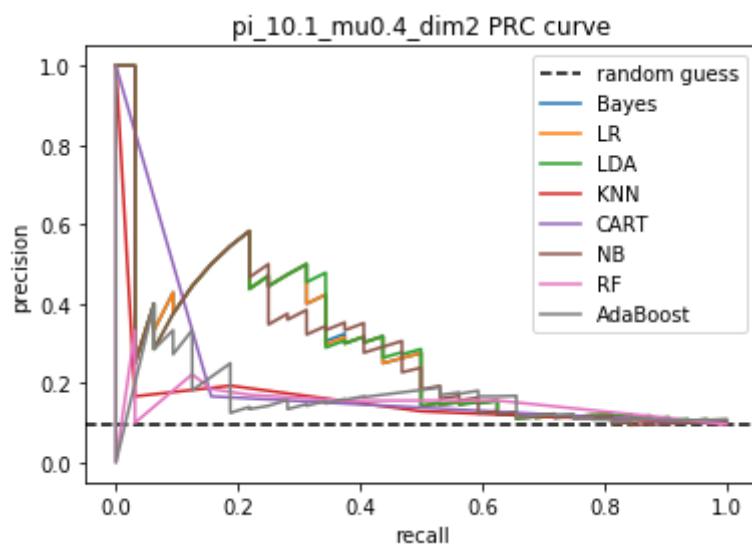
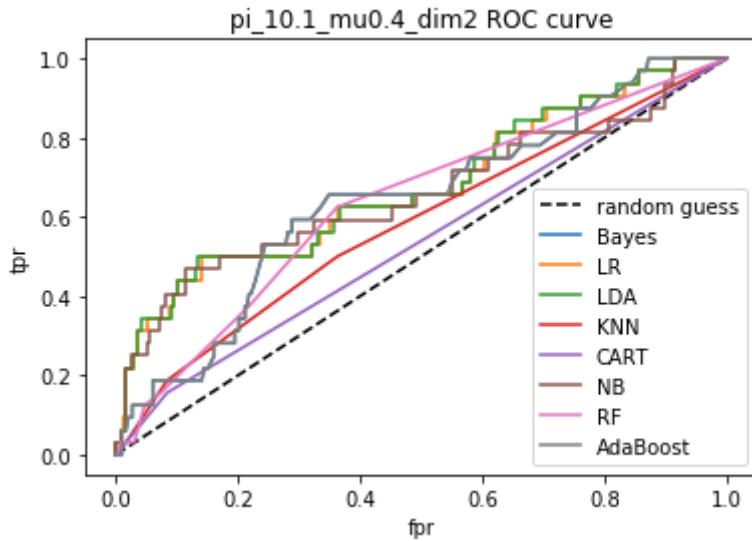
AdaBoost : AUROC = 0.428, AUPRC = 0.093, average precision = 0.108, .
Best threshold for ROC = 0.481, accuracy for the best ROC threshold is then
0.470, accuracy = 0.882.
F1 score = 0.049, log loss = 4.082, recall = 0.029.

Bayes classifier has AUROC = 0.529, and AUPRC = 0.117.

```



```
The best model measured by AUROC is RF
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is AdaBoost
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.4 , dim = 2 is 0.096 .
LR : AUROC = 0.675, AUPRC = 0.278, average precision = 0.125, .
Best threshold for ROC = 0.087, accuracy for the best ROC threshold is then
0.633, accuracy = 0.906.
F1 score = 0.061, log loss = 3.245, recall = 0.031.
-----
LDA : AUROC = 0.677, AUPRC = 0.279, average precision = 0.125, .
Best threshold for ROC = 0.080, accuracy for the best ROC threshold is then
0.630, accuracy = 0.906.
F1 score = 0.061, log loss = 3.245, recall = 0.031.
-----
KNN : AUROC = 0.582, AUPRC = 0.153, average precision = 0.099, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.845, accuracy = 0.891.
F1 score = 0.053, log loss = 3.768, recall = 0.031.
-----
CART : AUROC = 0.536, AUPRC = 0.202, average precision = 0.108, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.903, accuracy = 0.842.
F1 score = 0.161, log loss = 5.443, recall = 0.156.
-----
NB : AUROC = 0.657, AUPRC = 0.269, average precision = 0.125, .
Best threshold for ROC = 0.067, accuracy for the best ROC threshold is then
0.555, accuracy = 0.906.
F1 score = 0.061, log loss = 3.245, recall = 0.031.
-----
RF : AUROC = 0.634, AUPRC = 0.150, average precision = 0.097, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.742, accuracy = 0.879.
F1 score = 0.048, log loss = 4.187, recall = 0.031.
-----
AdaBoost : AUROC = 0.640, AUPRC = 0.159, average precision = 0.116, .
Best threshold for ROC = 0.486, accuracy for the best ROC threshold is then
0.661, accuracy = 0.900.
F1 score = 0.108, log loss = 3.454, recall = 0.062.
-----
Bayes classifier has AUROC = 0.674, and AUPRC = 0.278.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.4 , dim = 4  is 0.099 .
LR : AUROC = 0.729, AUPRC = 0.223, average precision = 0.100, .
Best threshold for ROC = 0.108, accuracy for the best ROC threshold is then
0.648, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.

-----
LDA : AUROC = 0.729, AUPRC = 0.224, average precision = 0.100, .
Best threshold for ROC = 0.103, accuracy for the best ROC threshold is then
0.648, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.

-----
KNN : AUROC = 0.543, AUPRC = 0.108, average precision = 0.100, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.824, accuracy = 0.873.
F1 score = 0.000, log loss = 4.396, recall = 0.000.

```

```

CART : AUROC = 0.525, AUPRC = 0.198, average precision = 0.106, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.900, accuracy = 0.800.
F1 score = 0.154, log loss = 6.908, recall = 0.182.

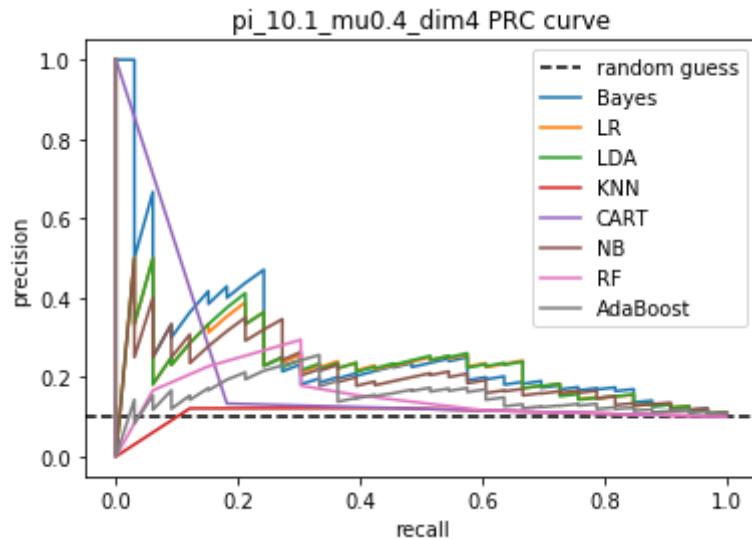
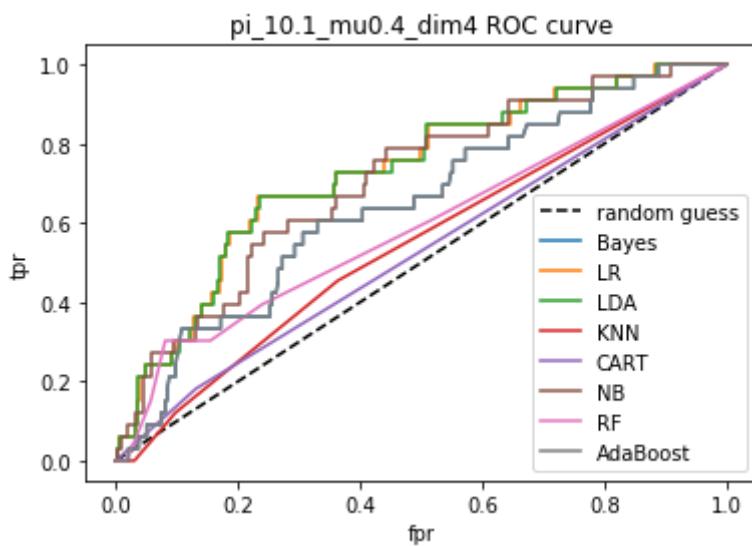
NB : AUROC = 0.706, AUPRC = 0.206, average precision = 0.100, .
Best threshold for ROC = 0.103, accuracy for the best ROC threshold is then
0.642, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.

RF : AUROC = 0.588, AUPRC = 0.149, average precision = 0.104, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.724, accuracy = 0.876.
F1 score = 0.089, log loss = 4.291, recall = 0.061.

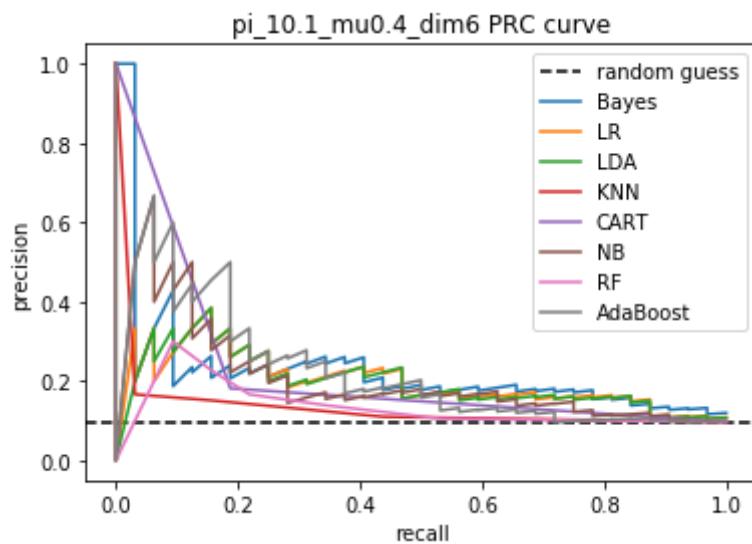
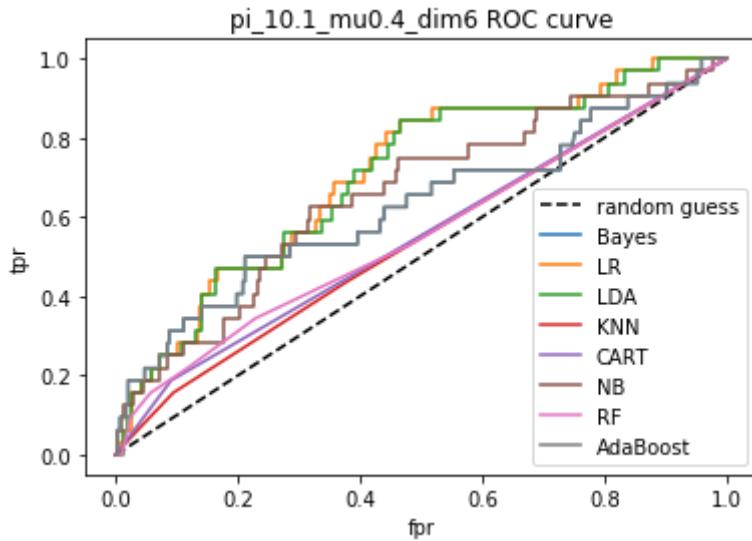
AdaBoost : AUROC = 0.646, AUPRC = 0.151, average precision = 0.103, .
Best threshold for ROC = 0.485, accuracy for the best ROC threshold is then
0.606, accuracy = 0.873.
F1 score = 0.087, log loss = 4.396, recall = 0.061.

Bayes classifier has AUROC = 0.730, and AUPRC = 0.259.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.4 , dim = 6 is 0.097 .
LR : AUROC = 0.707, AUPRC = 0.195, average precision = 0.097, .
Best threshold for ROC = 0.097, accuracy for the best ROC threshold is then
0.648, accuracy = 0.903.
F1 score = 0.000, log loss = 3.349, recall = 0.000.
-----
LDA : AUROC = 0.702, AUPRC = 0.193, average precision = 0.097, .
Best threshold for ROC = 0.090, accuracy for the best ROC threshold is then
0.633, accuracy = 0.900.
F1 score = 0.000, log loss = 3.454, recall = 0.000.
-----
KNN : AUROC = 0.538, AUPRC = 0.133, average precision = 0.099, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.833, accuracy = 0.891.
F1 score = 0.053, log loss = 3.768, recall = 0.031.
-----
CART : AUROC = 0.548, AUPRC = 0.224, average precision = 0.113, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.903, accuracy = 0.839.
F1 score = 0.185, log loss = 5.547, recall = 0.188.
-----
NB : AUROC = 0.658, AUPRC = 0.198, average precision = 0.133, .
Best threshold for ROC = 0.082, accuracy for the best ROC threshold is then
0.618, accuracy = 0.906.
F1 score = 0.114, log loss = 3.245, recall = 0.062.
-----
RF : AUROC = 0.555, AUPRC = 0.132, average precision = 0.097, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.730, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.
-----
AdaBoost : AUROC = 0.627, AUPRC = 0.213, average precision = 0.140, .
Best threshold for ROC = 0.484, accuracy for the best ROC threshold is then
0.570, accuracy = 0.900.
F1 score = 0.195, log loss = 3.454, recall = 0.125.
-----
Bayes classifier has AUROC = 0.731, and AUPRC = 0.223.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is NB
The best model measured by average_precision is AdaBoost
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.4 , dim = 8  is 0.098 .
LR : AUROC = 0.653, AUPRC = 0.154, average precision = 0.097, .
Best threshold for ROC = 0.080, accuracy for the best ROC threshold is then
0.579, accuracy = 0.897.
F1 score = 0.000, log loss = 3.559, recall = 0.000.

-----
LDA : AUROC = 0.652, AUPRC = 0.150, average precision = 0.097, .
Best threshold for ROC = 0.074, accuracy for the best ROC threshold is then
0.603, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

-----
KNN : AUROC = 0.563, AUPRC = 0.103, average precision = 0.097, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.815, accuracy = 0.894.
F1 score = 0.000, log loss = 3.663, recall = 0.000.

```

```

CART : AUROC = 0.535, AUPRC = 0.200, average precision = 0.107, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.903, accuracy = 0.839.
F1 score = 0.159, log loss = 5.547, recall = 0.156.

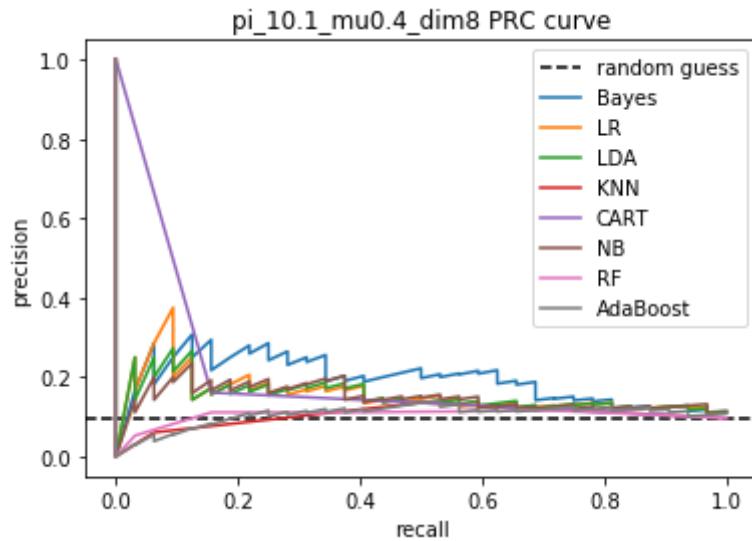
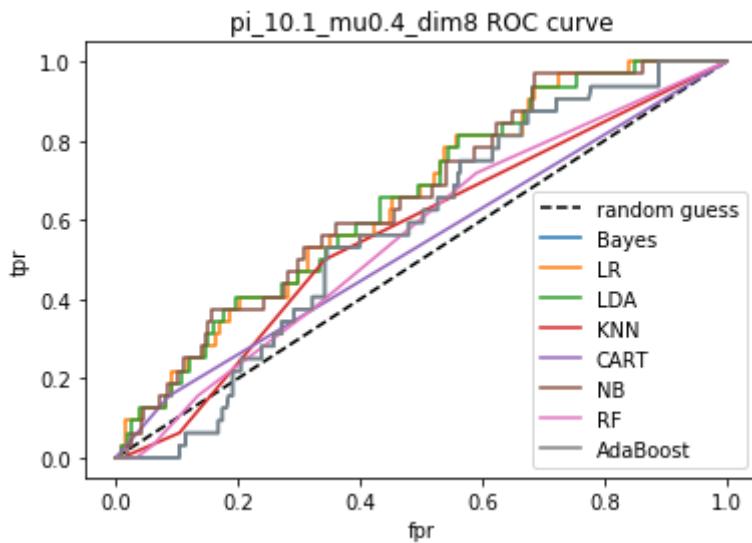
NB : AUROC = 0.653, AUPRC = 0.147, average precision = 0.097, .
Best threshold for ROC = 0.085, accuracy for the best ROC threshold is then
0.633, accuracy = 0.891.
F1 score = 0.000, log loss = 3.768, recall = 0.000.

RF : AUROC = 0.556, AUPRC = 0.104, average precision = 0.097, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.797, accuracy = 0.888.
F1 score = 0.000, log loss = 3.873, recall = 0.000.

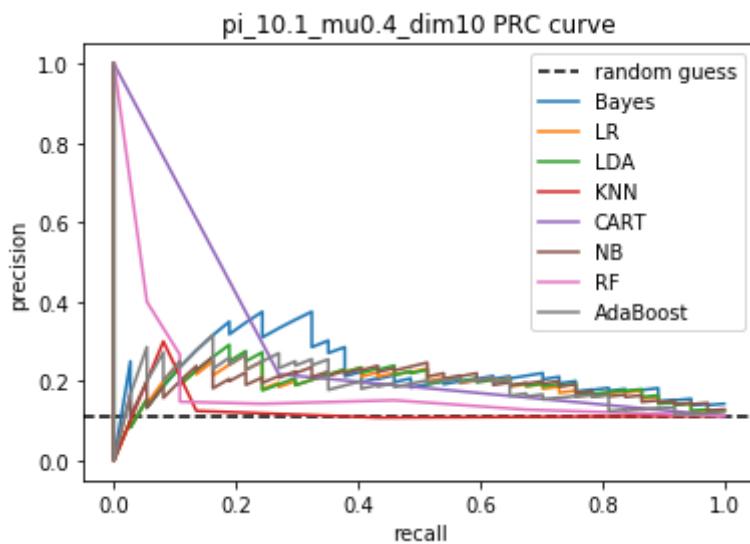
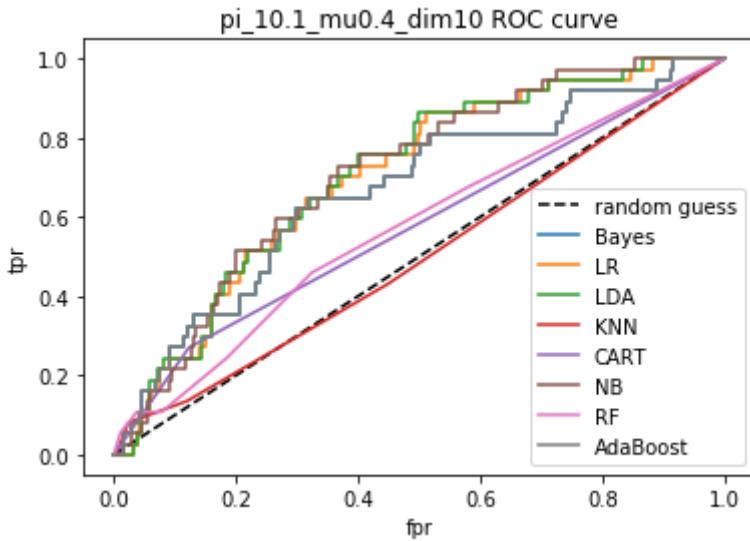
AdaBoost : AUROC = 0.577, AUPRC = 0.105, average precision = 0.097, .
Best threshold for ROC = 0.481, accuracy for the best ROC threshold is then
0.552, accuracy = 0.858.
F1 score = 0.000, log loss = 4.919, recall = 0.000.

Bayes classifier has AUROC = 0.712, and AUPRC = 0.191.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.4 , dim = 10  is 0.111 .
LR : AUROC = 0.703, AUPRC = 0.188, average precision = 0.112, .
Best threshold for ROC = 0.115, accuracy for the best ROC threshold is then
0.645, accuracy = 0.885.
F1 score = 0.000, log loss = 3.977, recall = 0.000.
-----
LDA : AUROC = 0.708, AUPRC = 0.192, average precision = 0.112, .
Best threshold for ROC = 0.114, accuracy for the best ROC threshold is then
0.652, accuracy = 0.885.
F1 score = 0.000, log loss = 3.977, recall = 0.000.
-----
KNN : AUROC = 0.499, AUPRC = 0.121, average precision = 0.127, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.797, accuracy = 0.876.
F1 score = 0.128, log loss = 4.291, recall = 0.081.
-----
CART : AUROC = 0.574, AUPRC = 0.285, average precision = 0.141, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.888, accuracy = 0.809.
F1 score = 0.241, log loss = 6.594, recall = 0.270.
-----
NB : AUROC = 0.710, AUPRC = 0.191, average precision = 0.112, .
Best threshold for ROC = 0.114, accuracy for the best ROC threshold is then
0.652, accuracy = 0.879.
F1 score = 0.000, log loss = 4.187, recall = 0.000.
-----
RF : AUROC = 0.572, AUPRC = 0.177, average precision = 0.128, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.752, accuracy = 0.885.
F1 score = 0.095, log loss = 3.977, recall = 0.054.
-----
AdaBoost : AUROC = 0.669, AUPRC = 0.191, average precision = 0.138, .
Best threshold for ROC = 0.486, accuracy for the best ROC threshold is then
0.676, accuracy = 0.858.
F1 score = 0.203, log loss = 4.919, recall = 0.162.
-----
Bayes classifier has AUROC = 0.733, and AUPRC = 0.220.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.6 , dim = 2  is 0.112 .
LR : AUROC = 0.818, AUPRC = 0.300, average precision = 0.113, .
Best threshold for ROC = 0.143, accuracy for the best ROC threshold is then
0.761, accuracy = 0.873.
F1 score = 0.045, log loss = 4.396, recall = 0.027.

-----
LDA : AUROC = 0.818, AUPRC = 0.302, average precision = 0.113, .
Best threshold for ROC = 0.136, accuracy for the best ROC threshold is then
0.755, accuracy = 0.873.
F1 score = 0.045, log loss = 4.396, recall = 0.027.

-----
KNN : AUROC = 0.597, AUPRC = 0.222, average precision = 0.186, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.839, accuracy = 0.888.
F1 score = 0.275, log loss = 3.873, recall = 0.189.

```

CART : AUROC = 0.582, AUPRC = 0.298, average precision = 0.148, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.888, accuracy = 0.824.  
F1 score = 0.256, log loss = 6.071, recall = 0.270.

---

NB : AUROC = 0.815, AUPRC = 0.290, average precision = 0.113, .  
Best threshold for ROC = 0.125, accuracy for the best ROC threshold is then  
0.758, accuracy = 0.873.  
F1 score = 0.045, log loss = 4.396, recall = 0.027.

---

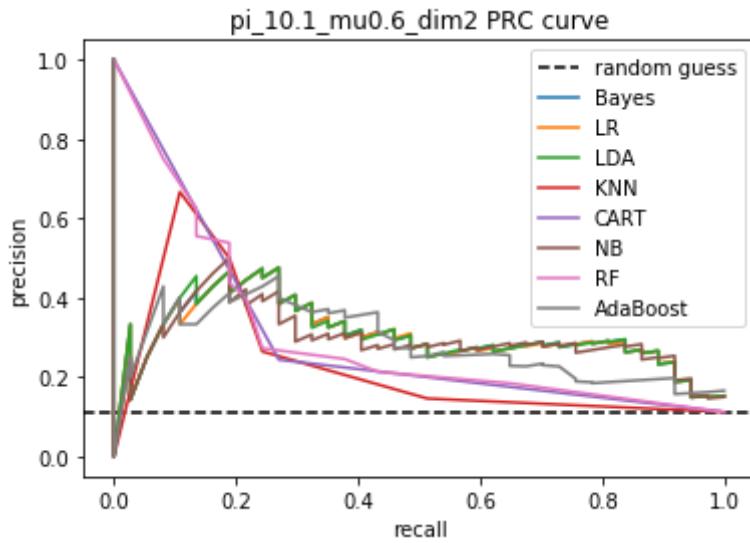
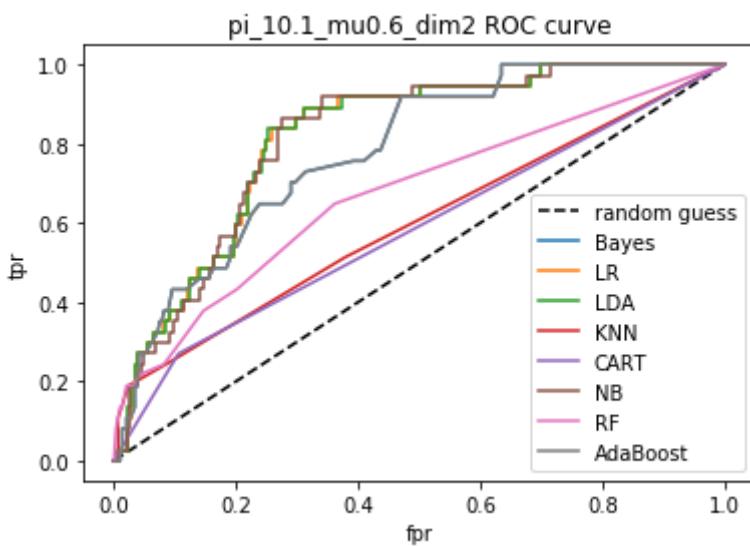
RF : AUROC = 0.671, AUPRC = 0.301, average precision = 0.174, .  
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then  
0.758, accuracy = 0.882.  
F1 score = 0.264, log loss = 4.082, recall = 0.189.

---

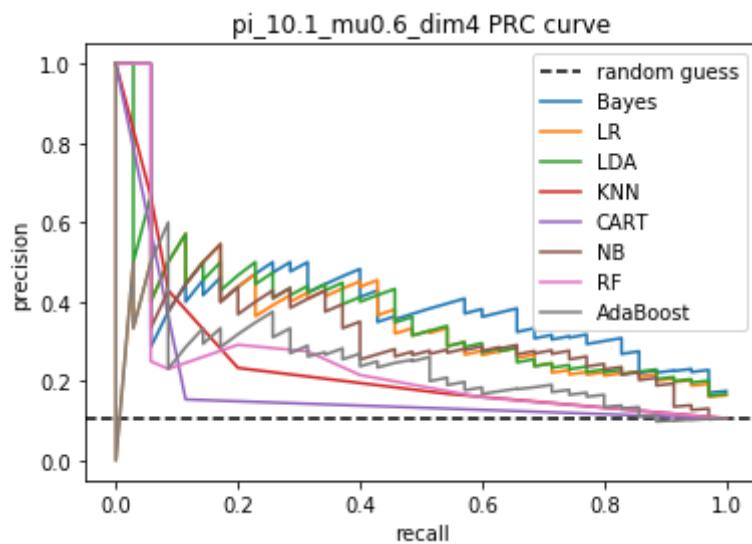
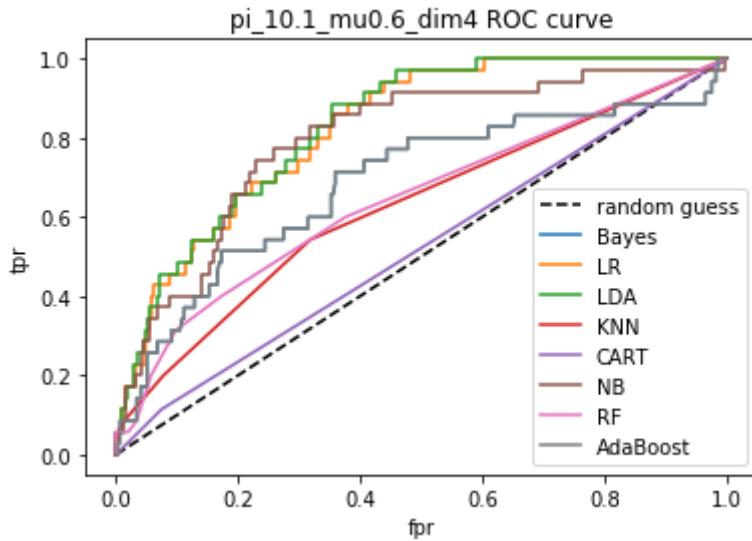
AdaBoost : AUROC = 0.781, AUPRC = 0.279, average precision = 0.169, .  
Best threshold for ROC = 0.487, accuracy for the best ROC threshold is then  
0.709, accuracy = 0.879.  
F1 score = 0.259, log loss = 4.187, recall = 0.189.

---

Bayes classifier has AUROC = 0.818, and AUPRC = 0.301.



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is KNN
The best model measured by average_precision is KNN
The best model measured by f1 is KNN
The best model measured by log_loss_score is KNN
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.6 , dim = 4 is 0.105 .
LR : AUROC = 0.824, AUPRC = 0.328, average precision = 0.129, .
Best threshold for ROC = 0.083, accuracy for the best ROC threshold is then
0.706, accuracy = 0.894.
F1 score = 0.103, log loss = 3.663, recall = 0.057.
-----
LDA : AUROC = 0.830, AUPRC = 0.362, average precision = 0.129, .
Best threshold for ROC = 0.078, accuracy for the best ROC threshold is then
0.724, accuracy = 0.894.
F1 score = 0.103, log loss = 3.663, recall = 0.057.
-----
KNN : AUROC = 0.625, AUPRC = 0.233, average precision = 0.134, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.845, accuracy = 0.891.
F1 score = 0.143, log loss = 3.768, recall = 0.086.
-----
CART : AUROC = 0.520, AUPRC = 0.181, average precision = 0.112, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.894, accuracy = 0.839.
F1 score = 0.131, log loss = 5.547, recall = 0.114.
-----
NB : AUROC = 0.795, AUPRC = 0.342, average precision = 0.129, .
Best threshold for ROC = 0.078, accuracy for the best ROC threshold is then
0.745, accuracy = 0.894.
F1 score = 0.103, log loss = 3.663, recall = 0.057.
-----
RF : AUROC = 0.643, AUPRC = 0.238, average precision = 0.114, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.782, accuracy = 0.882.
F1 score = 0.093, log loss = 4.082, recall = 0.057.
-----
AdaBoost : AUROC = 0.685, AUPRC = 0.231, average precision = 0.129, .
Best threshold for ROC = 0.482, accuracy for the best ROC threshold is then
0.642, accuracy = 0.888.
F1 score = 0.140, log loss = 3.873, recall = 0.086.
-----
Bayes classifier has AUROC = 0.863, and AUPRC = 0.398.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is KNN
The best model measured by f1 is KNN
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.6 , dim = 6 is 0.096 .
LR : AUROC = 0.806, AUPRC = 0.456, average precision = 0.182, .
Best threshold for ROC = 0.133, accuracy for the best ROC threshold is then
0.758, accuracy = 0.912.
F1 score = 0.171, log loss = 3.035, recall = 0.094.

-----
LDA : AUROC = 0.803, AUPRC = 0.455, average precision = 0.210, .
Best threshold for ROC = 0.117, accuracy for the best ROC threshold is then
0.730, accuracy = 0.915.
F1 score = 0.222, log loss = 2.931, recall = 0.125.

-----
KNN : AUROC = 0.575, AUPRC = 0.141, average precision = 0.097, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.836, accuracy = 0.882.
F1 score = 0.049, log loss = 4.082, recall = 0.031.

```

```

CART : AUROC = 0.648, AUPRC = 0.373, average precision = 0.172, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.903, accuracy = 0.842.
F1 score = 0.333, log loss = 5.443, recall = 0.406.

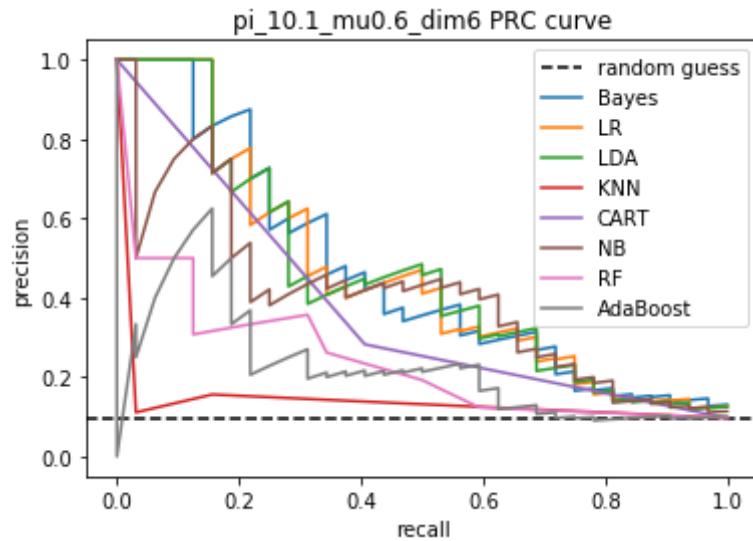
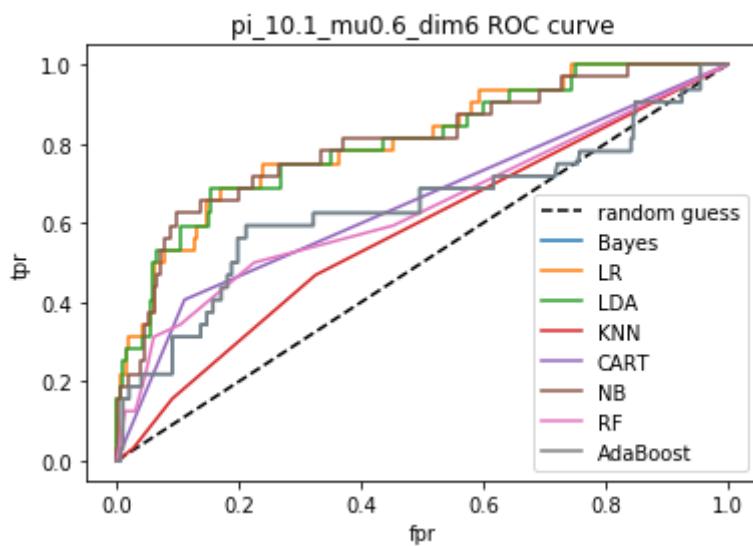
NB : AUROC = 0.801, AUPRC = 0.402, average precision = 0.185, .
Best threshold for ROC = 0.113, accuracy for the best ROC threshold is then
0.733, accuracy = 0.912.
F1 score = 0.216, log loss = 3.035, recall = 0.125.

RF : AUROC = 0.635, AUPRC = 0.237, average precision = 0.123, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.748, accuracy = 0.888.
F1 score = 0.178, log loss = 3.873, recall = 0.125.

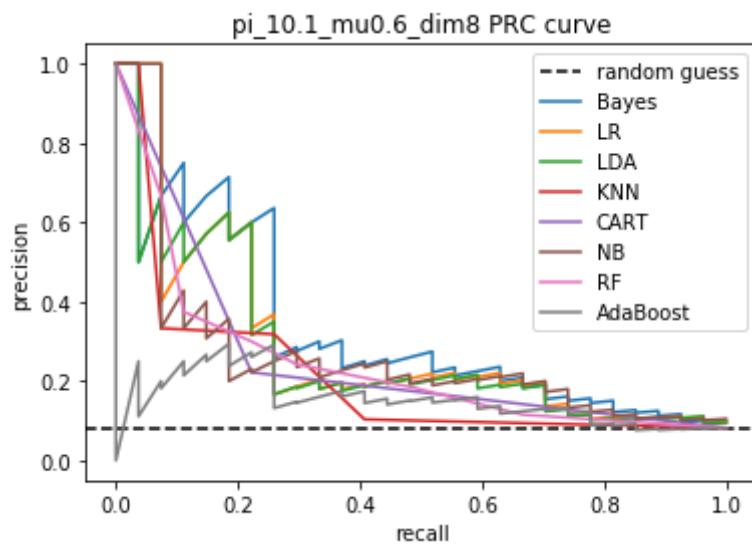
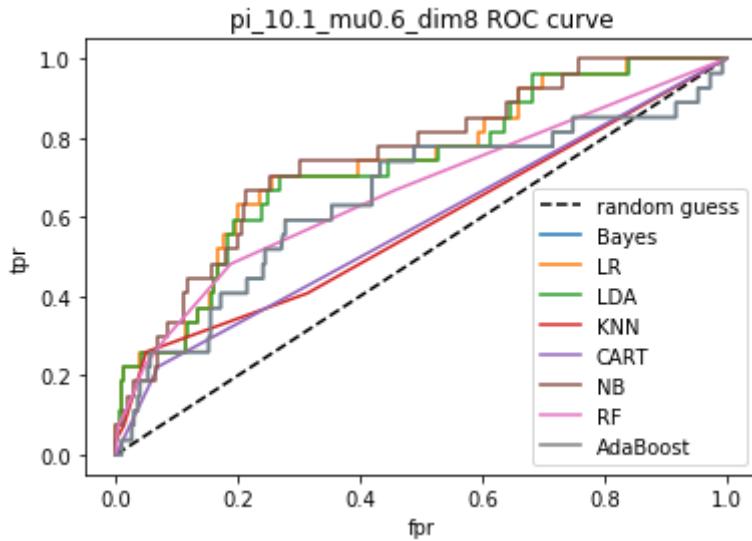
AdaBoost : AUROC = 0.637, AUPRC = 0.217, average precision = 0.142, .
Best threshold for ROC = 0.484, accuracy for the best ROC threshold is then
0.639, accuracy = 0.876.
F1 score = 0.255, log loss = 4.291, recall = 0.219.

Bayes classifier has AUROC = 0.812, and AUPRC = 0.460.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is CART
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.6 , dim = 8 is 0.083 .
LR : AUROC = 0.736, AUPRC = 0.288, average precision = 0.125, .
Best threshold for ROC = 0.089, accuracy for the best ROC threshold is then
0.739, accuracy = 0.921.
F1 score = 0.133, log loss = 2.721, recall = 0.074.
-----
LDA : AUROC = 0.729, AUPRC = 0.272, average precision = 0.125, .
Best threshold for ROC = 0.082, accuracy for the best ROC threshold is then
0.727, accuracy = 0.921.
F1 score = 0.133, log loss = 2.721, recall = 0.074.
-----
KNN : AUROC = 0.578, AUPRC = 0.208, average precision = 0.100, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.894, accuracy = 0.912.
F1 score = 0.121, log loss = 3.035, recall = 0.074.
-----
CART : AUROC = 0.576, AUPRC = 0.254, average precision = 0.113, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.918, accuracy = 0.873.
F1 score = 0.222, log loss = 4.396, recall = 0.222.
-----
NB : AUROC = 0.752, AUPRC = 0.264, average precision = 0.113, .
Best threshold for ROC = 0.075, accuracy for the best ROC threshold is then
0.703, accuracy = 0.918.
F1 score = 0.129, log loss = 2.826, recall = 0.074.
-----
RF : AUROC = 0.664, AUPRC = 0.239, average precision = 0.125, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.785, accuracy = 0.921.
F1 score = 0.133, log loss = 2.721, recall = 0.074.
-----
AdaBoost : AUROC = 0.646, AUPRC = 0.150, average precision = 0.083, .
Best threshold for ROC = 0.477, accuracy for the best ROC threshold is then
0.642, accuracy = 0.897.
F1 score = 0.056, log loss = 3.559, recall = 0.037.
-----
Bayes classifier has AUROC = 0.772, and AUPRC = 0.324.
```



The best model measured by AUROC is NB  
The best model measured by AUPRC is LR  
The best model measured by accuracy\_best\_threshold is CART  
The best model measured by accuracy is LR  
The best model measured by average\_precision is LR  
The best model measured by f1 is CART  
The best model measured by log\_loss\_score is LR  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.1 , mu = 0.6 , dim = 10 is 0.092 .  
LR : AUROC = 0.833, AUPRC = 0.331, average precision = 0.145, .  
Best threshold for ROC = 0.095, accuracy for the best ROC threshold is then 0.758, accuracy = 0.909.  
F1 score = 0.211, log loss = 3.140, recall = 0.133.

---

LDA : AUROC = 0.840, AUPRC = 0.332, average precision = 0.195, .  
Best threshold for ROC = 0.098, accuracy for the best ROC threshold is then 0.782, accuracy = 0.912.  
F1 score = 0.326, log loss = 3.035, recall = 0.233.

---

KNN : AUROC = 0.710, AUPRC = 0.217, average precision = 0.091, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then 0.897, accuracy = 0.906.  
F1 score = 0.000, log loss = 3.245, recall = 0.000.

```

CART : AUROC = 0.585, AUPRC = 0.286, average precision = 0.133, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.909, accuracy = 0.873.
F1 score = 0.250, log loss = 4.396, recall = 0.233.

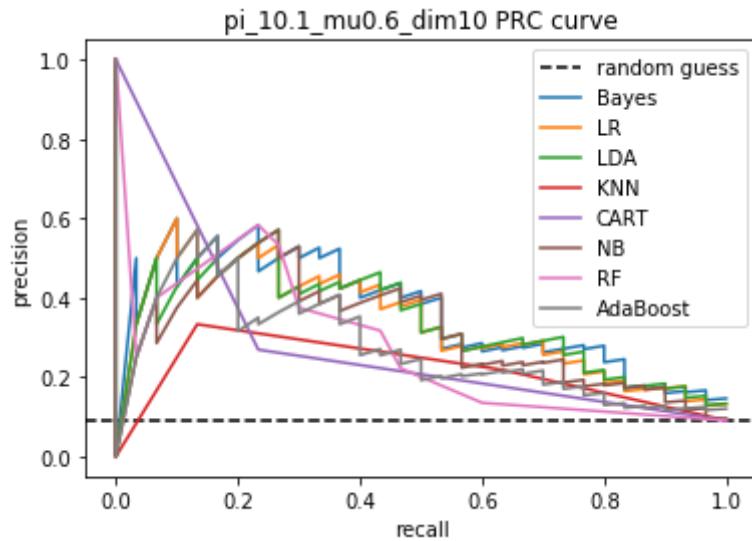
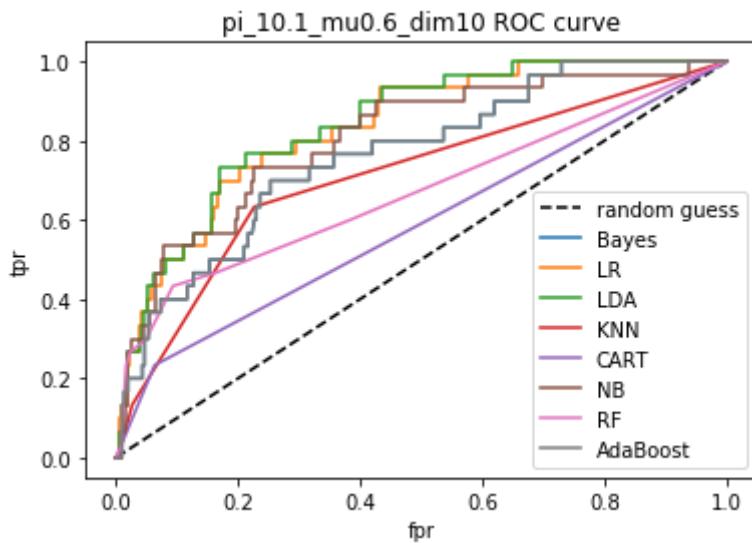
NB : AUROC = 0.804, AUPRC = 0.307, average precision = 0.219, .
Best threshold for ROC = 0.087, accuracy for the best ROC threshold is then
0.767, accuracy = 0.915.
F1 score = 0.364, log loss = 2.931, recall = 0.267.

RF : AUROC = 0.668, AUPRC = 0.272, average precision = 0.206, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.803, accuracy = 0.915.
F1 score = 0.333, log loss = 2.931, recall = 0.233.

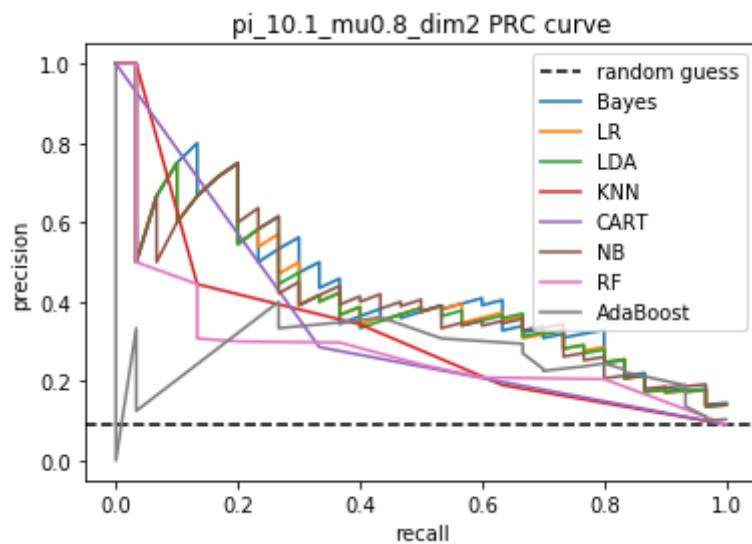
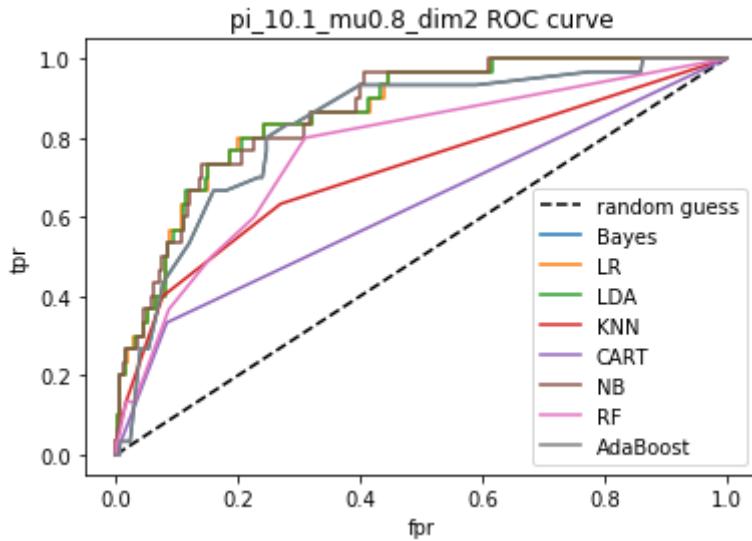
AdaBoost : AUROC = 0.764, AUPRC = 0.263, average precision = 0.147, .
Best threshold for ROC = 0.480, accuracy for the best ROC threshold is then
0.688, accuracy = 0.888.
F1 score = 0.275, log loss = 3.873, recall = 0.233.

Bayes classifier has AUROC = 0.849, and AUPRC = 0.355.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is RF
The best model measured by recall is NB
Positive ratio for pi_1 = 0.1 , mu = 0.8 , dim = 2 is 0.09 .
LR : AUROC = 0.861, AUPRC = 0.414, average precision = 0.195, .
Best threshold for ROC = 0.121, accuracy for the best ROC threshold is then
0.797, accuracy = 0.918.
F1 score = 0.270, log loss = 2.826, recall = 0.167.
-----
LDA : AUROC = 0.861, AUPRC = 0.413, average precision = 0.195, .
Best threshold for ROC = 0.112, accuracy for the best ROC threshold is then
0.791, accuracy = 0.918.
F1 score = 0.270, log loss = 2.826, recall = 0.167.
-----
KNN : AUROC = 0.713, AUPRC = 0.324, average precision = 0.138, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.876, accuracy = 0.906.
F1 score = 0.205, log loss = 3.245, recall = 0.133.
-----
CART : AUROC = 0.625, AUPRC = 0.340, average precision = 0.156, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.909, accuracy = 0.864.
F1 score = 0.308, log loss = 4.710, recall = 0.333.
-----
NB : AUROC = 0.862, AUPRC = 0.412, average precision = 0.195, .
Best threshold for ROC = 0.108, accuracy for the best ROC threshold is then
0.776, accuracy = 0.918.
F1 score = 0.270, log loss = 2.826, recall = 0.167.
-----
RF : AUROC = 0.765, AUPRC = 0.280, average precision = 0.120, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.758, accuracy = 0.894.
F1 score = 0.186, log loss = 3.663, recall = 0.133.
-----
AdaBoost : AUROC = 0.827, AUPRC = 0.266, average precision = 0.099, .
Best threshold for ROC = 0.485, accuracy for the best ROC threshold is then
0.755, accuracy = 0.906.
F1 score = 0.061, log loss = 3.245, recall = 0.033.
-----
Bayes classifier has AUROC = 0.867, and AUPRC = 0.428.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.8 , dim = 4  is 0.098 .
LR : AUROC = 0.867, AUPRC = 0.506, average precision = 0.246, .
Best threshold for ROC = 0.104, accuracy for the best ROC threshold is then
0.806, accuracy = 0.918.
F1 score = 0.341, log loss = 2.826, recall = 0.219.

-----
LDA : AUROC = 0.867, AUPRC = 0.511, average precision = 0.246, .
Best threshold for ROC = 0.101, accuracy for the best ROC threshold is then
0.806, accuracy = 0.918.
F1 score = 0.341, log loss = 2.826, recall = 0.219.

-----
KNN : AUROC = 0.692, AUPRC = 0.267, average precision = 0.131, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.861, accuracy = 0.885.
F1 score = 0.208, log loss = 3.977, recall = 0.156.

```

```

CART : AUROC = 0.590, AUPRC = 0.299, average precision = 0.142, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.903, accuracy = 0.864.
F1 score = 0.262, log loss = 4.710, recall = 0.250.

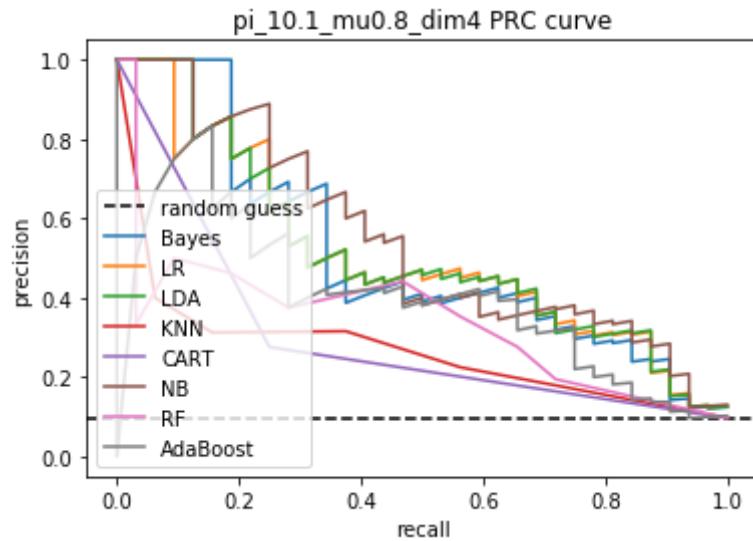
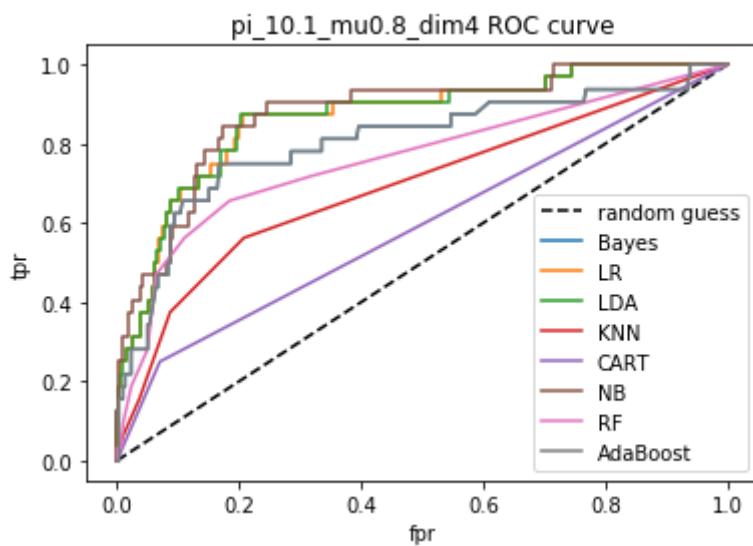
NB : AUROC = 0.878, AUPRC = 0.543, average precision = 0.307, .
Best threshold for ROC = 0.103, accuracy for the best ROC threshold is then
0.827, accuracy = 0.924.
F1 score = 0.444, log loss = 2.617, recall = 0.312.

RF : AUROC = 0.761, AUPRC = 0.341, average precision = 0.165, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.800, accuracy = 0.900.
F1 score = 0.267, log loss = 3.454, recall = 0.188.

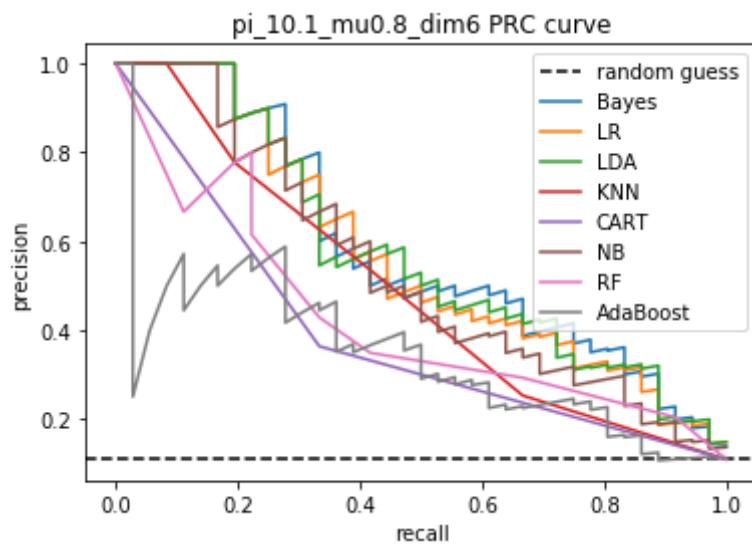
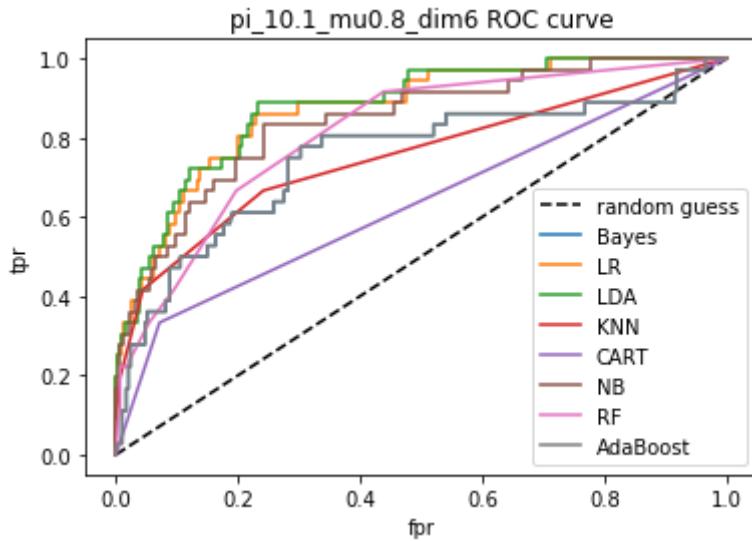
AdaBoost : AUROC = 0.804, AUPRC = 0.390, average precision = 0.185, .
Best threshold for ROC = 0.479, accuracy for the best ROC threshold is then
0.748, accuracy = 0.891.
F1 score = 0.333, log loss = 3.768, recall = 0.281.

Bayes classifier has AUROC = 0.858, and AUPRC = 0.508.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.1 , mu = 0.8 , dim = 6 is 0.109 .
LR : AUROC = 0.872, AUPRC = 0.569, average precision = 0.307, .
Best threshold for ROC = 0.097, accuracy for the best ROC threshold is then
0.797, accuracy = 0.915.
F1 score = 0.391, log loss = 2.931, recall = 0.250.
-----
LDA : AUROC = 0.878, AUPRC = 0.575, average precision = 0.286, .
Best threshold for ROC = 0.084, accuracy for the best ROC threshold is then
0.791, accuracy = 0.912.
F1 score = 0.383, log loss = 3.035, recall = 0.250.
-----
KNN : AUROC = 0.751, AUPRC = 0.487, average precision = 0.239, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.897, accuracy = 0.906.
F1 score = 0.311, log loss = 3.245, recall = 0.194.
-----
CART : AUROC = 0.631, AUPRC = 0.385, average precision = 0.194, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.891, accuracy = 0.864.
F1 score = 0.348, log loss = 4.710, recall = 0.333.
-----
NB : AUROC = 0.843, AUPRC = 0.533, average precision = 0.263, .
Best threshold for ROC = 0.086, accuracy for the best ROC threshold is then
0.761, accuracy = 0.909.
F1 score = 0.348, log loss = 3.140, recall = 0.222.
-----
RF : AUROC = 0.813, AUPRC = 0.420, average precision = 0.263, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.852, accuracy = 0.909.
F1 score = 0.348, log loss = 3.140, recall = 0.222.
-----
AdaBoost : AUROC = 0.750, AUPRC = 0.342, average precision = 0.193, .
Best threshold for ROC = 0.480, accuracy for the best ROC threshold is then
0.718, accuracy = 0.894.
F1 score = 0.286, log loss = 3.663, recall = 0.194.
-----
Bayes classifier has AUROC = 0.881, and AUPRC = 0.584.
```



The best model measured by AUROC is LDA  
The best model measured by AUPRC is LDA  
The best model measured by accuracy\_best\_threshold is KNN  
The best model measured by accuracy is LR  
The best model measured by average\_precision is LR  
The best model measured by f1 is LR  
The best model measured by log\_loss\_score is LR  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.1 , mu = 0.8 , dim = 8 is 0.099 .  
LR : AUROC = 0.866, AUPRC = 0.373, average precision = 0.135, .  
Best threshold for ROC = 0.121, accuracy for the best ROC threshold is then 0.809, accuracy = 0.885.  
F1 score = 0.208, log loss = 3.977, recall = 0.152.

---

LDA : AUROC = 0.868, AUPRC = 0.391, average precision = 0.143, .  
Best threshold for ROC = 0.115, accuracy for the best ROC threshold is then 0.815, accuracy = 0.891.  
F1 score = 0.217, log loss = 3.768, recall = 0.152.

---

KNN : AUROC = 0.652, AUPRC = 0.229, average precision = 0.121, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then 0.852, accuracy = 0.891.  
F1 score = 0.143, log loss = 3.768, recall = 0.091.

```

CART : AUROC = 0.616, AUPRC = 0.348, average precision = 0.167, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.900, accuracy = 0.867.
F1 score = 0.312, log loss = 4.605, recall = 0.303.

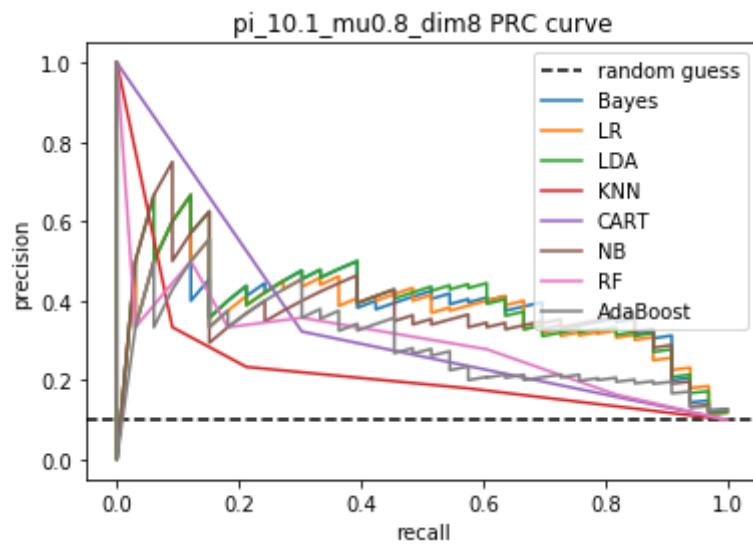
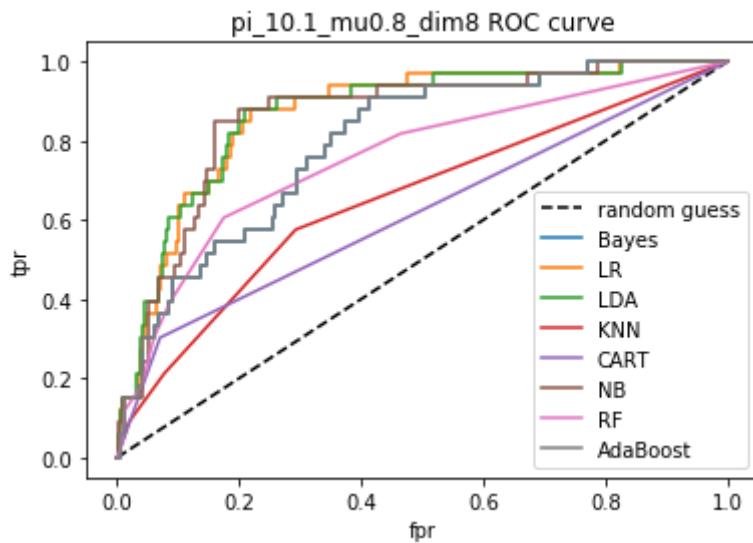
NB : AUROC = 0.859, AUPRC = 0.369, average precision = 0.135, .
Best threshold for ROC = 0.131, accuracy for the best ROC threshold is then
0.836, accuracy = 0.885.
F1 score = 0.208, log loss = 3.977, recall = 0.152.

RF : AUROC = 0.756, AUPRC = 0.292, average precision = 0.148, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.861, accuracy = 0.900.
F1 score = 0.195, log loss = 3.454, recall = 0.121.

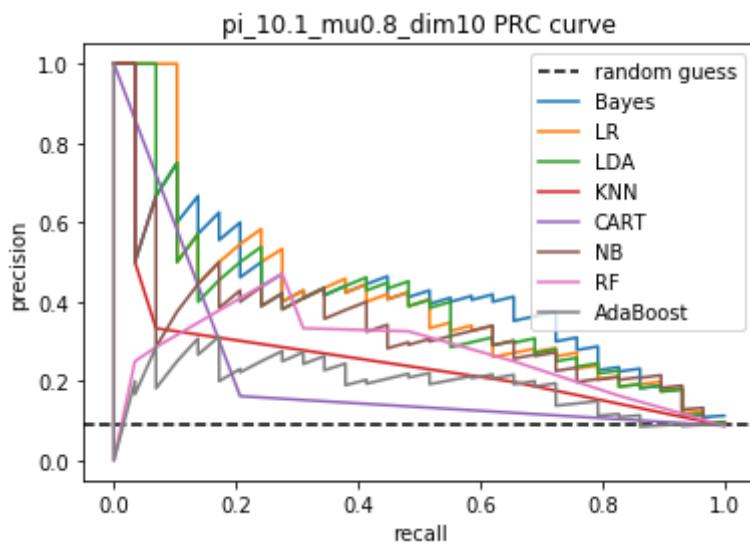
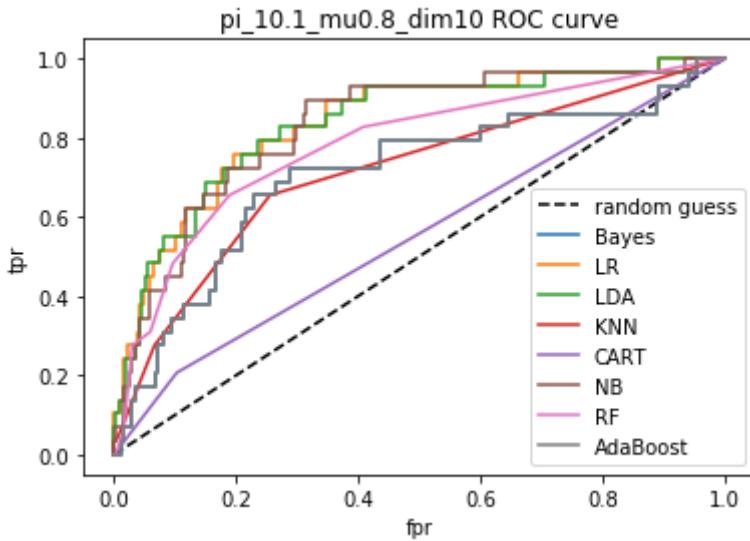
AdaBoost : AUROC = 0.793, AUPRC = 0.284, average precision = 0.142, .
Best threshold for ROC = 0.481, accuracy for the best ROC threshold is then
0.703, accuracy = 0.882.
F1 score = 0.235, log loss = 4.082, recall = 0.182.

Bayes classifier has AUROC = 0.870, and AUPRC = 0.383.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is RF
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is RF
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 0.8 , dim = 10  is 0.089 .
LR : AUROC = 0.838, AUPRC = 0.409, average precision = 0.202, .
Best threshold for ROC = 0.091, accuracy for the best ROC threshold is then
0.761, accuracy = 0.912.
F1 score = 0.356, log loss = 3.035, recall = 0.276.
-----
LDA : AUROC = 0.837, AUPRC = 0.393, average precision = 0.197, .
Best threshold for ROC = 0.086, accuracy for the best ROC threshold is then
0.767, accuracy = 0.915.
F1 score = 0.333, log loss = 2.931, recall = 0.241.
-----
KNN : AUROC = 0.714, AUPRC = 0.254, average precision = 0.105, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.876, accuracy = 0.906.
F1 score = 0.114, log loss = 3.245, recall = 0.069.
-----
CART : AUROC = 0.552, AUPRC = 0.219, average precision = 0.103, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.912, accuracy = 0.836.
F1 score = 0.182, log loss = 5.652, recall = 0.207.
-----
NB : AUROC = 0.831, AUPRC = 0.337, average precision = 0.172, .
Best threshold for ROC = 0.079, accuracy for the best ROC threshold is then
0.758, accuracy = 0.906.
F1 score = 0.311, log loss = 3.245, recall = 0.241.
-----
RF : AUROC = 0.782, AUPRC = 0.269, average precision = 0.102, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.867, accuracy = 0.903.
F1 score = 0.111, log loss = 3.349, recall = 0.069.
-----
AdaBoost : AUROC = 0.707, AUPRC = 0.189, average precision = 0.116, .
Best threshold for ROC = 0.473, accuracy for the best ROC threshold is then
0.709, accuracy = 0.882.
F1 score = 0.204, log loss = 4.082, recall = 0.172.
-----
Bayes classifier has AUROC = 0.857, and AUPRC = 0.414.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LDA
The best model measured by recall is LR
Positive ratio for pi_1 = 0.1 , mu = 1 , dim = 2  is 0.085 .
LR : AUROC = 0.939, AUPRC = 0.629, average precision = 0.322, .
Best threshold for ROC = 0.153, accuracy for the best ROC threshold is then
0.882, accuracy = 0.933.
F1 score = 0.500, log loss = 2.303, recall = 0.393.

-----
LDA : AUROC = 0.938, AUPRC = 0.626, average precision = 0.310, .
Best threshold for ROC = 0.146, accuracy for the best ROC threshold is then
0.882, accuracy = 0.933.
F1 score = 0.476, log loss = 2.303, recall = 0.357.

-----
KNN : AUROC = 0.843, AUPRC = 0.524, average precision = 0.251, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.921, accuracy = 0.927.
F1 score = 0.400, log loss = 2.512, recall = 0.286.

```

```

CART : AUROC = 0.673, AUPRC = 0.442, average precision = 0.224, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.915, accuracy = 0.906.
F1 score = 0.415, log loss = 3.245, recall = 0.393.

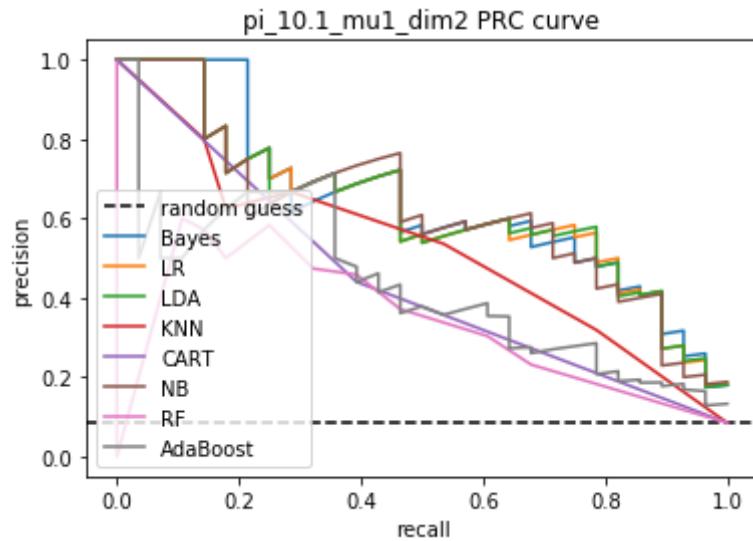
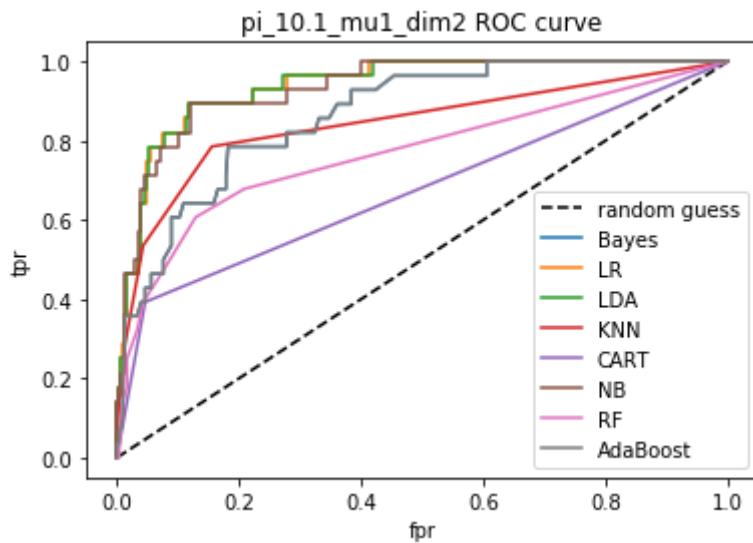
NB : AUROC = 0.933, AUPRC = 0.621, average precision = 0.310, .
Best threshold for ROC = 0.135, accuracy for the best ROC threshold is then
0.879, accuracy = 0.933.
F1 score = 0.476, log loss = 2.303, recall = 0.357.

RF : AUROC = 0.768, AUPRC = 0.330, average precision = 0.209, .
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then
0.848, accuracy = 0.921.
F1 score = 0.350, log loss = 2.721, recall = 0.250.

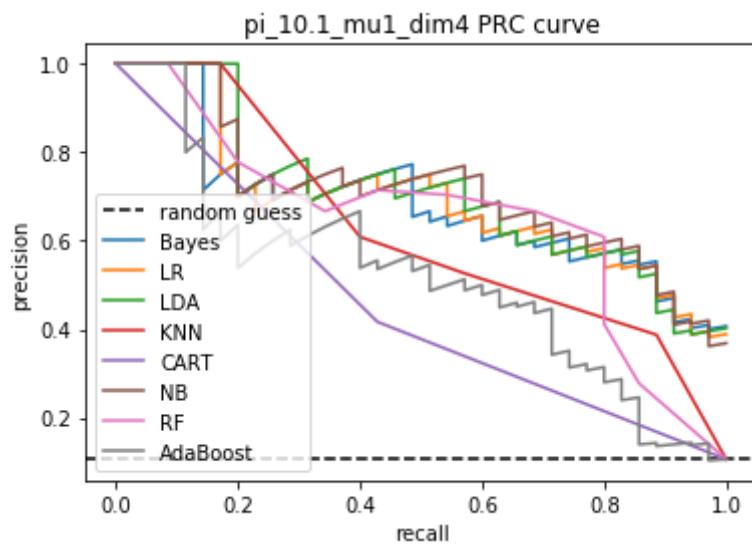
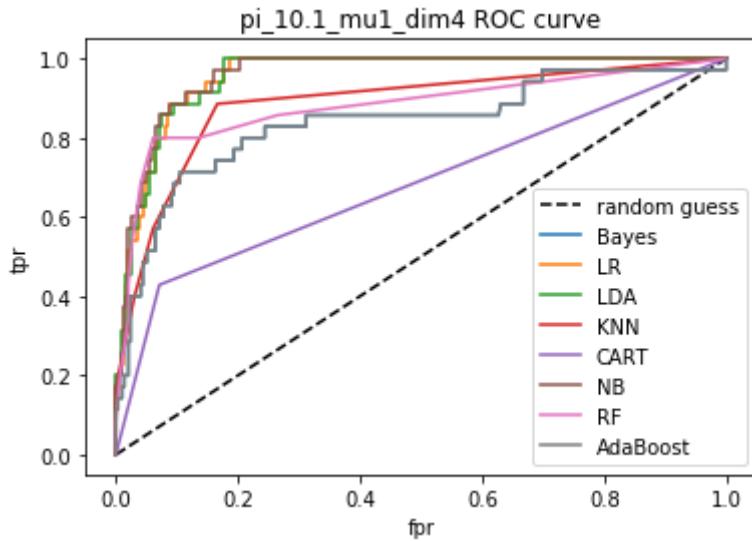
AdaBoost : AUROC = 0.866, AUPRC = 0.426, average precision = 0.278, .
Best threshold for ROC = 0.481, accuracy for the best ROC threshold is then
0.791, accuracy = 0.927.
F1 score = 0.455, log loss = 2.512, recall = 0.357.

Bayes classifier has AUROC = 0.940, and AUPRC = 0.642.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LDA
The best model measured by recall is LR
Positive ratio for pi_1 = 0.1 , mu = 1 , dim = 4 is 0.107 .
LR : AUROC = 0.956, AUPRC = 0.692, average precision = 0.390, .
Best threshold for ROC = 0.162, accuracy for the best ROC threshold is then
0.885, accuracy = 0.924.
F1 score = 0.561, log loss = 2.617, recall = 0.457.
-----
LDA : AUROC = 0.956, AUPRC = 0.706, average precision = 0.406, .
Best threshold for ROC = 0.201, accuracy for the best ROC threshold is then
0.900, accuracy = 0.927.
F1 score = 0.571, log loss = 2.512, recall = 0.457.
-----
KNN : AUROC = 0.886, AUPRC = 0.624, average precision = 0.307, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.900, accuracy = 0.909.
F1 score = 0.483, log loss = 3.140, recall = 0.400.
-----
CART : AUROC = 0.679, AUPRC = 0.453, average precision = 0.239, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.894, accuracy = 0.876.
F1 score = 0.423, log loss = 4.291, recall = 0.429.
-----
NB : AUROC = 0.959, AUPRC = 0.714, average precision = 0.414, .
Best threshold for ROC = 0.148, accuracy for the best ROC threshold is then
0.888, accuracy = 0.927.
F1 score = 0.586, log loss = 2.512, recall = 0.486.
-----
RF : AUROC = 0.881, AUPRC = 0.649, average precision = 0.367, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.924, accuracy = 0.921.
F1 score = 0.536, log loss = 2.721, recall = 0.429.
-----
AdaBoost : AUROC = 0.837, AUPRC = 0.515, average precision = 0.318, .
Best threshold for ROC = 0.486, accuracy for the best ROC threshold is then
0.791, accuracy = 0.912.
F1 score = 0.491, log loss = 3.035, recall = 0.400.
-----
Bayes classifier has AUROC = 0.955, and AUPRC = 0.682.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is RF
The best model measured by accuracy is LDA
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is LDA
The best model measured by recall is NB
Positive ratio for pi_1 = 0.1 , mu = 1 , dim = 6  is 0.094 .
LR : AUROC = 0.946, AUPRC = 0.645, average precision = 0.302, .
Best threshold for ROC = 0.152, accuracy for the best ROC threshold is then
0.873, accuracy = 0.918.
F1 score = 0.491, log loss = 2.826, recall = 0.419.

-----
LDA : AUROC = 0.948, AUPRC = 0.651, average precision = 0.269, .
Best threshold for ROC = 0.155, accuracy for the best ROC threshold is then
0.888, accuracy = 0.912.
F1 score = 0.453, log loss = 3.035, recall = 0.387.

-----
KNN : AUROC = 0.802, AUPRC = 0.421, average precision = 0.279, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.906, accuracy = 0.921.
F1 score = 0.435, log loss = 2.721, recall = 0.323.

```

CART : AUROC = 0.686, AUPRC = 0.436, average precision = 0.218, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.906, accuracy = 0.876.  
F1 score = 0.406, log loss = 4.291, recall = 0.452.

---

NB : AUROC = 0.950, AUPRC = 0.683, average precision = 0.302, .  
Best threshold for ROC = 0.157, accuracy for the best ROC threshold is then  
0.888, accuracy = 0.918.  
F1 score = 0.491, log loss = 2.826, recall = 0.419.

---

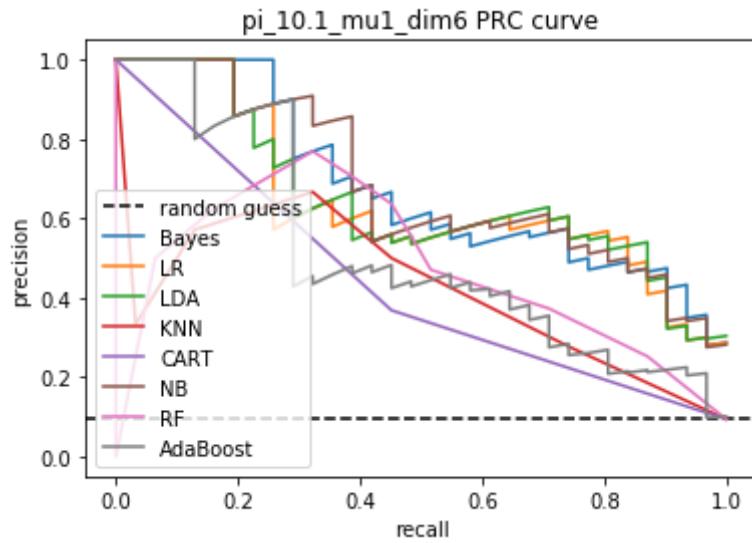
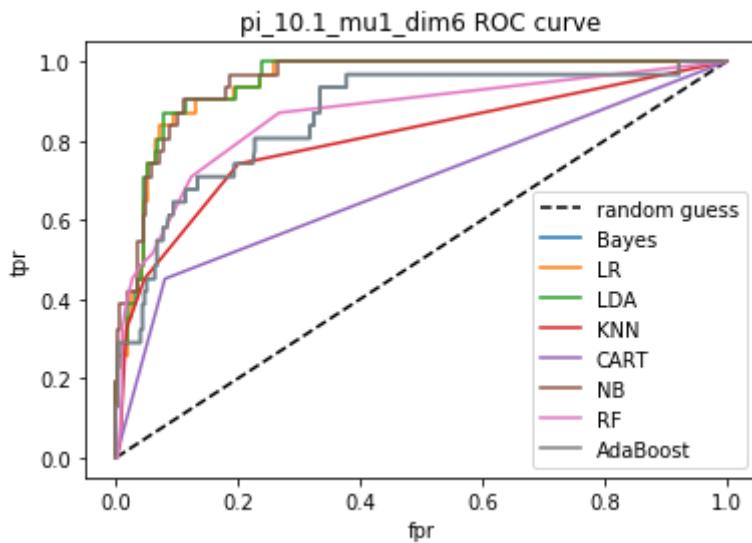
RF : AUROC = 0.861, AUPRC = 0.464, average precision = 0.331, .  
Best threshold for ROC = 0.100, accuracy for the best ROC threshold is then  
0.861, accuracy = 0.927.  
F1 score = 0.500, log loss = 2.512, recall = 0.387.

---

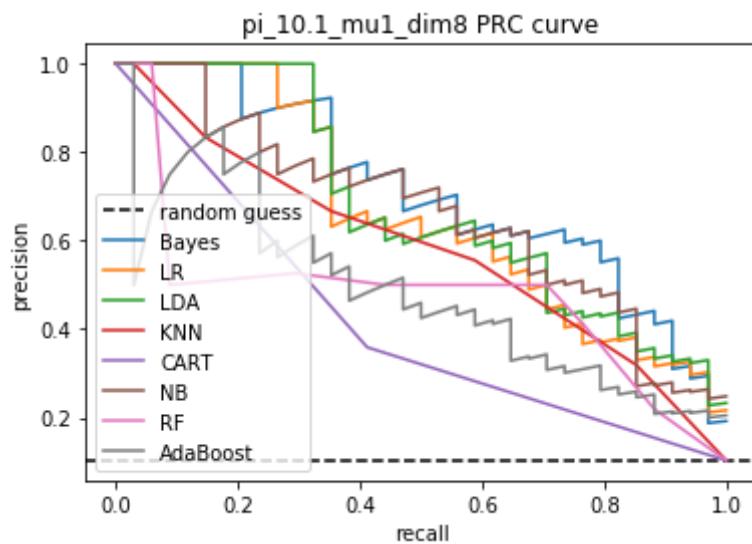
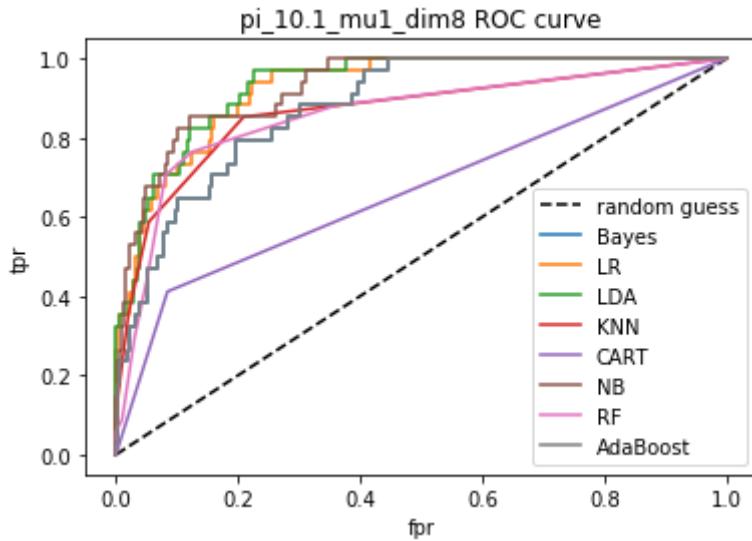
AdaBoost : AUROC = 0.864, AUPRC = 0.513, average precision = 0.210, .  
Best threshold for ROC = 0.476, accuracy for the best ROC threshold is then  
0.773, accuracy = 0.900.  
F1 score = 0.377, log loss = 3.454, recall = 0.323.

---

Bayes classifier has AUROC = 0.950, and AUPRC = 0.678.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is RF
The best model measured by average_precision is RF
The best model measured by f1 is RF
The best model measured by log_loss_score is RF
The best model measured by recall is CART
Positive ratio for pi_1 = 0.1 , mu = 1 , dim = 8  is 0.103 .
LR : AUROC = 0.926, AUPRC = 0.659, average precision = 0.335, .
Best threshold for ROC = 0.120, accuracy for the best ROC threshold is then
0.839, accuracy = 0.918.
F1 score = 0.509, log loss = 2.826, recall = 0.412.
-----
LDA : AUROC = 0.933, AUPRC = 0.675, average precision = 0.323, .
Best threshold for ROC = 0.125, accuracy for the best ROC threshold is then
0.845, accuracy = 0.915.
F1 score = 0.500, log loss = 2.931, recall = 0.412.
-----
KNN : AUROC = 0.865, AUPRC = 0.582, average precision = 0.302, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.909, accuracy = 0.915.
F1 score = 0.462, log loss = 2.931, recall = 0.353.
-----
CART : AUROC = 0.664, AUPRC = 0.416, average precision = 0.208, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.897, accuracy = 0.864.
F1 score = 0.384, log loss = 4.710, recall = 0.412.
-----
NB : AUROC = 0.929, AUPRC = 0.661, average precision = 0.382, .
Best threshold for ROC = 0.173, accuracy for the best ROC threshold is then
0.873, accuracy = 0.924.
F1 score = 0.561, log loss = 2.617, recall = 0.471.
-----
RF : AUROC = 0.858, AUPRC = 0.477, average precision = 0.138, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.897, accuracy = 0.897.
F1 score = 0.150, log loss = 3.559, recall = 0.088.
-----
AdaBoost : AUROC = 0.877, AUPRC = 0.483, average precision = 0.283, .
Best threshold for ROC = 0.482, accuracy for the best ROC threshold is then
0.800, accuracy = 0.894.
F1 score = 0.478, log loss = 3.663, recall = 0.471.
-----
Bayes classifier has AUROC = 0.941, and AUPRC = 0.710.
```



The best model measured by AUROC is LDA  
The best model measured by AUPRC is LDA  
The best model measured by accuracy\_best\_threshold is KNN  
The best model measured by accuracy is NB  
The best model measured by average\_precision is NB  
The best model measured by f1 is NB  
The best model measured by log\_loss\_score is NB  
The best model measured by recall is NB  
Positive ratio for pi\_1 = 0.1 , mu = 1 , dim = 10 is 0.09 .  
LR : AUROC = 0.916, AUPRC = 0.679, average precision = 0.420, .  
Best threshold for ROC = 0.128, accuracy for the best ROC threshold is then 0.824, accuracy = 0.939.  
F1 score = 0.600, log loss = 2.093, recall = 0.500.

---

LDA : AUROC = 0.918, AUPRC = 0.675, average precision = 0.403, .  
Best threshold for ROC = 0.098, accuracy for the best ROC threshold is then 0.803, accuracy = 0.936.  
F1 score = 0.588, log loss = 2.198, recall = 0.500.

---

KNN : AUROC = 0.780, AUPRC = 0.366, average precision = 0.115, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then 0.900, accuracy = 0.900.  
F1 score = 0.154, log loss = 3.454, recall = 0.100.

```

CART : AUROC = 0.760, AUPRC = 0.532, average precision = 0.294, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.909, accuracy = 0.891.
F1 score = 0.500, log loss = 3.768, recall = 0.600.

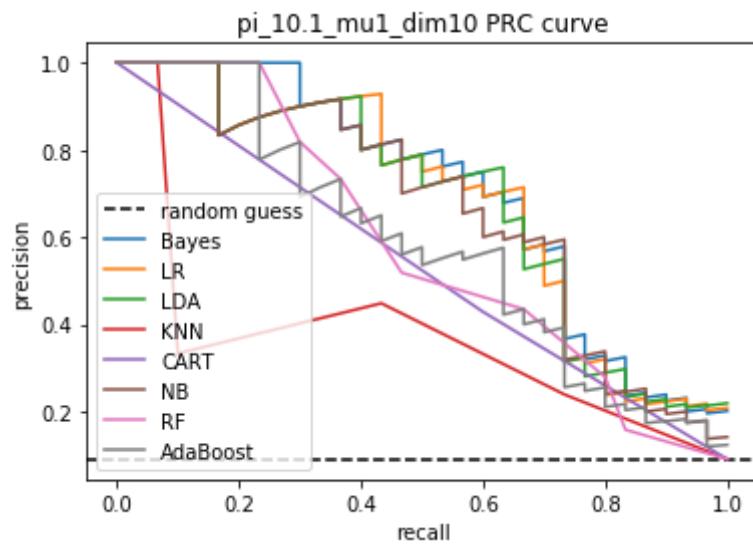
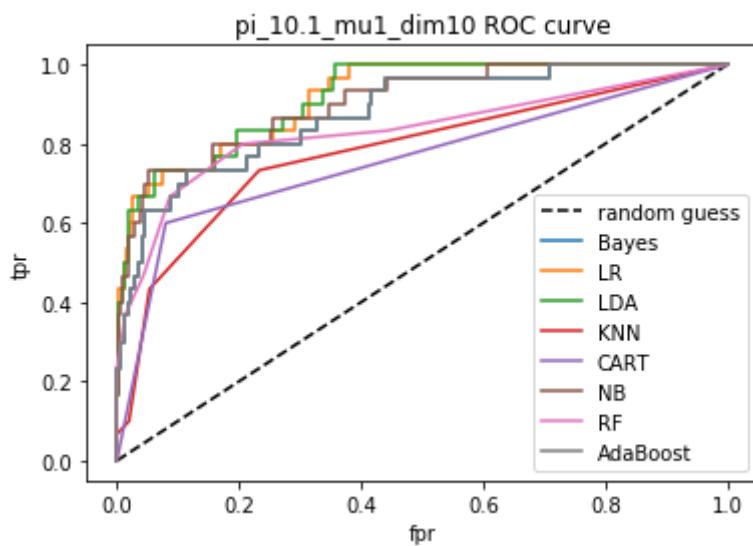
NB : AUROC = 0.903, AUPRC = 0.662, average precision = 0.375, .
Best threshold for ROC = 0.121, accuracy for the best ROC threshold is then
0.836, accuracy = 0.933.
F1 score = 0.560, log loss = 2.303, recall = 0.467.

RF : AUROC = 0.833, AUPRC = 0.579, average precision = 0.309, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.891, accuracy = 0.930.
F1 score = 0.439, log loss = 2.407, recall = 0.300.

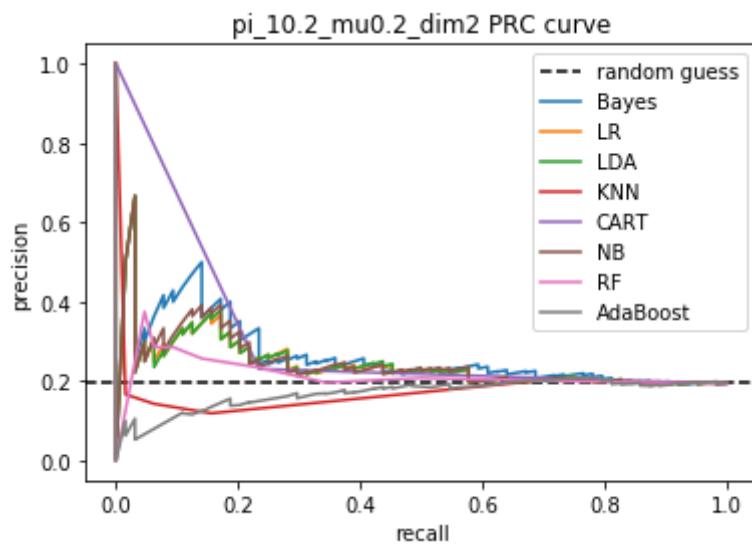
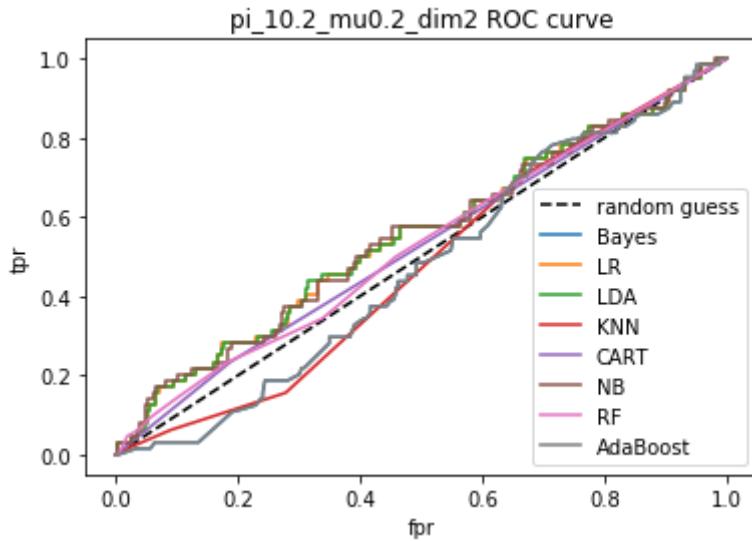
AdaBoost : AUROC = 0.877, AUPRC = 0.584, average precision = 0.333, .
Best threshold for ROC = 0.482, accuracy for the best ROC threshold is then
0.770, accuracy = 0.927.
F1 score = 0.520, log loss = 2.512, recall = 0.433.

Bayes classifier has AUROC = 0.921, and AUPRC = 0.701.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.2 , dim = 2 is 0.195 .
LR : AUROC = 0.550, AUPRC = 0.239, average precision = 0.194, .
Best threshold for ROC = 0.202, accuracy for the best ROC threshold is then
0.545, accuracy = 0.806.
F1 score = 0.000, log loss = 6.698, recall = 0.000.
-----
LDA : AUROC = 0.551, AUPRC = 0.239, average precision = 0.194, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.542, accuracy = 0.806.
F1 score = 0.000, log loss = 6.698, recall = 0.000.
-----
KNN : AUROC = 0.475, AUPRC = 0.176, average precision = 0.191, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.612, accuracy = 0.745.
F1 score = 0.087, log loss = 8.792, recall = 0.062.
-----
CART : AUROC = 0.523, AUPRC = 0.307, average precision = 0.203, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.806, accuracy = 0.700.
F1 score = 0.233, log loss = 10.362, recall = 0.234.
-----
NB : AUROC = 0.551, AUPRC = 0.242, average precision = 0.194, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.552, accuracy = 0.806.
F1 score = 0.000, log loss = 6.698, recall = 0.000.
-----
RF : AUROC = 0.527, AUPRC = 0.214, average precision = 0.203, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.600, accuracy = 0.779.
F1 score = 0.141, log loss = 7.640, recall = 0.094.
-----
AdaBoost : AUROC = 0.470, AUPRC = 0.169, average precision = 0.194, .
Best threshold for ROC = 0.492, accuracy for the best ROC threshold is then
0.500, accuracy = 0.803.
F1 score = 0.000, log loss = 6.803, recall = 0.000.
-----
Bayes classifier has AUROC = 0.573, and AUPRC = 0.261.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.2 , dim = 4 is 0.197 .
LR : AUROC = 0.623, AUPRC = 0.264, average precision = 0.197, .
Best threshold for ROC = 0.207, accuracy for the best ROC threshold is then
0.588, accuracy = 0.803.
F1 score = 0.000, log loss = 6.803, recall = 0.000.

-----
LDA : AUROC = 0.623, AUPRC = 0.265, average precision = 0.197, .
Best threshold for ROC = 0.205, accuracy for the best ROC threshold is then
0.588, accuracy = 0.803.
F1 score = 0.000, log loss = 6.803, recall = 0.000.

-----
KNN : AUROC = 0.525, AUPRC = 0.252, average precision = 0.206, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.670, accuracy = 0.785.
F1 score = 0.123, log loss = 7.431, recall = 0.077.

```

```

CART : AUROC = 0.554, AUPRC = 0.363, average precision = 0.220, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.803, accuracy = 0.694.
F1 score = 0.294, log loss = 10.571, recall = 0.323.

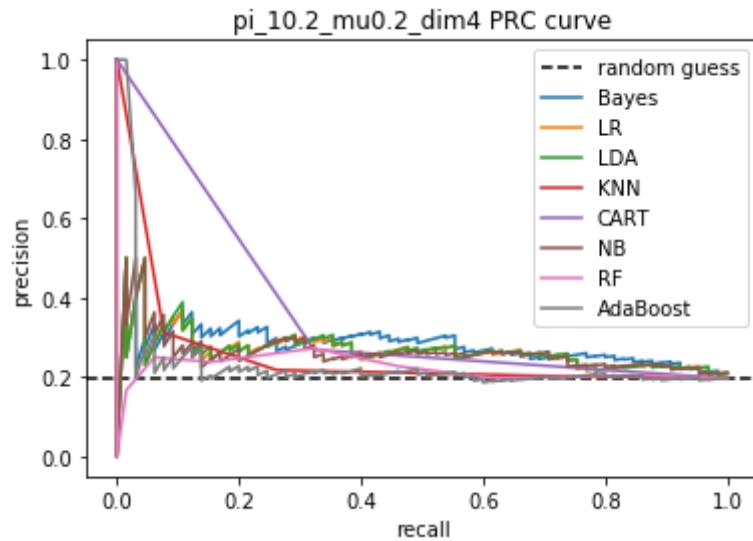
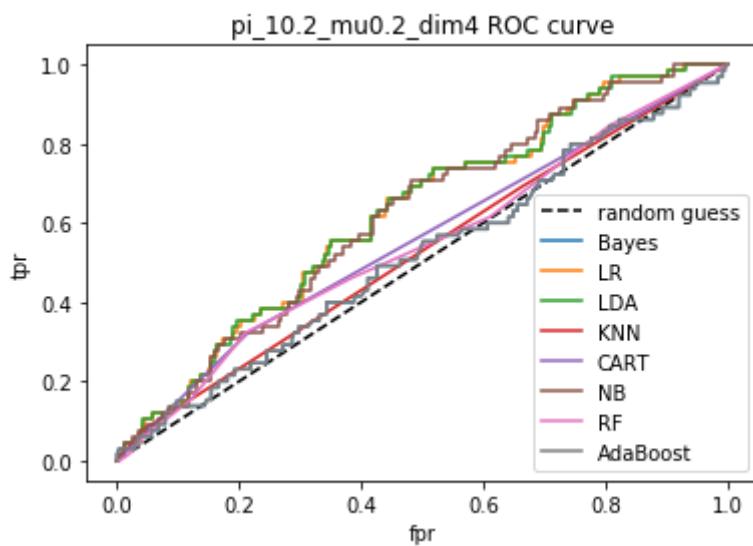
NB : AUROC = 0.616, AUPRC = 0.259, average precision = 0.197, .
Best threshold for ROC = 0.213, accuracy for the best ROC threshold is then
0.582, accuracy = 0.803.
F1 score = 0.000, log loss = 6.803, recall = 0.000.

RF : AUROC = 0.542, AUPRC = 0.221, average precision = 0.200, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.697, accuracy = 0.779.
F1 score = 0.099, log loss = 7.640, recall = 0.062.

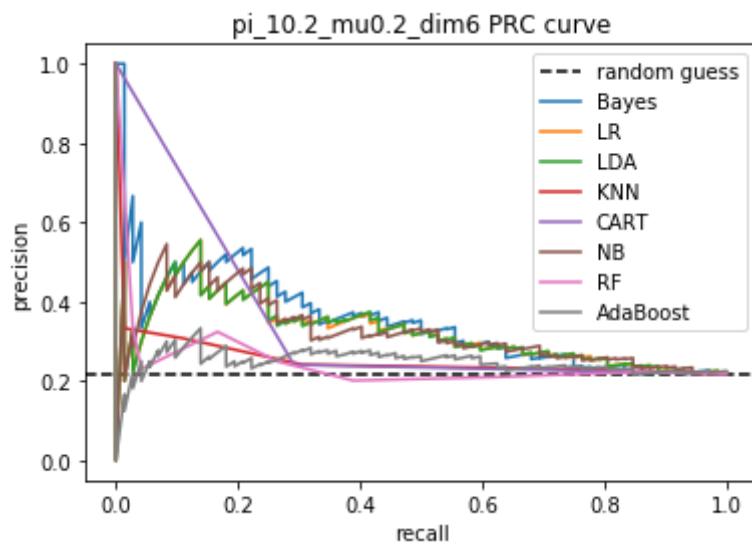
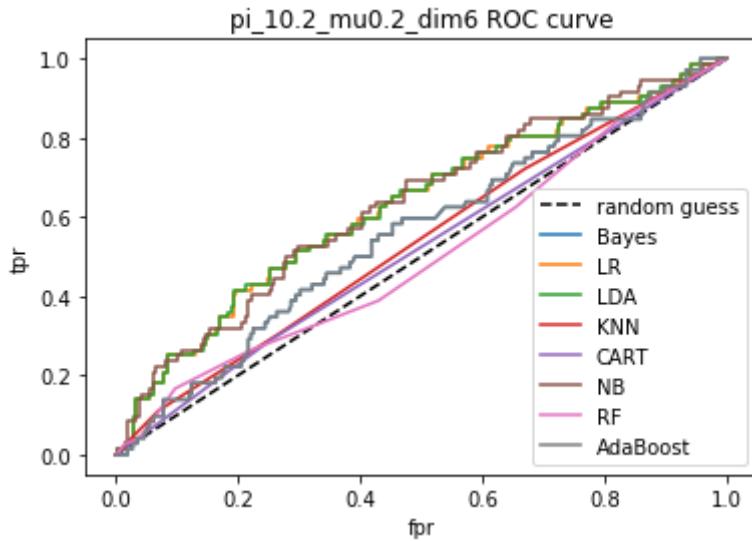
AdaBoost : AUROC = 0.516, AUPRC = 0.231, average precision = 0.199, .
Best threshold for ROC = 0.492, accuracy for the best ROC threshold is then
0.512, accuracy = 0.785.
F1 score = 0.078, log loss = 7.431, recall = 0.046.

Bayes classifier has AUROC = 0.646, and AUPRC = 0.277.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.2 , dim = 6 is 0.218 .
LR : AUROC = 0.629, AUPRC = 0.319, average precision = 0.218, .
Best threshold for ROC = 0.222, accuracy for the best ROC threshold is then
0.600, accuracy = 0.782.
F1 score = 0.000, log loss = 7.536, recall = 0.000.
-----
LDA : AUROC = 0.629, AUPRC = 0.320, average precision = 0.218, .
Best threshold for ROC = 0.219, accuracy for the best ROC threshold is then
0.591, accuracy = 0.782.
F1 score = 0.000, log loss = 7.536, recall = 0.000.
-----
KNN : AUROC = 0.536, AUPRC = 0.255, average precision = 0.228, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.639, accuracy = 0.752.
F1 score = 0.163, log loss = 8.582, recall = 0.111.
-----
CART : AUROC = 0.518, AUPRC = 0.344, average precision = 0.225, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.782, accuracy = 0.645.
F1 score = 0.264, log loss = 12.246, recall = 0.292.
-----
NB : AUROC = 0.630, AUPRC = 0.322, average precision = 0.218, .
Best threshold for ROC = 0.207, accuracy for the best ROC threshold is then
0.597, accuracy = 0.782.
F1 score = 0.000, log loss = 7.536, recall = 0.000.
-----
RF : AUROC = 0.503, AUPRC = 0.244, average precision = 0.219, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.667, accuracy = 0.761.
F1 score = 0.071, log loss = 8.268, recall = 0.042.
-----
AdaBoost : AUROC = 0.558, AUPRC = 0.246, average precision = 0.221, .
Best threshold for ROC = 0.492, accuracy for the best ROC threshold is then
0.552, accuracy = 0.755.
F1 score = 0.110, log loss = 8.478, recall = 0.069.
-----
Bayes classifier has AUROC = 0.627, and AUPRC = 0.350.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is KNN
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.2 , dim = 8 is 0.217 .
LR : AUROC = 0.594, AUPRC = 0.286, average precision = 0.218, .
Best threshold for ROC = 0.213, accuracy for the best ROC threshold is then
0.564, accuracy = 0.782.
F1 score = 0.000, log loss = 7.536, recall = 0.000.

-----
LDA : AUROC = 0.595, AUPRC = 0.286, average precision = 0.218, .
Best threshold for ROC = 0.211, accuracy for the best ROC threshold is then
0.564, accuracy = 0.782.
F1 score = 0.000, log loss = 7.536, recall = 0.000.

-----
KNN : AUROC = 0.510, AUPRC = 0.230, average precision = 0.222, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.636, accuracy = 0.758.
F1 score = 0.111, log loss = 8.373, recall = 0.069.

```

```

CART : AUROC = 0.512, AUPRC = 0.330, average precision = 0.223, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.782, accuracy = 0.652.
F1 score = 0.248, log loss = 12.036, recall = 0.264.

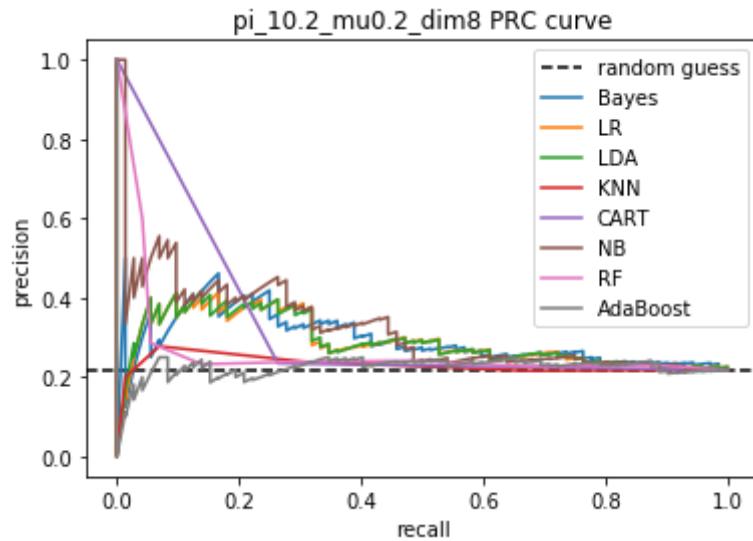
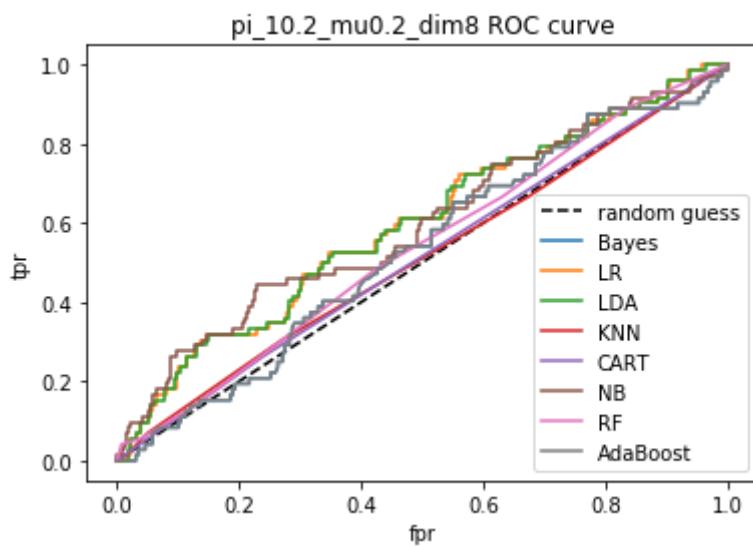
NB : AUROC = 0.594, AUPRC = 0.320, average precision = 0.230, .
Best threshold for ROC = 0.201, accuracy for the best ROC threshold is then
0.539, accuracy = 0.782.
F1 score = 0.077, log loss = 7.536, recall = 0.042.

RF : AUROC = 0.536, AUPRC = 0.262, average precision = 0.222, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.648, accuracy = 0.764.
F1 score = 0.093, log loss = 8.164, recall = 0.056.

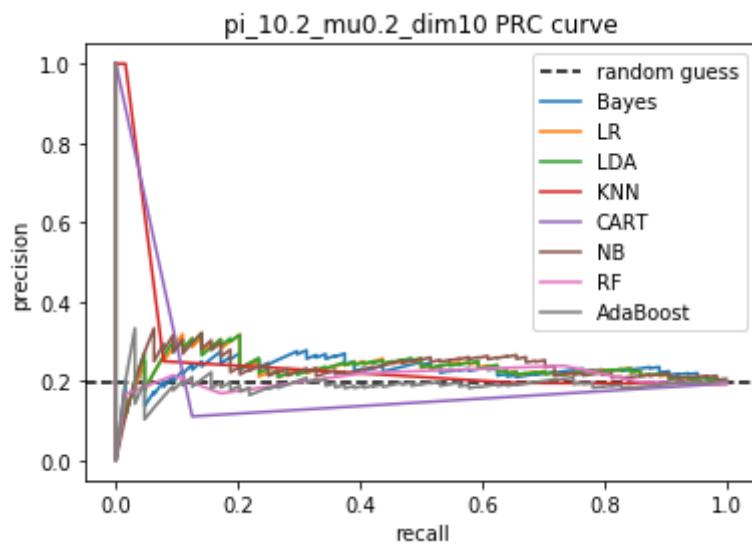
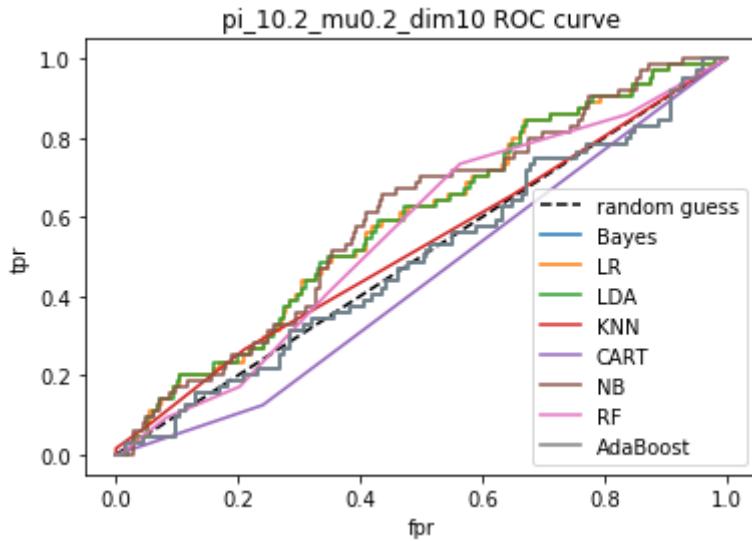
AdaBoost : AUROC = 0.529, AUPRC = 0.224, average precision = 0.217, .
Best threshold for ROC = 0.491, accuracy for the best ROC threshold is then
0.536, accuracy = 0.727.
F1 score = 0.118, log loss = 9.420, recall = 0.083.

Bayes classifier has AUROC = 0.607, and AUPRC = 0.291.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is NB
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.2 , dim = 10  is 0.195 .
LR : AUROC = 0.588, AUPRC = 0.232, average precision = 0.194, .
Best threshold for ROC = 0.194, accuracy for the best ROC threshold is then
0.576, accuracy = 0.806.
F1 score = 0.000, log loss = 6.698, recall = 0.000.
-----
LDA : AUROC = 0.588, AUPRC = 0.233, average precision = 0.194, .
Best threshold for ROC = 0.192, accuracy for the best ROC threshold is then
0.573, accuracy = 0.806.
F1 score = 0.000, log loss = 6.698, recall = 0.000.
-----
KNN : AUROC = 0.521, AUPRC = 0.251, average precision = 0.198, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.688, accuracy = 0.776.
F1 score = 0.119, log loss = 7.745, recall = 0.078.
-----
CART : AUROC = 0.442, AUPRC = 0.203, average precision = 0.184, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.806, accuracy = 0.636.
F1 score = 0.118, log loss = 12.560, recall = 0.125.
-----
NB : AUROC = 0.594, AUPRC = 0.235, average precision = 0.194, .
Best threshold for ROC = 0.186, accuracy for the best ROC threshold is then
0.591, accuracy = 0.797.
F1 score = 0.000, log loss = 7.012, recall = 0.000.
-----
RF : AUROC = 0.554, AUPRC = 0.207, average precision = 0.194, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.676, accuracy = 0.794.
F1 score = 0.029, log loss = 7.117, recall = 0.016.
-----
AdaBoost : AUROC = 0.492, AUPRC = 0.189, average precision = 0.191, .
Best threshold for ROC = 0.491, accuracy for the best ROC threshold is then
0.494, accuracy = 0.755.
F1 score = 0.069, log loss = 8.478, recall = 0.047.
-----
Bayes classifier has AUROC = 0.590, and AUPRC = 0.228.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is KNN
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is KNN
The best model measured by f1 is KNN
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.4 , dim = 2  is 0.219 .
LR : AUROC = 0.761, AUPRC = 0.454, average precision = 0.265, .
Best threshold for ROC = 0.253, accuracy for the best ROC threshold is then
0.758, accuracy = 0.782.
F1 score = 0.250, log loss = 7.536, recall = 0.167.

-----
LDA : AUROC = 0.761, AUPRC = 0.457, average precision = 0.261, .
Best threshold for ROC = 0.251, accuracy for the best ROC threshold is then
0.758, accuracy = 0.782.
F1 score = 0.234, log loss = 7.536, recall = 0.153.

-----
KNN : AUROC = 0.694, AUPRC = 0.450, average precision = 0.344, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.809, accuracy = 0.809.
F1 score = 0.411, log loss = 6.594, recall = 0.306.

```

```

CART : AUROC = 0.575, AUPRC = 0.409, average precision = 0.257, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.782, accuracy = 0.703.
F1 score = 0.338, log loss = 10.257, recall = 0.347.

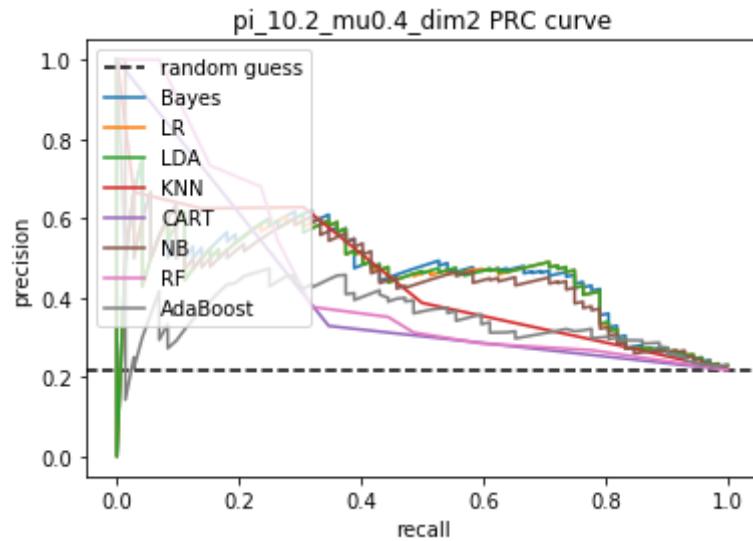
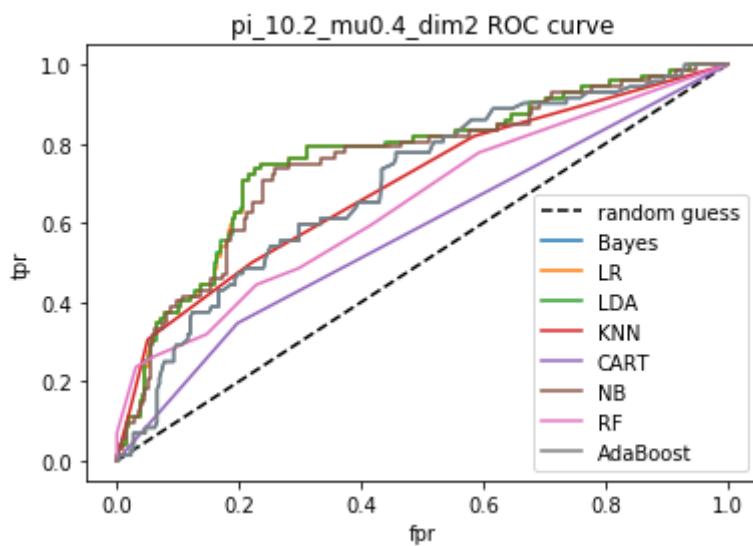
NB : AUROC = 0.749, AUPRC = 0.454, average precision = 0.258, .
Best threshold for ROC = 0.246, accuracy for the best ROC threshold is then
0.736, accuracy = 0.779.
F1 score = 0.232, log loss = 7.640, recall = 0.153.

RF : AUROC = 0.648, AUPRC = 0.440, average precision = 0.304, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.655, accuracy = 0.791.
F1 score = 0.355, log loss = 7.222, recall = 0.264.

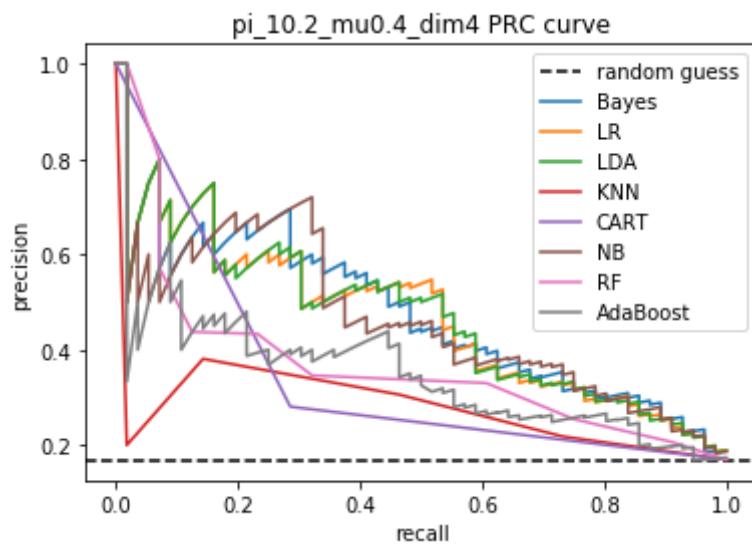
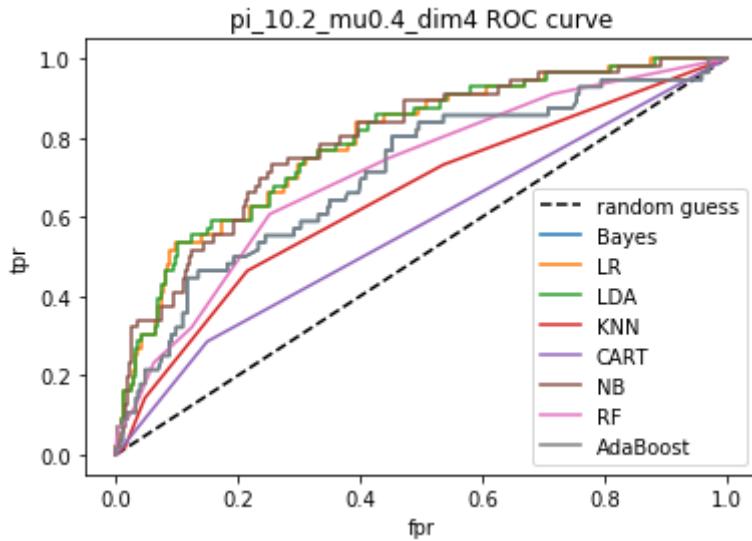
AdaBoost : AUROC = 0.693, AUPRC = 0.354, average precision = 0.257, .
Best threshold for ROC = 0.492, accuracy for the best ROC threshold is then
0.627, accuracy = 0.770.
F1 score = 0.255, log loss = 7.954, recall = 0.181.

Bayes classifier has AUROC = 0.764, and AUPRC = 0.462.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is KNN
The best model measured by average_precision is KNN
The best model measured by f1 is KNN
The best model measured by log_loss_score is KNN
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.4 , dim = 4 is 0.169 .
LR : AUROC = 0.790, AUPRC = 0.464, average precision = 0.210, .
Best threshold for ROC = 0.197, accuracy for the best ROC threshold is then
0.703, accuracy = 0.836.
F1 score = 0.156, log loss = 5.652, recall = 0.089.
-----
LDA : AUROC = 0.791, AUPRC = 0.464, average precision = 0.210, .
Best threshold for ROC = 0.196, accuracy for the best ROC threshold is then
0.706, accuracy = 0.836.
F1 score = 0.156, log loss = 5.652, recall = 0.089.
-----
KNN : AUROC = 0.647, AUPRC = 0.280, average precision = 0.200, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.730, accuracy = 0.815.
F1 score = 0.208, log loss = 6.384, recall = 0.143.
-----
CART : AUROC = 0.568, AUPRC = 0.344, average precision = 0.201, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.830, accuracy = 0.755.
F1 score = 0.283, log loss = 8.478, recall = 0.286.
-----
NB : AUROC = 0.792, AUPRC = 0.457, average precision = 0.204, .
Best threshold for ROC = 0.211, accuracy for the best ROC threshold is then
0.739, accuracy = 0.833.
F1 score = 0.154, log loss = 5.756, recall = 0.089.
-----
RF : AUROC = 0.711, AUPRC = 0.367, average precision = 0.203, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.782, accuracy = 0.824.
F1 score = 0.194, log loss = 6.070, recall = 0.125.
-----
AdaBoost : AUROC = 0.706, AUPRC = 0.346, average precision = 0.215, .
Best threshold for ROC = 0.491, accuracy for the best ROC threshold is then
0.648, accuracy = 0.824.
F1 score = 0.237, log loss = 6.070, recall = 0.161.
-----
Bayes classifier has AUROC = 0.798, and AUPRC = 0.470.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is AdaBoost
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.4 , dim = 6 is 0.2 .
LR : AUROC = 0.732, AUPRC = 0.456, average precision = 0.200, .
Best threshold for ROC = 0.211, accuracy for the best ROC threshold is then
0.682, accuracy = 0.800.
F1 score = 0.000, log loss = 6.908, recall = 0.000.

-----
LDA : AUROC = 0.731, AUPRC = 0.452, average precision = 0.212, .
Best threshold for ROC = 0.204, accuracy for the best ROC threshold is then
0.661, accuracy = 0.803.
F1 score = 0.030, log loss = 6.803, recall = 0.015.

-----
KNN : AUROC = 0.573, AUPRC = 0.243, average precision = 0.198, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.764, accuracy = 0.764.
F1 score = 0.071, log loss = 8.164, recall = 0.045.

```

```

CART : AUROC = 0.528, AUPRC = 0.316, average precision = 0.211, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.800, accuracy = 0.709.
F1 score = 0.238, log loss = 10.048, recall = 0.227.

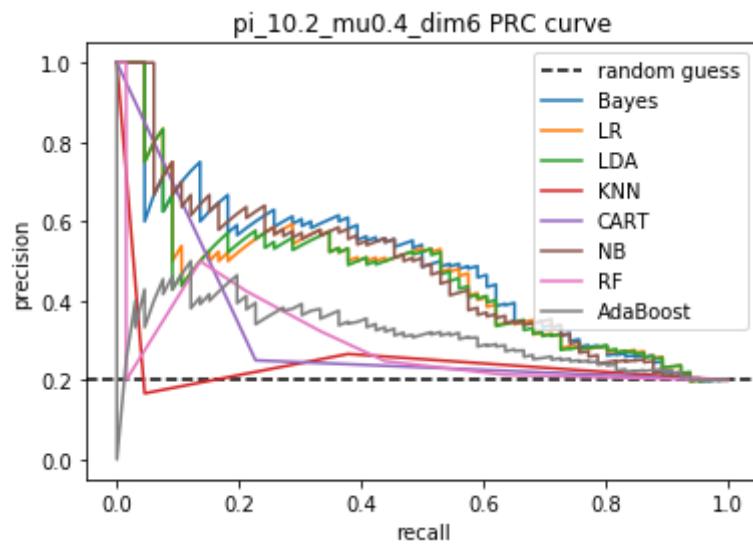
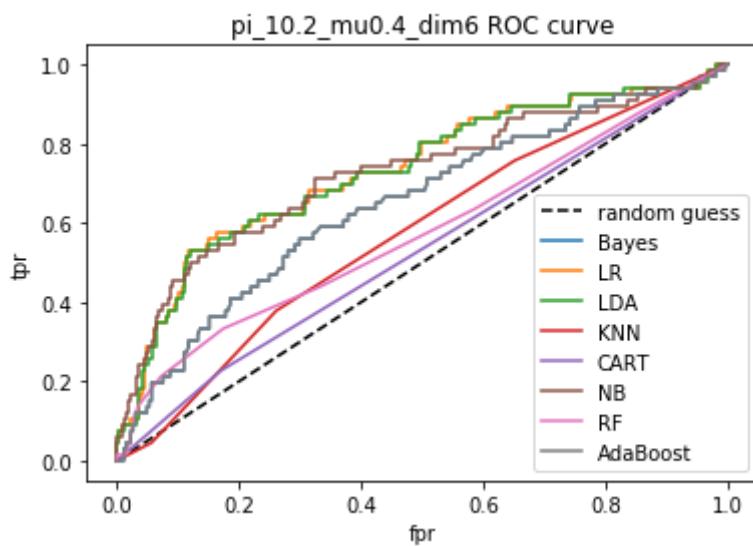
NB : AUROC = 0.723, AUPRC = 0.473, average precision = 0.224, .
Best threshold for ROC = 0.209, accuracy for the best ROC threshold is then
0.676, accuracy = 0.806.
F1 score = 0.059, log loss = 6.698, recall = 0.030.

RF : AUROC = 0.573, AUPRC = 0.289, average precision = 0.241, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.621, accuracy = 0.800.
F1 score = 0.214, log loss = 6.908, recall = 0.136.

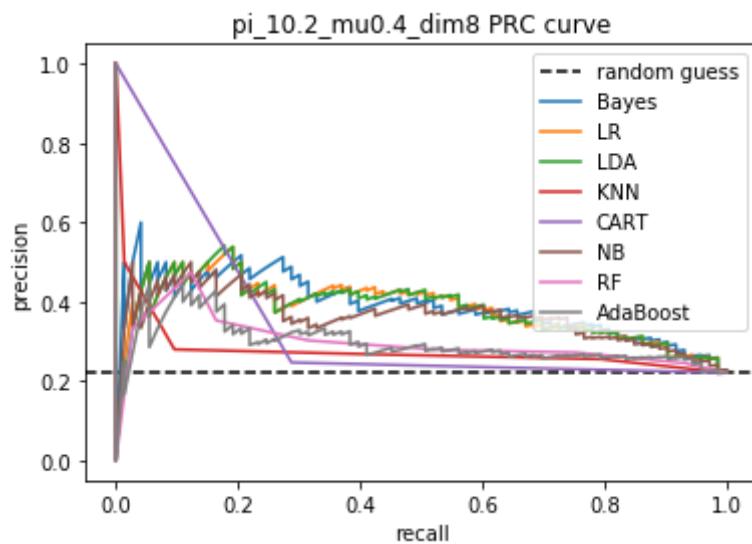
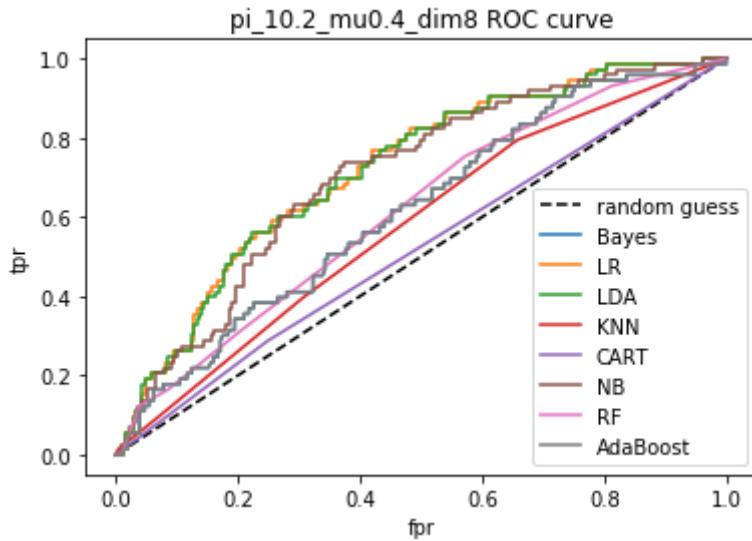
AdaBoost : AUROC = 0.649, AUPRC = 0.311, average precision = 0.224, .
Best threshold for ROC = 0.492, accuracy for the best ROC threshold is then
0.618, accuracy = 0.788.
F1 score = 0.186, log loss = 7.326, recall = 0.121.

Bayes classifier has AUROC = 0.740, and AUPRC = 0.485.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is NB
The best model measured by average_precision is RF
The best model measured by f1 is CART
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.4 , dim = 8 is 0.222 .
LR : AUROC = 0.720, AUPRC = 0.379, average precision = 0.241, .
Best threshold for ROC = 0.229, accuracy for the best ROC threshold is then
0.652, accuracy = 0.776.
F1 score = 0.140, log loss = 7.745, recall = 0.082.
-----
LDA : AUROC = 0.719, AUPRC = 0.377, average precision = 0.241, .
Best threshold for ROC = 0.228, accuracy for the best ROC threshold is then
0.655, accuracy = 0.776.
F1 score = 0.140, log loss = 7.745, recall = 0.082.
-----
KNN : AUROC = 0.578, AUPRC = 0.278, average precision = 0.227, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.745, accuracy = 0.745.
F1 score = 0.143, log loss = 8.792, recall = 0.096.
-----
CART : AUROC = 0.519, AUPRC = 0.346, average precision = 0.229, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.779, accuracy = 0.648.
F1 score = 0.266, log loss = 12.141, recall = 0.288.
-----
NB : AUROC = 0.706, AUPRC = 0.360, average precision = 0.238, .
Best threshold for ROC = 0.232, accuracy for the best ROC threshold is then
0.664, accuracy = 0.773.
F1 score = 0.138, log loss = 7.850, recall = 0.082.
-----
RF : AUROC = 0.616, AUPRC = 0.296, average precision = 0.252, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.688, accuracy = 0.776.
F1 score = 0.196, log loss = 7.745, recall = 0.123.
-----
AdaBoost : AUROC = 0.616, AUPRC = 0.292, average precision = 0.244, .
Best threshold for ROC = 0.493, accuracy for the best ROC threshold is then
0.570, accuracy = 0.767.
F1 score = 0.189, log loss = 8.059, recall = 0.123.
-----
Bayes classifier has AUROC = 0.725, and AUPRC = 0.387.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is RF
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.4 , dim = 10  is 0.233 .
LR : AUROC = 0.696, AUPRC = 0.498, average precision = 0.332, .
Best threshold for ROC = 0.235, accuracy for the best ROC threshold is then
0.603, accuracy = 0.794.
F1 score = 0.333, log loss = 7.117, recall = 0.221.

-----
LDA : AUROC = 0.695, AUPRC = 0.494, average precision = 0.332, .
Best threshold for ROC = 0.229, accuracy for the best ROC threshold is then
0.603, accuracy = 0.794.
F1 score = 0.333, log loss = 7.117, recall = 0.221.

-----
KNN : AUROC = 0.593, AUPRC = 0.317, average precision = 0.255, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.742, accuracy = 0.742.
F1 score = 0.220, log loss = 8.896, recall = 0.156.

```

```

CART : AUROC = 0.589, AUPRC = 0.445, average precision = 0.284, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.767, accuracy = 0.703.
F1 score = 0.372, log loss = 10.257, recall = 0.377.

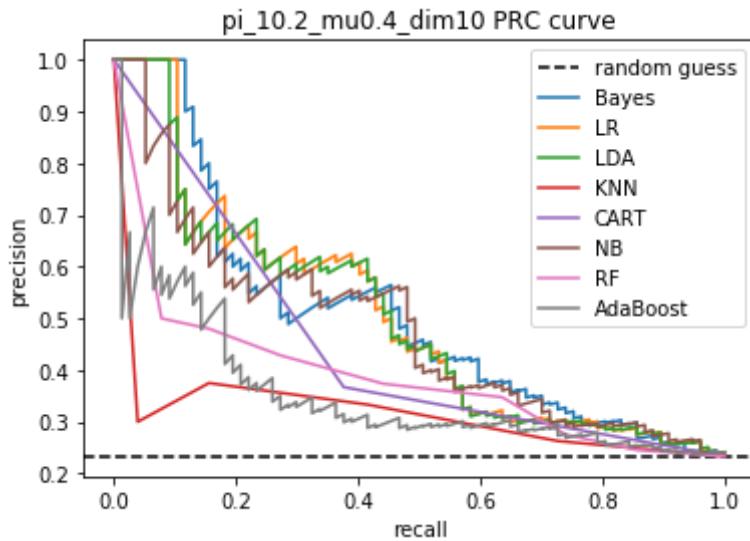
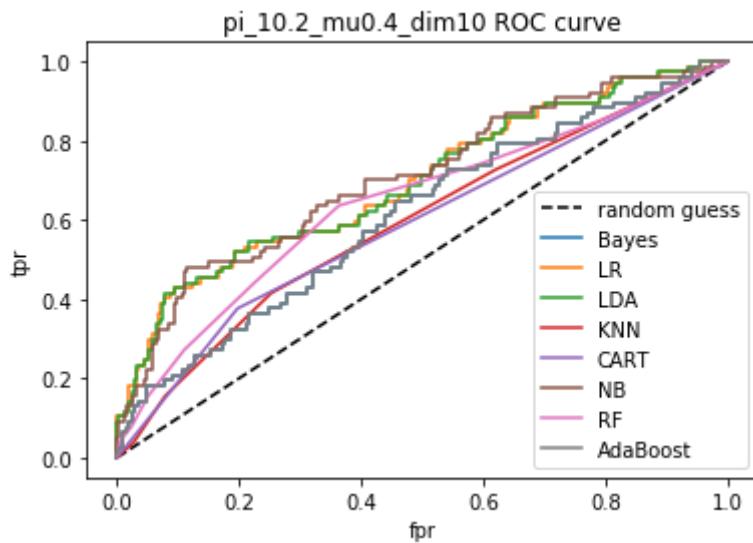
NB : AUROC = 0.705, AUPRC = 0.479, average precision = 0.300, .
Best threshold for ROC = 0.224, accuracy for the best ROC threshold is then
0.652, accuracy = 0.779.
F1 score = 0.291, log loss = 7.640, recall = 0.195.

RF : AUROC = 0.641, AUPRC = 0.385, average precision = 0.272, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.697, accuracy = 0.764.
F1 score = 0.235, log loss = 8.164, recall = 0.156.

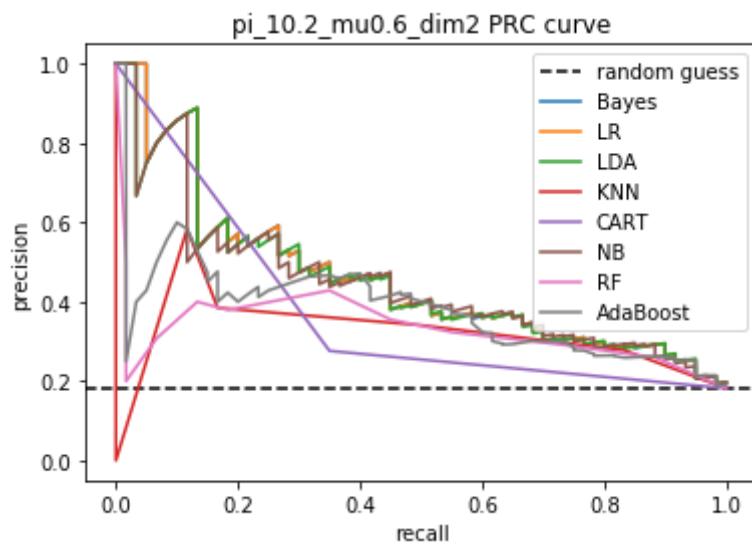
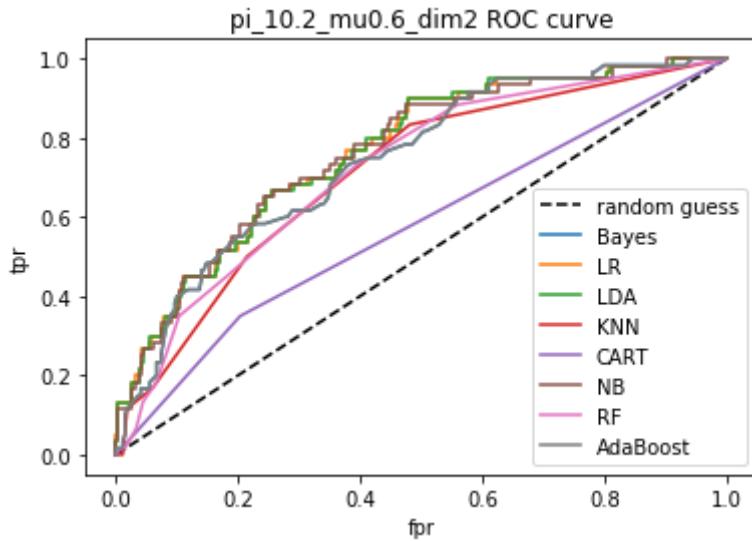
AdaBoost : AUROC = 0.611, AUPRC = 0.350, average precision = 0.266, .
Best threshold for ROC = 0.492, accuracy for the best ROC threshold is then
0.576, accuracy = 0.748.
F1 score = 0.252, log loss = 8.687, recall = 0.182.

Bayes classifier has AUROC = 0.710, and AUPRC = 0.503.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.6 , dim = 2 is 0.182 .
LR : AUROC = 0.767, AUPRC = 0.457, average precision = 0.260, .
Best threshold for ROC = 0.175, accuracy for the best ROC threshold is then
0.688, accuracy = 0.824.
F1 score = 0.310, log loss = 6.070, recall = 0.217.
-----
LDA : AUROC = 0.766, AUPRC = 0.451, average precision = 0.265, .
Best threshold for ROC = 0.169, accuracy for the best ROC threshold is then
0.682, accuracy = 0.827.
F1 score = 0.313, log loss = 5.966, recall = 0.217.
-----
KNN : AUROC = 0.711, AUPRC = 0.321, average precision = 0.216, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.800, accuracy = 0.800.
F1 score = 0.233, log loss = 6.908, recall = 0.167.
-----
CART : AUROC = 0.573, AUPRC = 0.372, average precision = 0.215, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.818, accuracy = 0.715.
F1 score = 0.309, log loss = 9.838, recall = 0.350.
-----
NB : AUROC = 0.766, AUPRC = 0.444, average precision = 0.260, .
Best threshold for ROC = 0.178, accuracy for the best ROC threshold is then
0.697, accuracy = 0.824.
F1 score = 0.310, log loss = 6.070, recall = 0.217.
-----
RF : AUROC = 0.721, AUPRC = 0.332, average precision = 0.218, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.709, accuracy = 0.797.
F1 score = 0.247, log loss = 7.012, recall = 0.183.
-----
AdaBoost : AUROC = 0.743, AUPRC = 0.381, average precision = 0.241, .
Best threshold for ROC = 0.491, accuracy for the best ROC threshold is then
0.655, accuracy = 0.806.
F1 score = 0.304, log loss = 6.698, recall = 0.233.
-----
Bayes classifier has AUROC = 0.766, and AUPRC = 0.457.
```



The best model measured by AUROC is LR  
The best model measured by AUPRC is LR  
The best model measured by accuracy\_best\_threshold is CART  
The best model measured by accuracy is LDA  
The best model measured by average\_precision is LDA  
The best model measured by f1 is LDA  
The best model measured by log\_loss\_score is LDA  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.2 , mu = 0.6 , dim = 4 is 0.179 .  
LR : AUROC = 0.791, AUPRC = 0.493, average precision = 0.299, .  
Best threshold for ROC = 0.190, accuracy for the best ROC threshold is then 0.736, accuracy = 0.845.  
F1 score = 0.338, log loss = 5.338, recall = 0.220.

---

LDA : AUROC = 0.791, AUPRC = 0.493, average precision = 0.299, .  
Best threshold for ROC = 0.188, accuracy for the best ROC threshold is then 0.739, accuracy = 0.845.  
F1 score = 0.338, log loss = 5.338, recall = 0.220.

---

KNN : AUROC = 0.720, AUPRC = 0.432, average precision = 0.292, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then 0.758, accuracy = 0.839.  
F1 score = 0.361, log loss = 5.547, recall = 0.254.

```

CART : AUROC = 0.610, AUPRC = 0.421, average precision = 0.249, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.821, accuracy = 0.785.
F1 score = 0.360, log loss = 7.431, recall = 0.339.

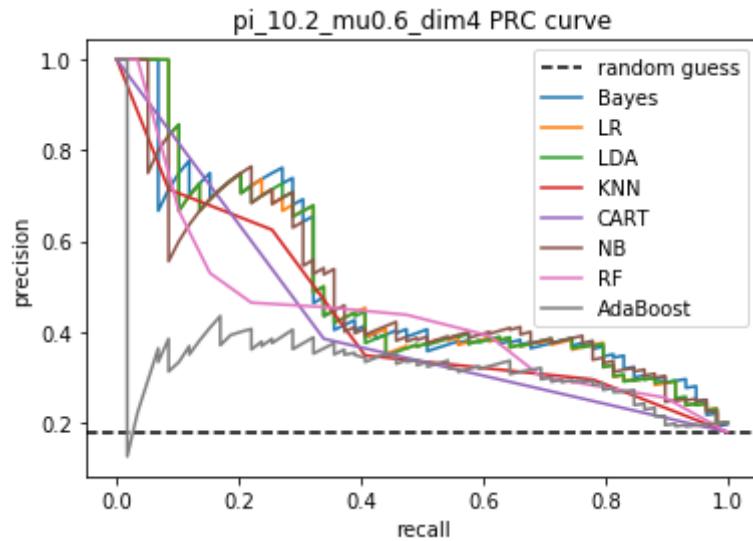
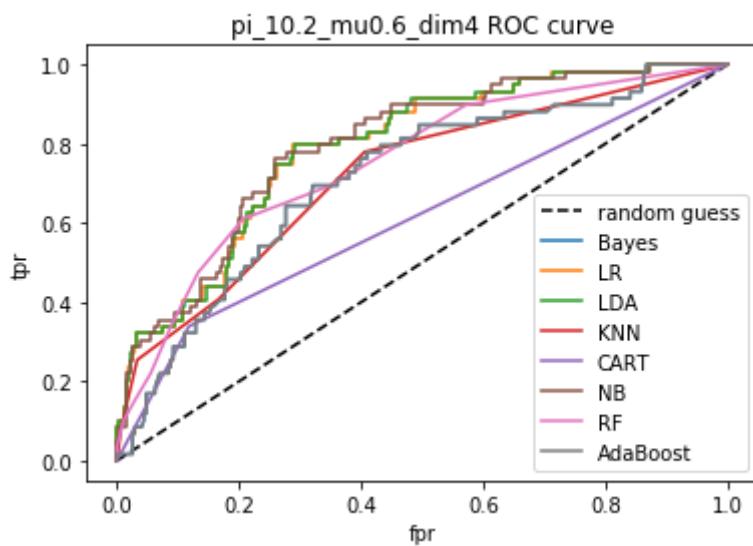
NB : AUROC = 0.796, AUPRC = 0.485, average precision = 0.302, .
Best threshold for ROC = 0.192, accuracy for the best ROC threshold is then
0.742, accuracy = 0.845.
F1 score = 0.354, log loss = 5.338, recall = 0.237.

RF : AUROC = 0.752, AUPRC = 0.434, average precision = 0.242, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.761, accuracy = 0.815.
F1 score = 0.299, log loss = 6.384, recall = 0.220.

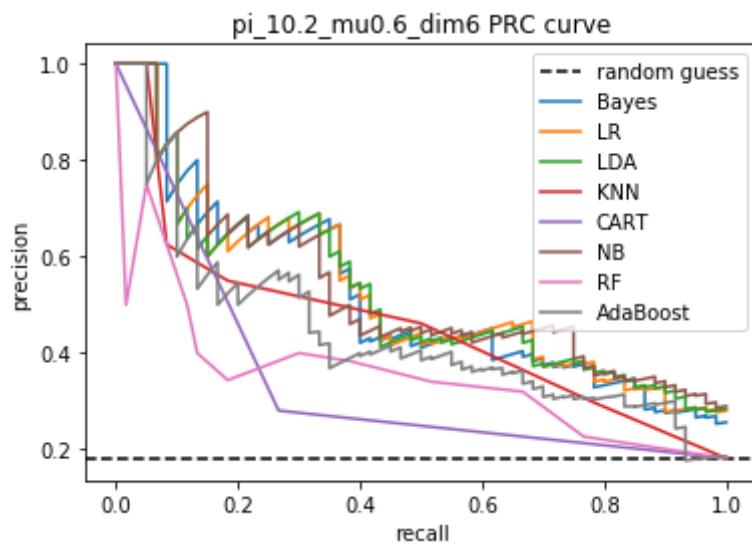
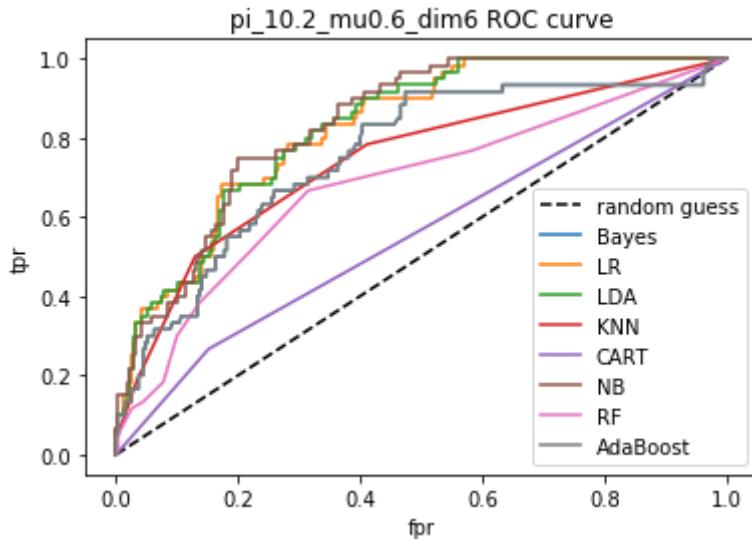
AdaBoost : AUROC = 0.713, AUPRC = 0.325, average precision = 0.219, .
Best threshold for ROC = 0.490, accuracy for the best ROC threshold is then
0.679, accuracy = 0.803.
F1 score = 0.253, log loss = 6.803, recall = 0.186.

Bayes classifier has AUROC = 0.798, and AUPRC = 0.494.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is NB
The best model measured by f1 is KNN
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.6 , dim = 6 is 0.181 .
LR : AUROC = 0.824, AUPRC = 0.521, average precision = 0.343, .
Best threshold for ROC = 0.161, accuracy for the best ROC threshold is then
0.730, accuracy = 0.848.
F1 score = 0.444, log loss = 5.233, recall = 0.333.
-----
LDA : AUROC = 0.827, AUPRC = 0.519, average precision = 0.351, .
Best threshold for ROC = 0.163, accuracy for the best ROC threshold is then
0.736, accuracy = 0.852.
F1 score = 0.449, log loss = 5.129, recall = 0.333.
-----
KNN : AUROC = 0.742, AUPRC = 0.455, average precision = 0.249, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.803, accuracy = 0.824.
F1 score = 0.275, log loss = 6.070, recall = 0.183.
-----
CART : AUROC = 0.557, AUPRC = 0.340, average precision = 0.208, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.818, accuracy = 0.742.
F1 score = 0.274, log loss = 8.896, recall = 0.267.
-----
NB : AUROC = 0.836, AUPRC = 0.530, average precision = 0.336, .
Best threshold for ROC = 0.181, accuracy for the best ROC threshold is then
0.742, accuracy = 0.845.
F1 score = 0.440, log loss = 5.338, recall = 0.333.
-----
RF : AUROC = 0.681, AUPRC = 0.350, average precision = 0.212, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.730, accuracy = 0.788.
F1 score = 0.239, log loss = 7.326, recall = 0.183.
-----
AdaBoost : AUROC = 0.755, AUPRC = 0.440, average precision = 0.265, .
Best threshold for ROC = 0.487, accuracy for the best ROC threshold is then
0.688, accuracy = 0.794.
F1 score = 0.382, log loss = 7.117, recall = 0.350.
-----
Bayes classifier has AUROC = 0.813, and AUPRC = 0.515.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.2 , mu = 0.6 , dim = 8 is 0.202 .
LR : AUROC = 0.790, AUPRC = 0.526, average precision = 0.362, .
Best threshold for ROC = 0.174, accuracy for the best ROC threshold is then
0.688, accuracy = 0.833.
F1 score = 0.444, log loss = 5.756, recall = 0.328.

-----
LDA : AUROC = 0.789, AUPRC = 0.525, average precision = 0.352, .
Best threshold for ROC = 0.182, accuracy for the best ROC threshold is then
0.703, accuracy = 0.830.
F1 score = 0.429, log loss = 5.861, recall = 0.313.

-----
KNN : AUROC = 0.679, AUPRC = 0.331, average precision = 0.244, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.776, accuracy = 0.776.
F1 score = 0.275, log loss = 7.745, recall = 0.209.

```

CART : AUROC = 0.599, AUPRC = 0.426, average precision = 0.261, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.797, accuracy = 0.742.  
F1 score = 0.361, log loss = 8.896, recall = 0.358.

---

NB : AUROC = 0.796, AUPRC = 0.553, average precision = 0.361, .  
Best threshold for ROC = 0.195, accuracy for the best ROC threshold is then  
0.712, accuracy = 0.836.  
F1 score = 0.413, log loss = 5.652, recall = 0.284.

---

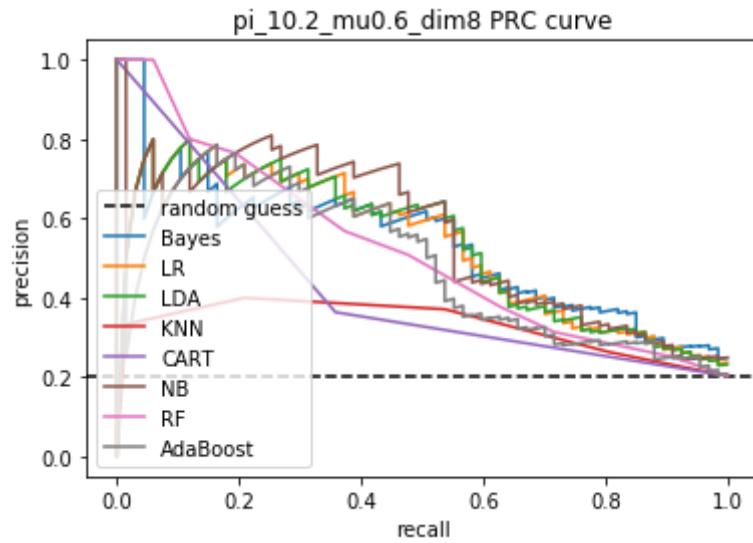
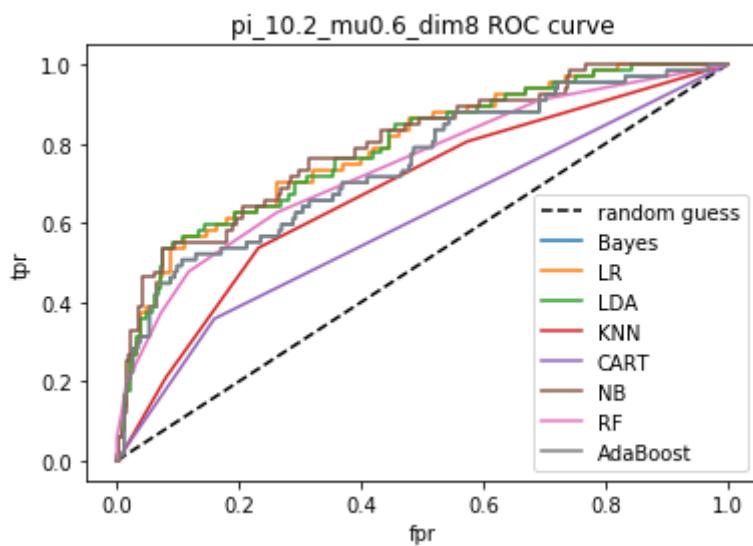
RF : AUROC = 0.742, AUPRC = 0.520, average precision = 0.312, .  
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then  
0.800, accuracy = 0.824.  
F1 score = 0.310, log loss = 6.070, recall = 0.194.

---

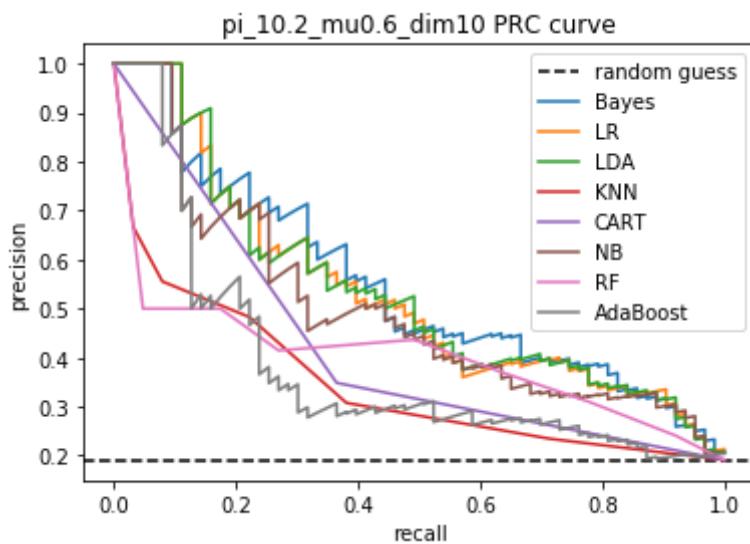
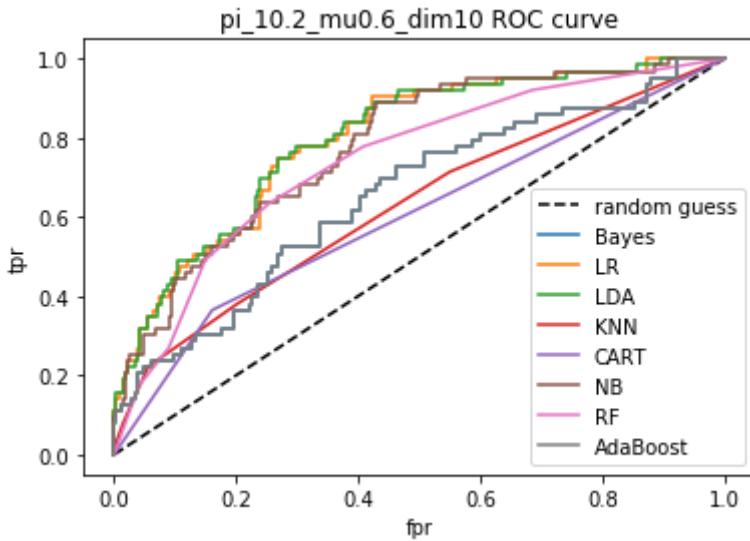
AdaBoost : AUROC = 0.745, AUPRC = 0.471, average precision = 0.327, .  
Best threshold for ROC = 0.489, accuracy for the best ROC threshold is then  
0.652, accuracy = 0.818.  
F1 score = 0.412, log loss = 6.280, recall = 0.313.

---

Bayes classifier has AUROC = 0.806, and AUPRC = 0.536.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is RF
The best model measured by accuracy is NB
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.6 , dim = 10 is 0.19 .
LR : AUROC = 0.798, AUPRC = 0.531, average precision = 0.288, .
Best threshold for ROC = 0.190, accuracy for the best ROC threshold is then
0.733, accuracy = 0.824.
F1 score = 0.341, log loss = 6.070, recall = 0.238.
-----
LDA : AUROC = 0.799, AUPRC = 0.533, average precision = 0.294, .
Best threshold for ROC = 0.185, accuracy for the best ROC threshold is then
0.730, accuracy = 0.827.
F1 score = 0.345, log loss = 5.966, recall = 0.238.
-----
KNN : AUROC = 0.627, AUPRC = 0.344, average precision = 0.256, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.718, accuracy = 0.806.
F1 score = 0.304, log loss = 6.698, recall = 0.222.
-----
CART : AUROC = 0.602, AUPRC = 0.417, average precision = 0.248, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.809, accuracy = 0.748.
F1 score = 0.357, log loss = 8.687, recall = 0.365.
-----
NB : AUROC = 0.779, AUPRC = 0.496, average precision = 0.316, .
Best threshold for ROC = 0.173, accuracy for the best ROC threshold is then
0.691, accuracy = 0.836.
F1 score = 0.357, log loss = 5.652, recall = 0.238.
-----
RF : AUROC = 0.742, AUPRC = 0.400, average precision = 0.245, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.782, accuracy = 0.809.
F1 score = 0.259, log loss = 6.594, recall = 0.175.
-----
AdaBoost : AUROC = 0.654, AUPRC = 0.379, average precision = 0.233, .
Best threshold for ROC = 0.488, accuracy for the best ROC threshold is then
0.609, accuracy = 0.776.
F1 score = 0.288, log loss = 7.745, recall = 0.238.
-----
Bayes classifier has AUROC = 0.809, and AUPRC = 0.548.
```



The best model measured by AUROC is LDA  
The best model measured by AUPRC is LDA  
The best model measured by accuracy\_best\_threshold is CART  
The best model measured by accuracy is NB  
The best model measured by average\_precision is NB  
The best model measured by f1 is NB  
The best model measured by log\_loss\_score is NB  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.2 , mu = 0.8 , dim = 2 is 0.2 .  
LR : AUROC = 0.830, AUPRC = 0.582, average precision = 0.379, .  
Best threshold for ROC = 0.196, accuracy for the best ROC threshold is then 0.764, accuracy = 0.833.  
F1 score = 0.505, log loss = 5.757, recall = 0.424.

---

LDA : AUROC = 0.831, AUPRC = 0.578, average precision = 0.379, .  
Best threshold for ROC = 0.199, accuracy for the best ROC threshold is then 0.773, accuracy = 0.833.  
F1 score = 0.505, log loss = 5.757, recall = 0.424.

---

KNN : AUROC = 0.772, AUPRC = 0.543, average precision = 0.363, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then 0.779, accuracy = 0.824.  
F1 score = 0.491, log loss = 6.071, recall = 0.424.

CART : AUROC = 0.680, AUPRC = 0.536, average precision = 0.336, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.800, accuracy = 0.788.  
F1 score = 0.485, log loss = 7.326, recall = 0.500.

---

NB : AUROC = 0.829, AUPRC = 0.576, average precision = 0.379, .  
Best threshold for ROC = 0.191, accuracy for the best ROC threshold is then  
0.755, accuracy = 0.833.  
F1 score = 0.505, log loss = 5.757, recall = 0.424.

---

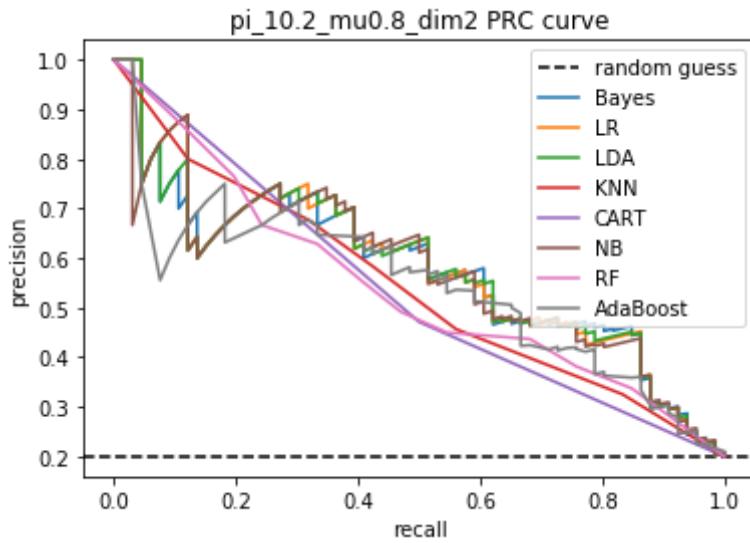
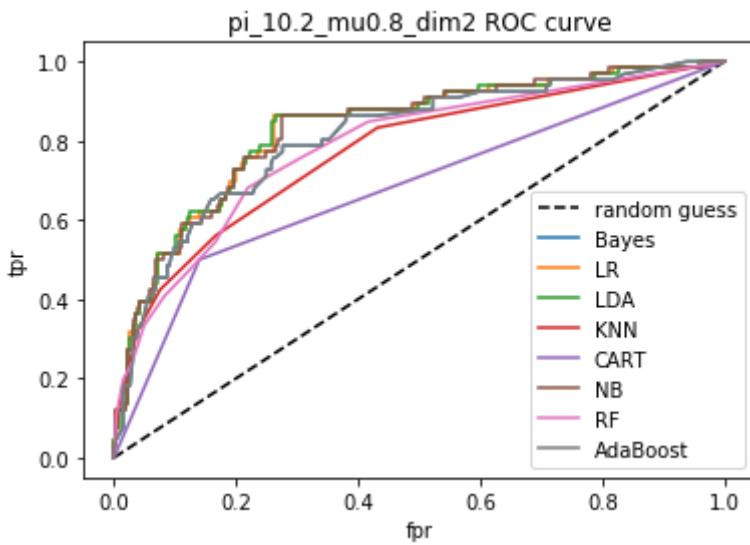
RF : AUROC = 0.786, AUPRC = 0.542, average precision = 0.344, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then  
0.761, accuracy = 0.815.  
F1 score = 0.470, log loss = 6.384, recall = 0.409.

---

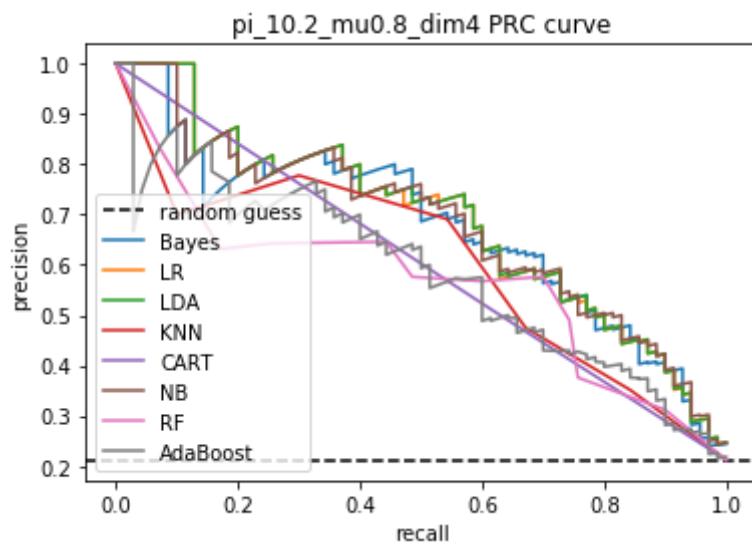
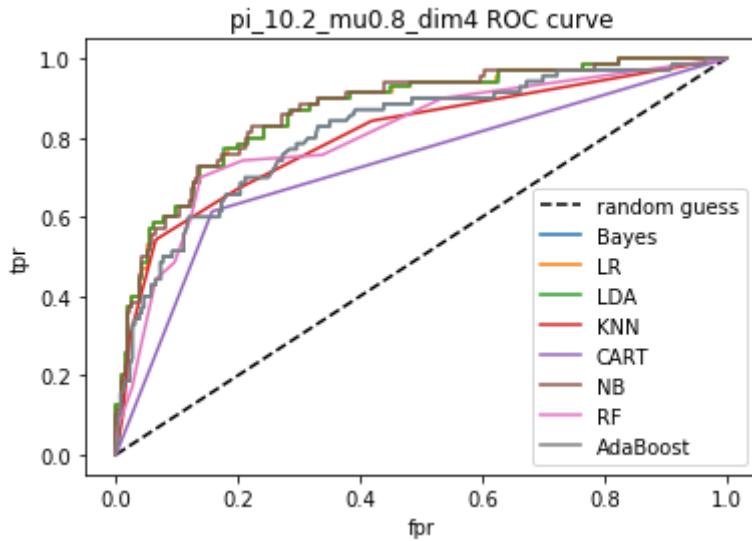
AdaBoost : AUROC = 0.810, AUPRC = 0.541, average precision = 0.381, .  
Best threshold for ROC = 0.493, accuracy for the best ROC threshold is then  
0.739, accuracy = 0.836.  
F1 score = 0.500, log loss = 5.652, recall = 0.409.

---

Bayes classifier has AUROC = 0.831, and AUPRC = 0.577.



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is AdaBoost
The best model measured by average_precision is AdaBoost
The best model measured by f1 is LR
The best model measured by log_loss_score is AdaBoost
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.8 , dim = 4 is 0.211 .
LR : AUROC = 0.868, AUPRC = 0.686, average precision = 0.491, .
Best threshold for ROC = 0.219, accuracy for the best ROC threshold is then
0.788, accuracy = 0.855.
F1 score = 0.636, log loss = 5.024, recall = 0.600.
-----
LDA : AUROC = 0.869, AUPRC = 0.686, average precision = 0.491, .
Best threshold for ROC = 0.216, accuracy for the best ROC threshold is then
0.788, accuracy = 0.855.
F1 score = 0.636, log loss = 5.024, recall = 0.600.
-----
KNN : AUROC = 0.804, AUPRC = 0.601, average precision = 0.472, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.852, accuracy = 0.852.
F1 score = 0.608, log loss = 5.129, recall = 0.543.
-----
CART : AUROC = 0.728, AUPRC = 0.604, average precision = 0.396, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.788, accuracy = 0.794.
F1 score = 0.558, log loss = 7.117, recall = 0.614.
-----
NB : AUROC = 0.870, AUPRC = 0.679, average precision = 0.485, .
Best threshold for ROC = 0.211, accuracy for the best ROC threshold is then
0.788, accuracy = 0.855.
F1 score = 0.625, log loss = 5.024, recall = 0.571.
-----
RF : AUROC = 0.806, AUPRC = 0.566, average precision = 0.389, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.827, accuracy = 0.815.
F1 score = 0.527, log loss = 6.385, recall = 0.486.
-----
AdaBoost : AUROC = 0.814, AUPRC = 0.584, average precision = 0.407, .
Best threshold for ROC = 0.491, accuracy for the best ROC threshold is then
0.736, accuracy = 0.821.
F1 score = 0.550, log loss = 6.175, recall = 0.514.
-----
Bayes classifier has AUROC = 0.864, and AUPRC = 0.672.
```



The best model measured by AUROC is NB  
The best model measured by AUPRC is LDA  
The best model measured by accuracy\_best\_threshold is KNN  
The best model measured by accuracy is LR  
The best model measured by average\_precision is LR  
The best model measured by f1 is LR  
The best model measured by log\_loss\_score is NB  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.2 , mu = 0.8 , dim = 6 is 0.207 .  
LR : AUROC = 0.785, AUPRC = 0.451, average precision = 0.328, .  
Best threshold for ROC = 0.171, accuracy for the best ROC threshold is then 0.703, accuracy = 0.815.  
F1 score = 0.408, log loss = 6.384, recall = 0.309.

---

LDA : AUROC = 0.786, AUPRC = 0.450, average precision = 0.296, .  
Best threshold for ROC = 0.169, accuracy for the best ROC threshold is then 0.700, accuracy = 0.806.  
F1 score = 0.347, log loss = 6.698, recall = 0.250.

---

KNN : AUROC = 0.658, AUPRC = 0.317, average precision = 0.243, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then 0.718, accuracy = 0.779.  
F1 score = 0.247, log loss = 7.640, recall = 0.176.

```

CART : AUROC = 0.591, AUPRC = 0.420, average precision = 0.263, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.794, accuracy = 0.758.
F1 score = 0.344, log loss = 8.373, recall = 0.309.

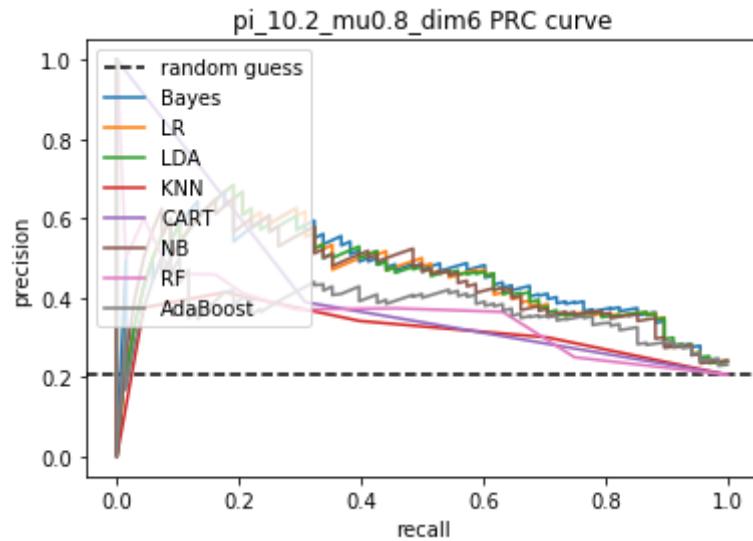
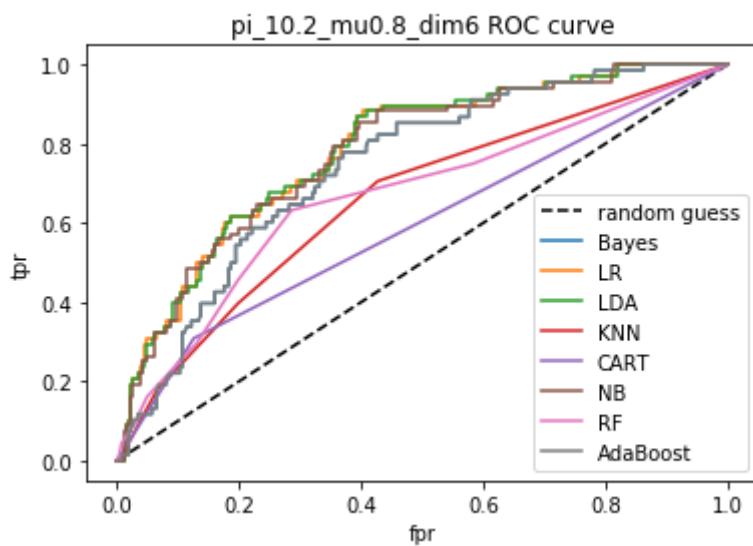
NB : AUROC = 0.779, AUPRC = 0.445, average precision = 0.306, .
Best threshold for ROC = 0.166, accuracy for the best ROC threshold is then
0.694, accuracy = 0.812.
F1 score = 0.354, log loss = 6.489, recall = 0.250.

RF : AUROC = 0.666, AUPRC = 0.357, average precision = 0.248, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.730, accuracy = 0.776.
F1 score = 0.275, log loss = 7.745, recall = 0.206.

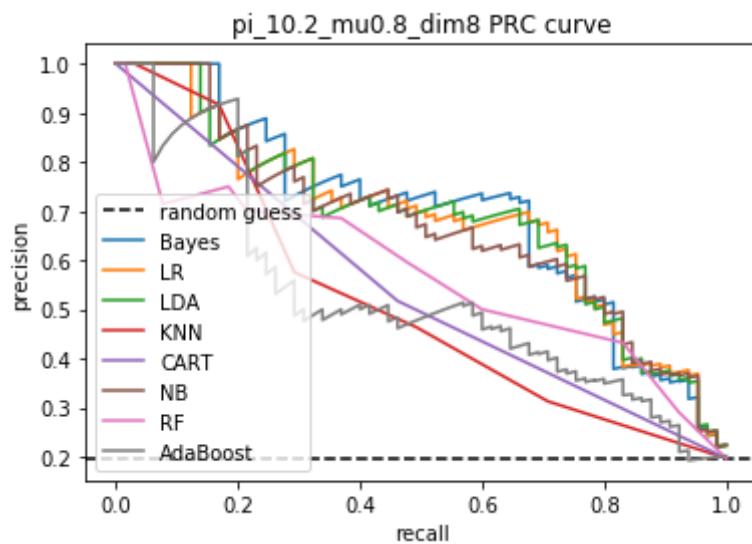
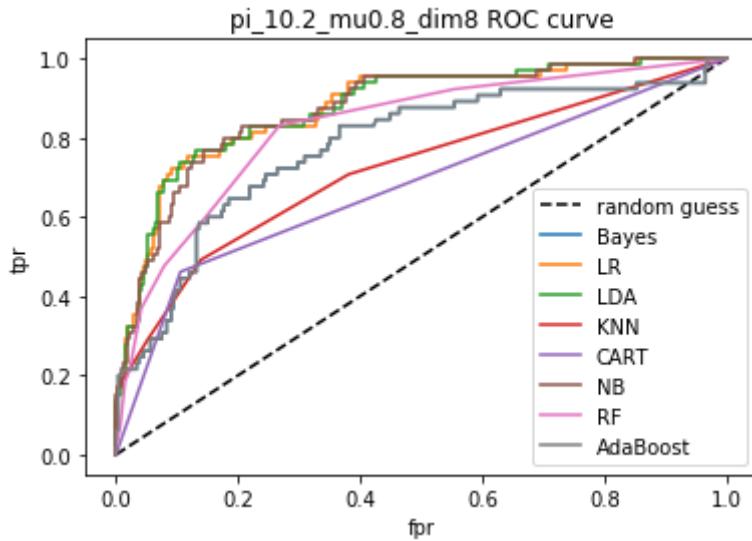
AdaBoost : AUROC = 0.743, AUPRC = 0.366, average precision = 0.236, .
Best threshold for ROC = 0.487, accuracy for the best ROC threshold is then
0.679, accuracy = 0.776.
F1 score = 0.229, log loss = 7.745, recall = 0.162.

Bayes classifier has AUROC = 0.793, and AUPRC = 0.457.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.2 , mu = 0.8 , dim = 8 is 0.198 .
LR : AUROC = 0.877, AUPRC = 0.684, average precision = 0.393, .
Best threshold for ROC = 0.208, accuracy for the best ROC threshold is then
0.806, accuracy = 0.848.
F1 score = 0.490, log loss = 5.233, recall = 0.369.
-----
LDA : AUROC = 0.877, AUPRC = 0.683, average precision = 0.418, .
Best threshold for ROC = 0.198, accuracy for the best ROC threshold is then
0.803, accuracy = 0.855.
F1 score = 0.529, log loss = 5.024, recall = 0.415.
-----
KNN : AUROC = 0.719, AUPRC = 0.517, average precision = 0.308, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.788, accuracy = 0.818.
F1 score = 0.388, log loss = 6.280, recall = 0.292.
-----
CART : AUROC = 0.678, AUPRC = 0.542, average precision = 0.345, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.803, accuracy = 0.809.
F1 score = 0.488, log loss = 6.594, recall = 0.462.
-----
NB : AUROC = 0.874, AUPRC = 0.674, average precision = 0.393, .
Best threshold for ROC = 0.187, accuracy for the best ROC threshold is then
0.800, accuracy = 0.848.
F1 score = 0.490, log loss = 5.233, recall = 0.369.
-----
RF : AUROC = 0.827, AUPRC = 0.572, average precision = 0.305, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.803, accuracy = 0.827.
F1 score = 0.329, log loss = 5.966, recall = 0.215.
-----
AdaBoost : AUROC = 0.778, AUPRC = 0.527, average precision = 0.282, .
Best threshold for ROC = 0.489, accuracy for the best ROC threshold is then
0.730, accuracy = 0.800.
F1 score = 0.365, log loss = 6.908, recall = 0.292.
-----
Bayes classifier has AUROC = 0.873, and AUPRC = 0.694.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 0.8 , dim = 10  is 0.206 .
LR : AUROC = 0.809, AUPRC = 0.603, average precision = 0.403, .
Best threshold for ROC = 0.158, accuracy for the best ROC threshold is then
0.742, accuracy = 0.842.
F1 score = 0.500, log loss = 5.442, recall = 0.382.

-----
LDA : AUROC = 0.808, AUPRC = 0.598, average precision = 0.396, .
Best threshold for ROC = 0.132, accuracy for the best ROC threshold is then
0.730, accuracy = 0.839.
F1 score = 0.495, log loss = 5.547, recall = 0.382.

-----
KNN : AUROC = 0.687, AUPRC = 0.482, average precision = 0.302, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.767, accuracy = 0.812.
F1 score = 0.340, log loss = 6.489, recall = 0.235.

```

```

CART : AUROC = 0.643, AUPRC = 0.492, average precision = 0.306, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.794, accuracy = 0.770.
F1 score = 0.433, log loss = 7.954, recall = 0.426.

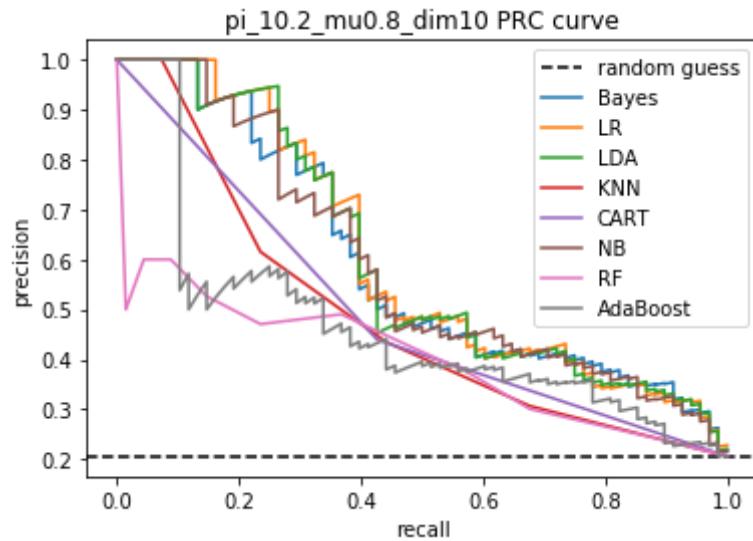
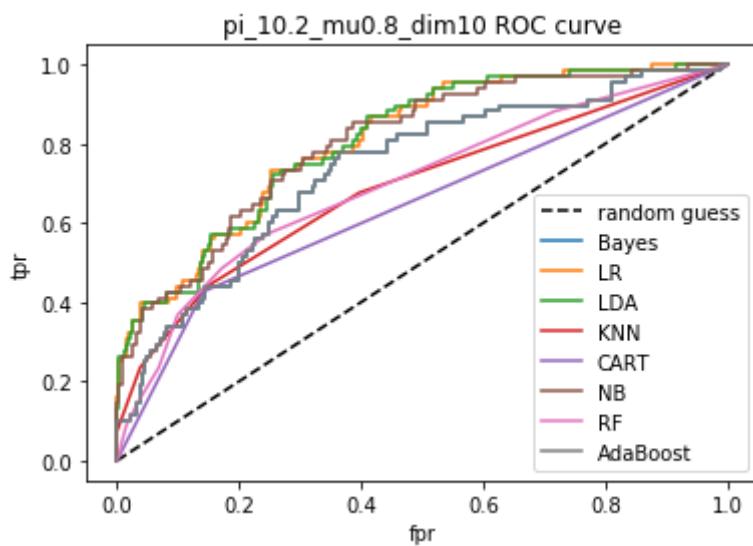
NB : AUROC = 0.803, AUPRC = 0.588, average precision = 0.372, .
Best threshold for ROC = 0.137, accuracy for the best ROC threshold is then
0.727, accuracy = 0.833.
F1 score = 0.455, log loss = 5.756, recall = 0.338.

RF : AUROC = 0.697, AUPRC = 0.400, average precision = 0.268, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.715, accuracy = 0.788.
F1 score = 0.314, log loss = 7.326, recall = 0.235.

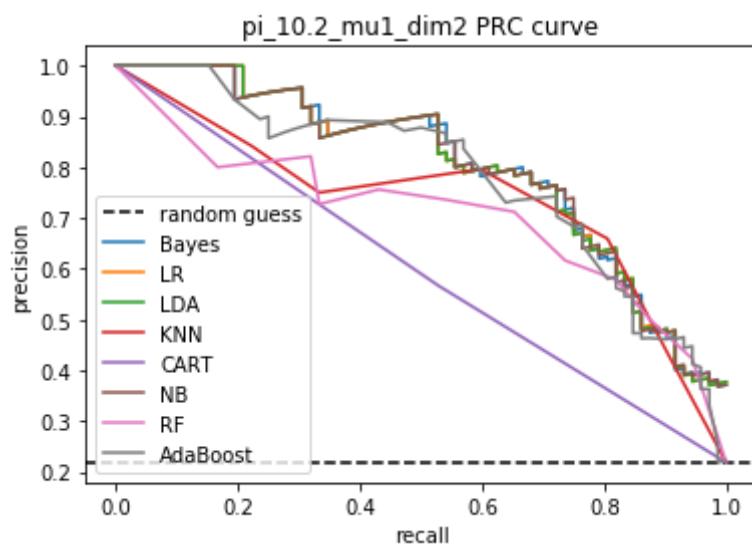
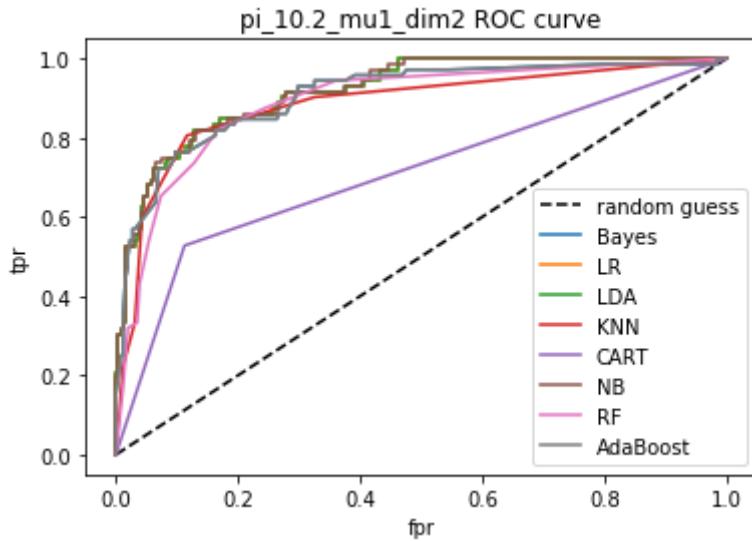
AdaBoost : AUROC = 0.737, AUPRC = 0.461, average precision = 0.302, .
Best threshold for ROC = 0.486, accuracy for the best ROC threshold is then
0.682, accuracy = 0.791.
F1 score = 0.400, log loss = 7.222, recall = 0.338.

Bayes classifier has AUROC = 0.809, and AUPRC = 0.590.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.2 , mu = 1 , dim = 2 is 0.219 .
LR : AUROC = 0.918, AUPRC = 0.799, average precision = 0.597, .
Best threshold for ROC = 0.232, accuracy for the best ROC threshold is then
0.833, accuracy = 0.888.
F1 score = 0.722, log loss = 3.873, recall = 0.667.
-----
LDA : AUROC = 0.918, AUPRC = 0.798, average precision = 0.597, .
Best threshold for ROC = 0.218, accuracy for the best ROC threshold is then
0.833, accuracy = 0.888.
F1 score = 0.722, log loss = 3.873, recall = 0.667.
-----
KNN : AUROC = 0.884, AUPRC = 0.734, average precision = 0.563, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.879, accuracy = 0.879.
F1 score = 0.683, log loss = 4.187, recall = 0.597.
-----
CART : AUROC = 0.708, AUPRC = 0.599, average precision = 0.402, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.782, accuracy = 0.809.
F1 score = 0.547, log loss = 6.594, recall = 0.528.
-----
NB : AUROC = 0.919, AUPRC = 0.799, average precision = 0.608, .
Best threshold for ROC = 0.211, accuracy for the best ROC threshold is then
0.827, accuracy = 0.891.
F1 score = 0.731, log loss = 3.768, recall = 0.681.
-----
RF : AUROC = 0.890, AUPRC = 0.705, average precision = 0.499, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.842, accuracy = 0.858.
F1 score = 0.624, log loss = 4.919, recall = 0.542.
-----
AdaBoost : AUROC = 0.905, AUPRC = 0.781, average precision = 0.555, .
Best threshold for ROC = 0.493, accuracy for the best ROC threshold is then
0.824, accuracy = 0.873.
F1 score = 0.691, log loss = 4.396, recall = 0.653.
-----
Bayes classifier has AUROC = 0.919, and AUPRC = 0.800.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.2 , mu = 1 , dim = 4  is 0.188 .
LR : AUROC = 0.941, AUPRC = 0.792, average precision = 0.514, .
Best threshold for ROC = 0.223, accuracy for the best ROC threshold is then
0.858, accuracy = 0.888.
F1 score = 0.634, log loss = 3.873, recall = 0.516.

-----
LDA : AUROC = 0.941, AUPRC = 0.791, average precision = 0.540, .
Best threshold for ROC = 0.218, accuracy for the best ROC threshold is then
0.861, accuracy = 0.894.
F1 score = 0.660, log loss = 3.663, recall = 0.548.

-----
KNN : AUROC = 0.852, AUPRC = 0.673, average precision = 0.400, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.870, accuracy = 0.855.
F1 score = 0.529, log loss = 5.024, recall = 0.435.

```

CART : AUROC = 0.733, AUPRC = 0.620, average precision = 0.418, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.812, accuracy = 0.848.  
F1 score = 0.576, log loss = 5.233, recall = 0.548.

---

NB : AUROC = 0.941, AUPRC = 0.792, average precision = 0.504, .  
Best threshold for ROC = 0.207, accuracy for the best ROC threshold is then  
0.858, accuracy = 0.885.  
F1 score = 0.627, log loss = 3.977, recall = 0.516.

---

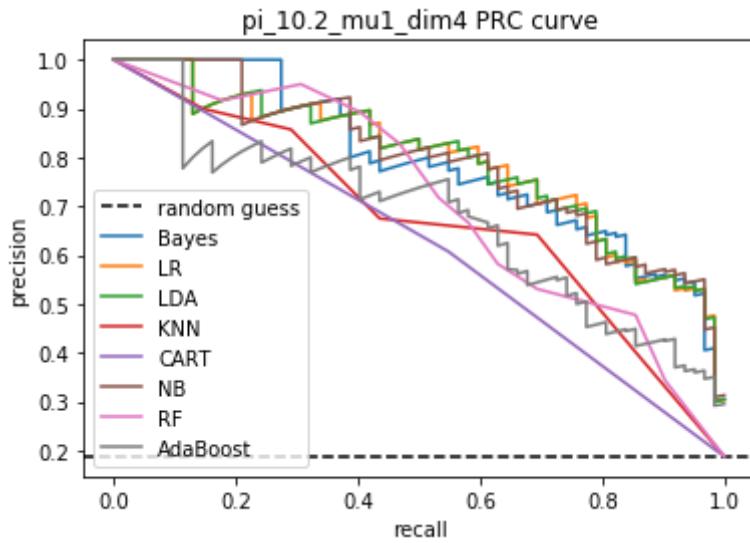
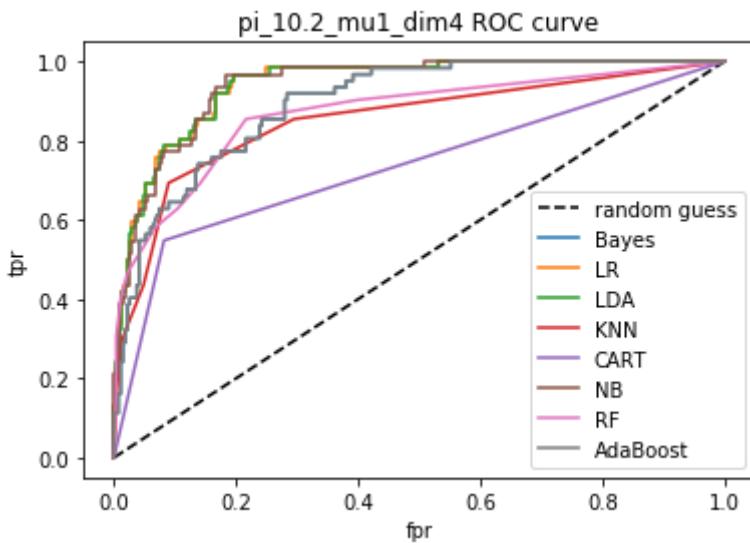
RF : AUROC = 0.869, AUPRC = 0.712, average precision = 0.470, .  
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then  
0.827, accuracy = 0.873.  
F1 score = 0.611, log loss = 4.396, recall = 0.532.

---

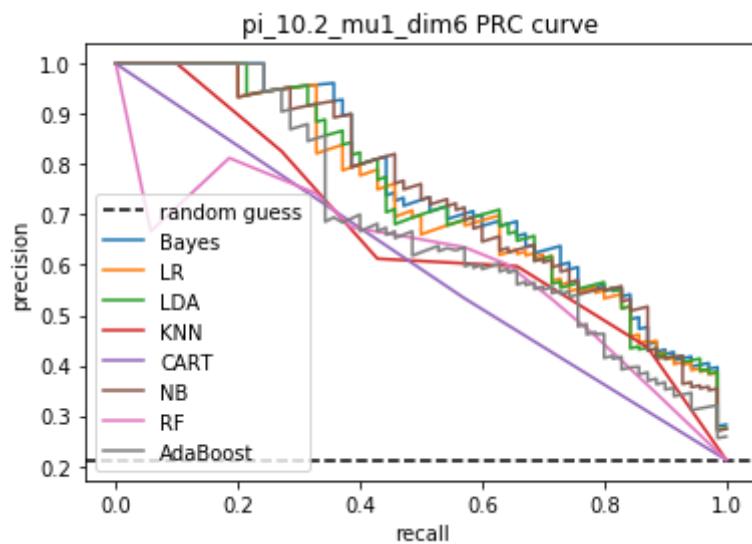
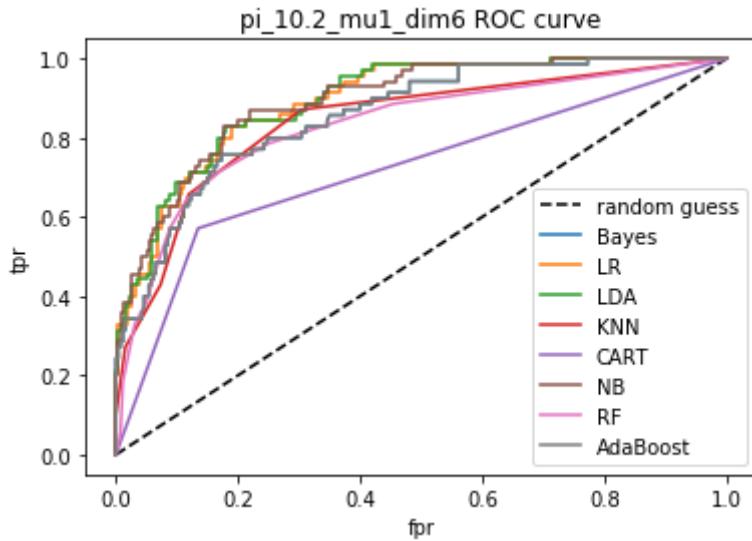
AdaBoost : AUROC = 0.894, AUPRC = 0.677, average precision = 0.499, .  
Best threshold for ROC = 0.489, accuracy for the best ROC threshold is then  
0.785, accuracy = 0.882.  
F1 score = 0.636, log loss = 4.082, recall = 0.548.

---

Bayes classifier has AUROC = 0.938, and AUPRC = 0.790.



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is LDA
Positive ratio for pi_1 = 0.2 , mu = 1 , dim = 6 is 0.211 .
LR : AUROC = 0.893, AUPRC = 0.729, average precision = 0.475, .
Best threshold for ROC = 0.196, accuracy for the best ROC threshold is then
0.812, accuracy = 0.852.
F1 score = 0.614, log loss = 5.129, recall = 0.557.
-----
LDA : AUROC = 0.895, AUPRC = 0.737, average precision = 0.472, .
Best threshold for ROC = 0.198, accuracy for the best ROC threshold is then
0.821, accuracy = 0.852.
F1 score = 0.608, log loss = 5.129, recall = 0.543.
-----
KNN : AUROC = 0.841, AUPRC = 0.660, average precision = 0.384, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.833, accuracy = 0.821.
F1 score = 0.504, log loss = 6.175, recall = 0.429.
-----
CART : AUROC = 0.718, AUPRC = 0.598, average precision = 0.396, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.788, accuracy = 0.803.
F1 score = 0.552, log loss = 6.803, recall = 0.571.
-----
NB : AUROC = 0.894, AUPRC = 0.741, average precision = 0.496, .
Best threshold for ROC = 0.191, accuracy for the best ROC threshold is then
0.821, accuracy = 0.861.
F1 score = 0.629, log loss = 4.815, recall = 0.557.
-----
RF : AUROC = 0.830, AUPRC = 0.608, average precision = 0.427, .
Best threshold for ROC = 0.200, accuracy for the best ROC threshold is then
0.806, accuracy = 0.836.
F1 score = 0.557, log loss = 5.652, recall = 0.486.
-----
AdaBoost : AUROC = 0.858, AUPRC = 0.680, average precision = 0.444, .
Best threshold for ROC = 0.489, accuracy for the best ROC threshold is then
0.773, accuracy = 0.836.
F1 score = 0.591, log loss = 5.652, recall = 0.557.
-----
Bayes classifier has AUROC = 0.901, and AUPRC = 0.750.
```



The best model measured by AUROC is LDA  
The best model measured by AUPRC is NB  
The best model measured by accuracy\_best\_threshold is KNN  
The best model measured by accuracy is NB  
The best model measured by average\_precision is NB  
The best model measured by f1 is NB  
The best model measured by log\_loss\_score is NB  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.2 , mu = 1 , dim = 8 is 0.212 .  
LR : AUROC = 0.911, AUPRC = 0.756, average precision = 0.535, .  
Best threshold for ROC = 0.282, accuracy for the best ROC threshold is then 0.861, accuracy = 0.870.  
F1 score = 0.677, log loss = 4.501, recall = 0.643.

---

LDA : AUROC = 0.913, AUPRC = 0.766, average precision = 0.563, .  
Best threshold for ROC = 0.256, accuracy for the best ROC threshold is then 0.855, accuracy = 0.879.  
F1 score = 0.701, log loss = 4.187, recall = 0.671.

---

KNN : AUROC = 0.849, AUPRC = 0.685, average precision = 0.456, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then 0.848, accuracy = 0.848.  
F1 score = 0.583, log loss = 5.233, recall = 0.500.

CART : AUROC = 0.747, AUPRC = 0.665, average precision = 0.472, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.788, accuracy = 0.848.  
F1 score = 0.615, log loss = 5.233, recall = 0.571.

---

NB : AUROC = 0.916, AUPRC = 0.774, average precision = 0.573, .  
Best threshold for ROC = 0.240, accuracy for the best ROC threshold is then  
0.848, accuracy = 0.885.  
F1 score = 0.698, log loss = 3.977, recall = 0.629.

---

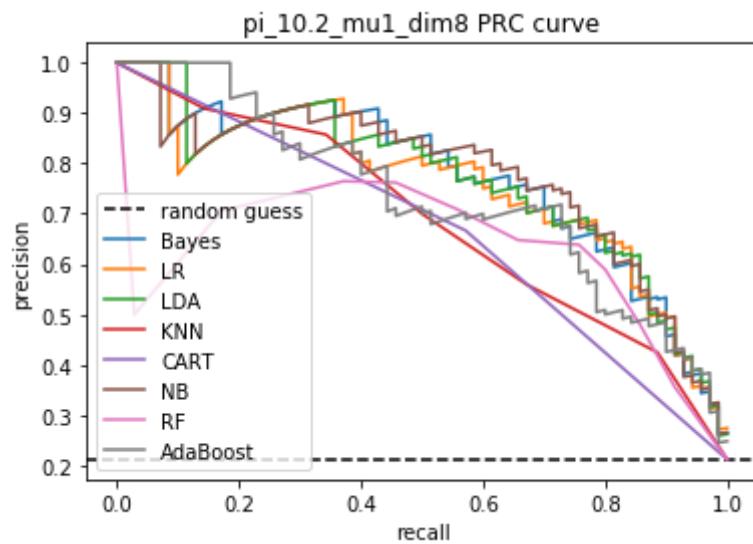
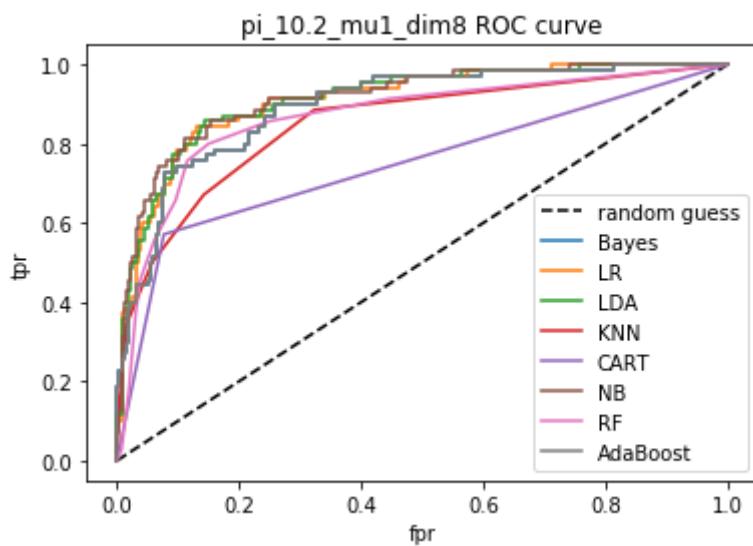
RF : AUROC = 0.868, AUPRC = 0.631, average precision = 0.489, .  
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then  
0.858, accuracy = 0.858.  
F1 score = 0.624, log loss = 4.919, recall = 0.557.

---

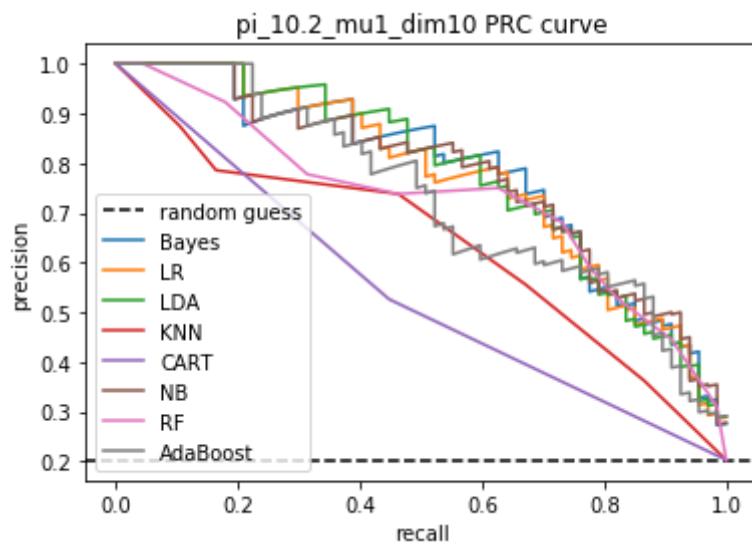
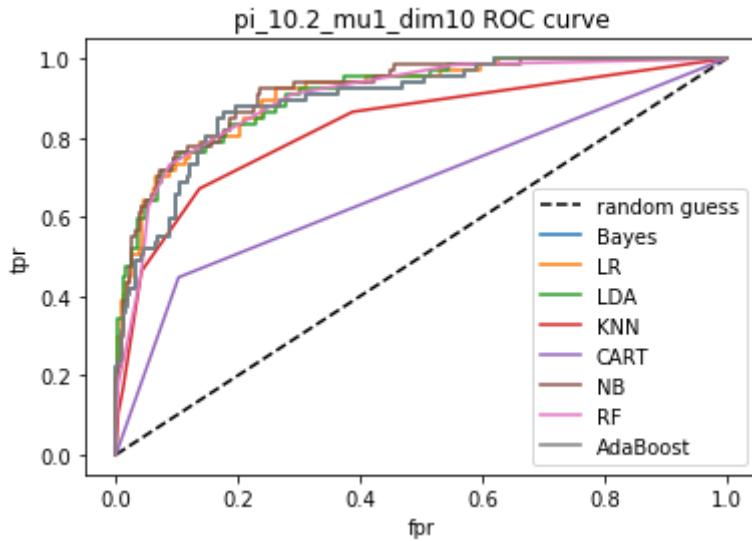
AdaBoost : AUROC = 0.896, AUPRC = 0.733, average precision = 0.528, .  
Best threshold for ROC = 0.487, accuracy for the best ROC threshold is then  
0.794, accuracy = 0.867.  
F1 score = 0.672, log loss = 4.605, recall = 0.643.

---

Bayes classifier has AUROC = 0.912, and AUPRC = 0.771.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is LDA
The best model measured by log_loss_score is NB
The best model measured by recall is LDA
Positive ratio for pi_1 = 0.2 , mu = 1 , dim = 10  is 0.202 .
LR : AUROC = 0.910, AUPRC = 0.773, average precision = 0.549, .
Best threshold for ROC = 0.239, accuracy for the best ROC threshold is then
0.803, accuracy = 0.882.
F1 score = 0.688, log loss = 4.082, recall = 0.642.
-----
LDA : AUROC = 0.910, AUPRC = 0.778, average precision = 0.533, .
Best threshold for ROC = 0.238, accuracy for the best ROC threshold is then
0.818, accuracy = 0.876.
F1 score = 0.677, log loss = 4.291, recall = 0.642.
-----
KNN : AUROC = 0.829, AUPRC = 0.637, average precision = 0.451, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.858, accuracy = 0.858.
F1 score = 0.569, log loss = 4.919, recall = 0.463.
-----
CART : AUROC = 0.673, AUPRC = 0.543, average precision = 0.348, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.797, accuracy = 0.806.
F1 score = 0.484, log loss = 6.698, recall = 0.448.
-----
NB : AUROC = 0.916, AUPRC = 0.774, average precision = 0.563, .
Best threshold for ROC = 0.244, accuracy for the best ROC threshold is then
0.821, accuracy = 0.888.
F1 score = 0.694, log loss = 3.873, recall = 0.627.
-----
RF : AUROC = 0.901, AUPRC = 0.727, average precision = 0.546, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.845, accuracy = 0.882.
F1 score = 0.683, log loss = 4.082, recall = 0.627.
-----
AdaBoost : AUROC = 0.895, AUPRC = 0.734, average precision = 0.443, .
Best threshold for ROC = 0.490, accuracy for the best ROC threshold is then
0.833, accuracy = 0.845.
F1 score = 0.592, log loss = 5.338, recall = 0.552.
-----
Bayes classifier has AUROC = 0.914, and AUPRC = 0.778.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.3 , mu = 0.2 , dim = 2  is 0.277 .
LR : AUROC = 0.611, AUPRC = 0.360, average precision = 0.291, .
Best threshold for ROC = 0.271, accuracy for the best ROC threshold is then
0.582, accuracy = 0.724.
F1 score = 0.117, log loss = 9.524, recall = 0.066.

-----
LDA : AUROC = 0.611, AUPRC = 0.360, average precision = 0.288, .
Best threshold for ROC = 0.268, accuracy for the best ROC threshold is then
0.582, accuracy = 0.721.
F1 score = 0.115, log loss = 9.629, recall = 0.066.

-----
KNN : AUROC = 0.538, AUPRC = 0.297, average precision = 0.285, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.691, accuracy = 0.691.
F1 score = 0.190, log loss = 10.676, recall = 0.132.

```

```

CART : AUROC = 0.507, AUPRC = 0.373, average precision = 0.279, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.724, accuracy = 0.621.
F1 score = 0.269, log loss = 13.083, recall = 0.253.

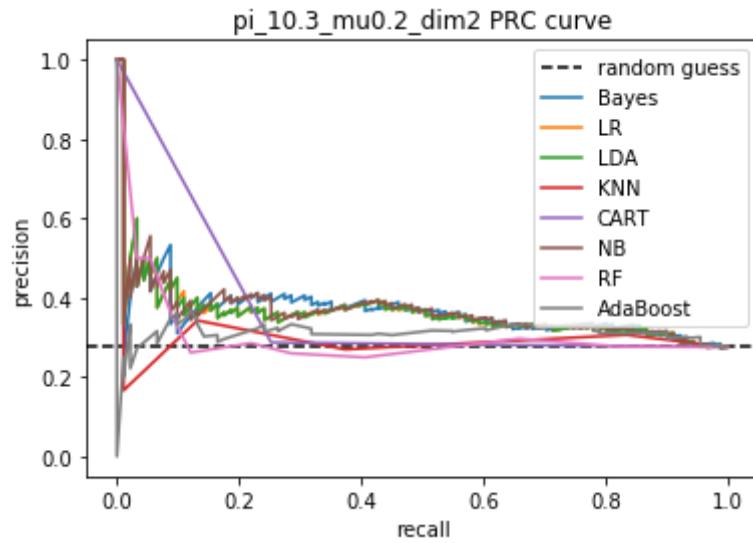
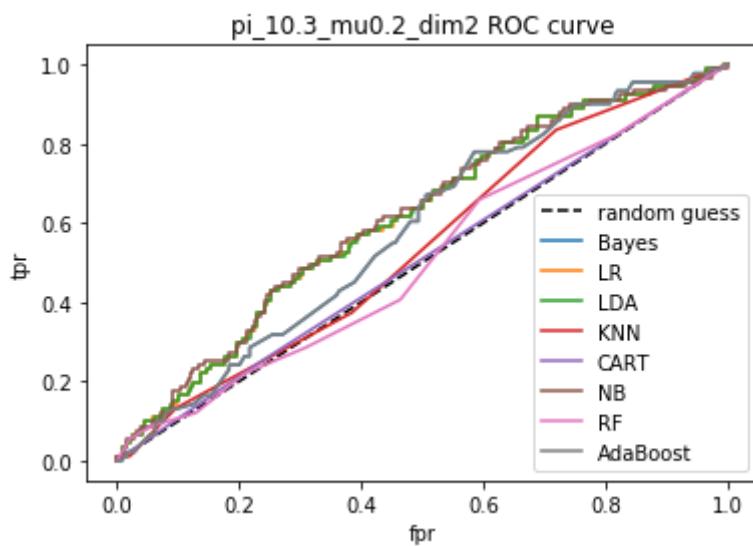
NB : AUROC = 0.616, AUPRC = 0.364, average precision = 0.288, .
Best threshold for ROC = 0.251, accuracy for the best ROC threshold is then
0.582, accuracy = 0.718.
F1 score = 0.131, log loss = 9.734, recall = 0.077.

RF : AUROC = 0.504, AUPRC = 0.301, average precision = 0.274, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.579, accuracy = 0.664.
F1 score = 0.165, log loss = 11.618, recall = 0.121.

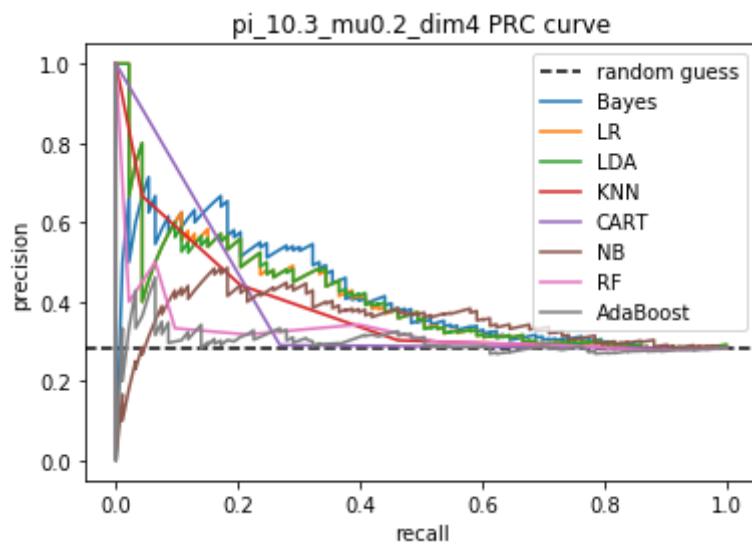
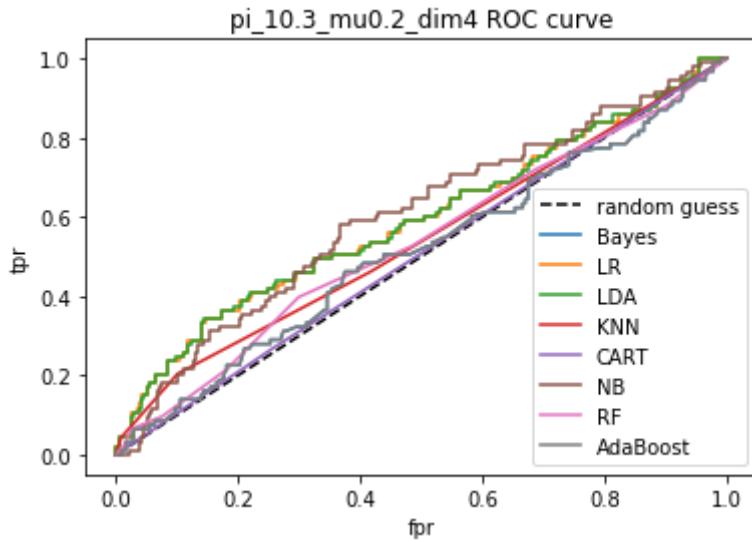
AdaBoost : AUROC = 0.581, AUPRC = 0.311, average precision = 0.276, .
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then
0.561, accuracy = 0.697.
F1 score = 0.107, log loss = 10.466, recall = 0.066.

Bayes classifier has AUROC = 0.618, and AUPRC = 0.365.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.2 , dim = 4 is 0.282 .
LR : AUROC = 0.591, AUPRC = 0.405, average precision = 0.282, .
Best threshold for ROC = 0.271, accuracy for the best ROC threshold is then
0.552, accuracy = 0.718.
F1 score = 0.000, log loss = 9.734, recall = 0.000.
-----
LDA : AUROC = 0.591, AUPRC = 0.405, average precision = 0.282, .
Best threshold for ROC = 0.269, accuracy for the best ROC threshold is then
0.552, accuracy = 0.718.
F1 score = 0.000, log loss = 9.734, recall = 0.000.
-----
KNN : AUROC = 0.542, AUPRC = 0.377, average precision = 0.315, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.703, accuracy = 0.703.
F1 score = 0.279, log loss = 10.257, recall = 0.204.
-----
CART : AUROC = 0.506, AUPRC = 0.383, average precision = 0.284, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.718, accuracy = 0.609.
F1 score = 0.279, log loss = 13.502, recall = 0.269.
-----
NB : AUROC = 0.601, AUPRC = 0.353, average precision = 0.282, .
Best threshold for ROC = 0.264, accuracy for the best ROC threshold is then
0.582, accuracy = 0.712.
F1 score = 0.000, log loss = 9.943, recall = 0.000.
-----
RF : AUROC = 0.533, AUPRC = 0.324, average precision = 0.287, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.615, accuracy = 0.691.
F1 score = 0.150, log loss = 10.676, recall = 0.097.
-----
AdaBoost : AUROC = 0.512, AUPRC = 0.296, average precision = 0.285, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.518, accuracy = 0.694.
F1 score = 0.122, log loss = 10.571, recall = 0.075.
-----
Bayes classifier has AUROC = 0.601, and AUPRC = 0.411.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is KNN
The best model measured by f1 is KNN
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.2 , dim = 6 is 0.291 .
LR : AUROC = 0.618, AUPRC = 0.384, average precision = 0.291, .
Best threshold for ROC = 0.293, accuracy for the best ROC threshold is then
0.567, accuracy = 0.709.
F1 score = 0.000, log loss = 10.048, recall = 0.000.

-----
LDA : AUROC = 0.617, AUPRC = 0.383, average precision = 0.291, .
Best threshold for ROC = 0.292, accuracy for the best ROC threshold is then
0.564, accuracy = 0.709.
F1 score = 0.000, log loss = 10.048, recall = 0.000.

-----
KNN : AUROC = 0.506, AUPRC = 0.332, average precision = 0.306, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.682, accuracy = 0.682.
F1 score = 0.222, log loss = 10.990, recall = 0.156.

```

```

CART : AUROC = 0.541, AUPRC = 0.435, average precision = 0.312, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.709, accuracy = 0.636.
F1 score = 0.333, log loss = 12.560, recall = 0.312.

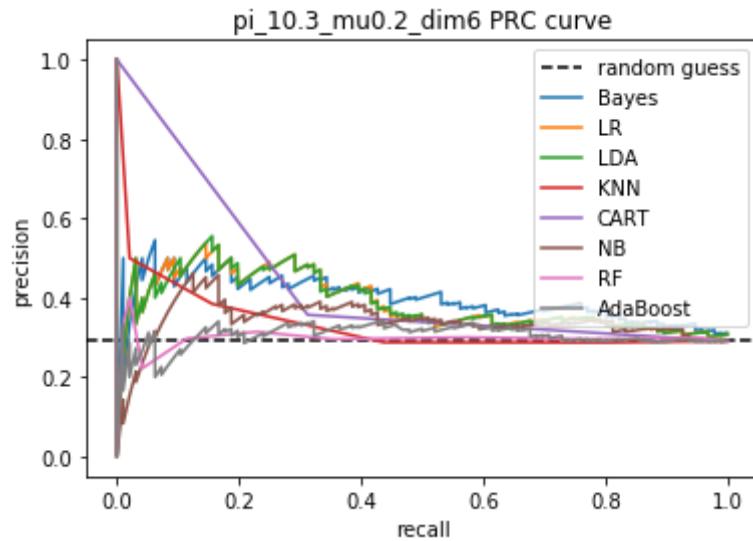
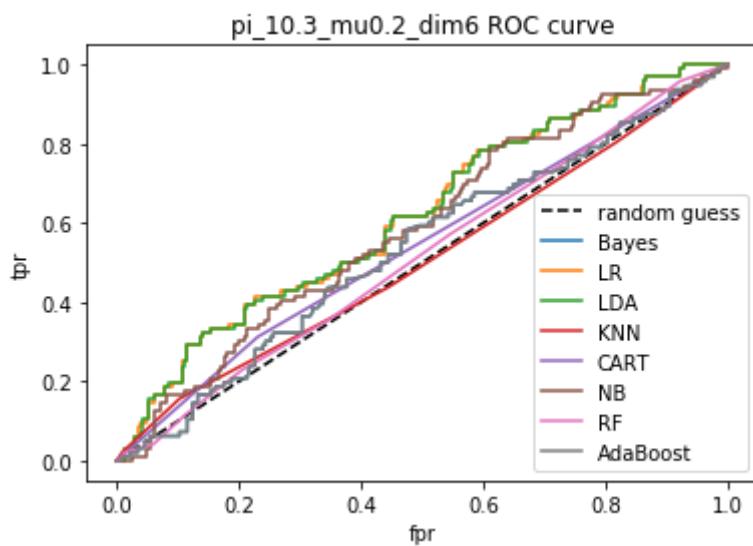
NB : AUROC = 0.586, AUPRC = 0.338, average precision = 0.291, .
Best threshold for ROC = 0.292, accuracy for the best ROC threshold is then
0.558, accuracy = 0.706.
F1 score = 0.000, log loss = 10.152, recall = 0.000.

RF : AUROC = 0.517, AUPRC = 0.296, average precision = 0.292, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.567, accuracy = 0.664.
F1 score = 0.165, log loss = 11.618, recall = 0.115.

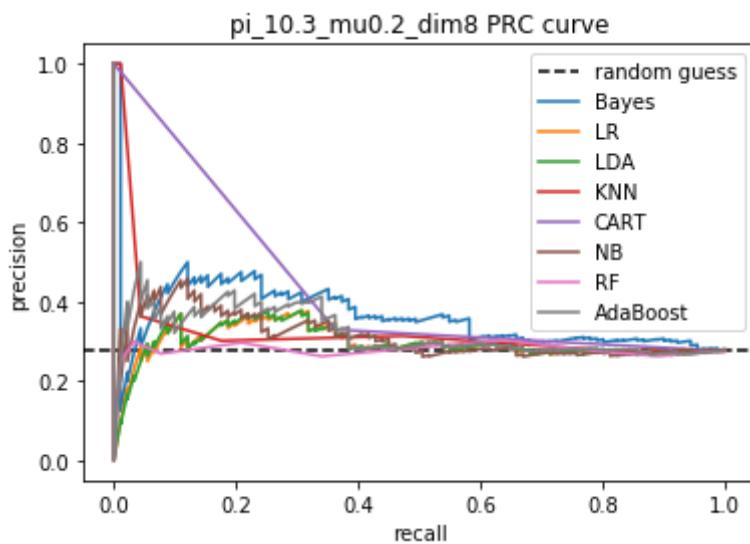
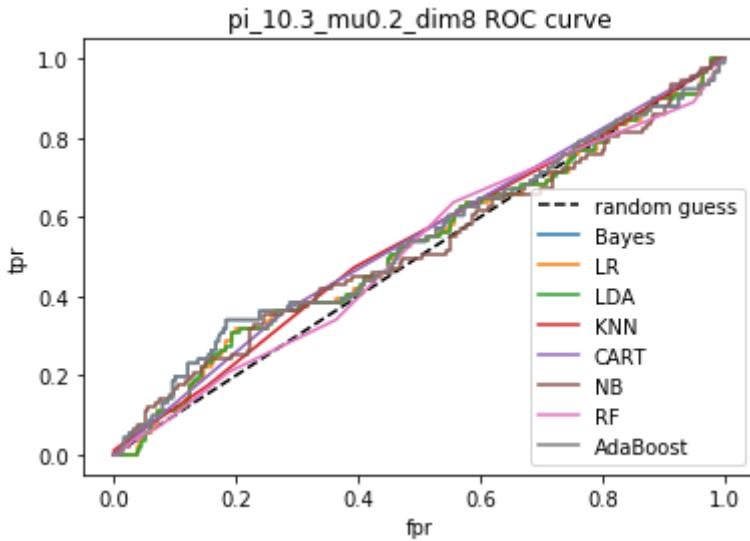
AdaBoost : AUROC = 0.533, AUPRC = 0.303, average precision = 0.286, .
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then
0.530, accuracy = 0.658.
F1 score = 0.096, log loss = 11.827, recall = 0.062.

Bayes classifier has AUROC = 0.648, and AUPRC = 0.395.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.2 , dim = 8 is 0.276 .
LR : AUROC = 0.524, AUPRC = 0.293, average precision = 0.276, .
Best threshold for ROC = 0.281, accuracy for the best ROC threshold is then
0.524, accuracy = 0.715.
F1 score = 0.000, log loss = 9.838, recall = 0.000.
-----
LDA : AUROC = 0.525, AUPRC = 0.294, average precision = 0.276, .
Best threshold for ROC = 0.279, accuracy for the best ROC threshold is then
0.524, accuracy = 0.715.
F1 score = 0.000, log loss = 9.838, recall = 0.000.
-----
KNN : AUROC = 0.533, AUPRC = 0.321, average precision = 0.280, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.661, accuracy = 0.661.
F1 score = 0.222, log loss = 11.722, recall = 0.176.
-----
CART : AUROC = 0.541, AUPRC = 0.434, average precision = 0.295, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.724, accuracy = 0.621.
F1 score = 0.346, log loss = 13.083, recall = 0.363.
-----
NB : AUROC = 0.520, AUPRC = 0.308, average precision = 0.280, .
Best threshold for ROC = 0.266, accuracy for the best ROC threshold is then
0.497, accuracy = 0.715.
F1 score = 0.078, log loss = 9.838, recall = 0.044.
-----
RF : AUROC = 0.510, AUPRC = 0.279, average precision = 0.275, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.555, accuracy = 0.688.
F1 score = 0.120, log loss = 10.780, recall = 0.077.
-----
AdaBoost : AUROC = 0.536, AUPRC = 0.318, average precision = 0.299, .
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then
0.527, accuracy = 0.694.
F1 score = 0.263, log loss = 10.571, recall = 0.198.
-----
Bayes classifier has AUROC = 0.604, and AUPRC = 0.362.
```



```

The best model measured by AUROC is CART
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LR
The best model measured by average_precision is AdaBoost
The best model measured by f1 is CART
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.2 , dim = 10  is 0.314 .
LR : AUROC = 0.525, AUPRC = 0.329, average precision = 0.320, .
Best threshold for ROC = 0.318, accuracy for the best ROC threshold is then
0.497, accuracy = 0.676.
F1 score = 0.101, log loss = 11.199, recall = 0.058.

-----
LDA : AUROC = 0.525, AUPRC = 0.330, average precision = 0.322, .
Best threshold for ROC = 0.316, accuracy for the best ROC threshold is then
0.500, accuracy = 0.679.
F1 score = 0.102, log loss = 11.094, recall = 0.058.

-----
KNN : AUROC = 0.504, AUPRC = 0.310, average precision = 0.315, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.585, accuracy = 0.585.
F1 score = 0.290, log loss = 14.339, recall = 0.269.

```

CART : AUROC = 0.550, AUPRC = 0.477, average precision = 0.342, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.685, accuracy = 0.618.  
F1 score = 0.376, log loss = 13.188, recall = 0.365.

---

NB : AUROC = 0.547, AUPRC = 0.339, average precision = 0.315, .  
Best threshold for ROC = 0.336, accuracy for the best ROC threshold is then  
0.536, accuracy = 0.670.  
F1 score = 0.068, log loss = 11.408, recall = 0.038.

---

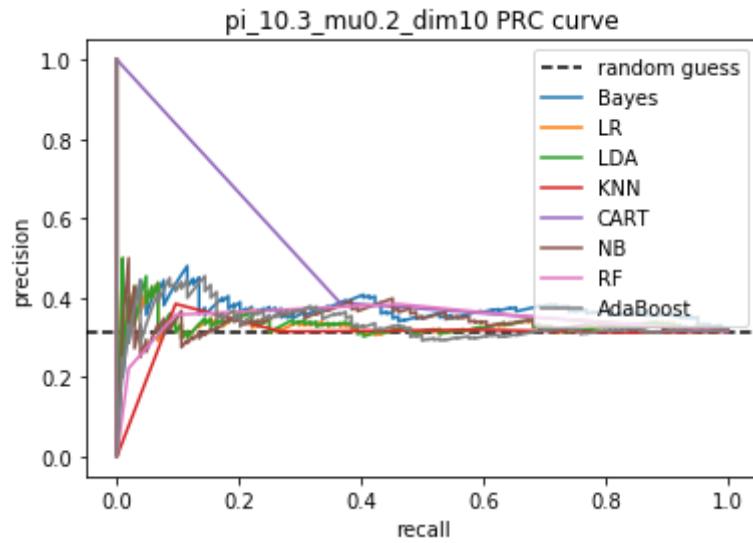
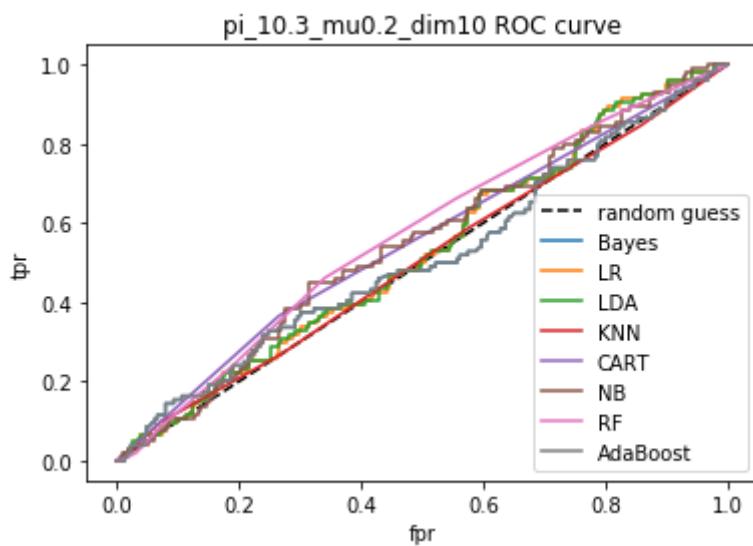
RF : AUROC = 0.568, AUPRC = 0.347, average precision = 0.319, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then  
0.630, accuracy = 0.661.  
F1 score = 0.152, log loss = 11.722, recall = 0.096.

---

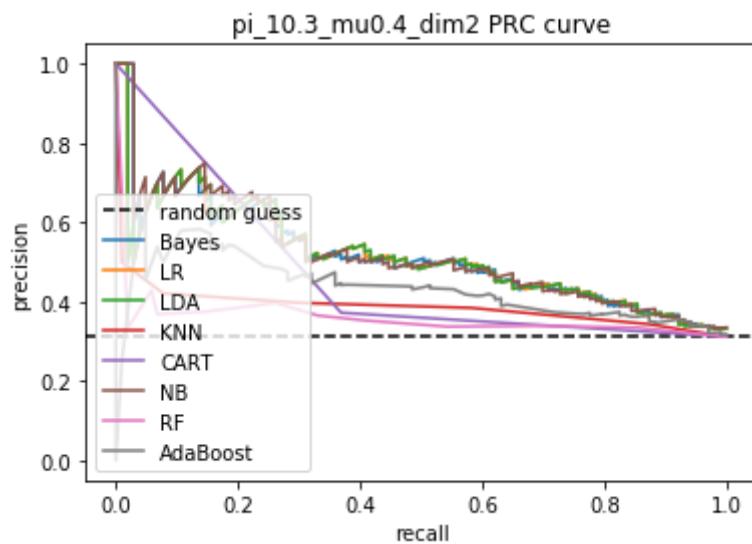
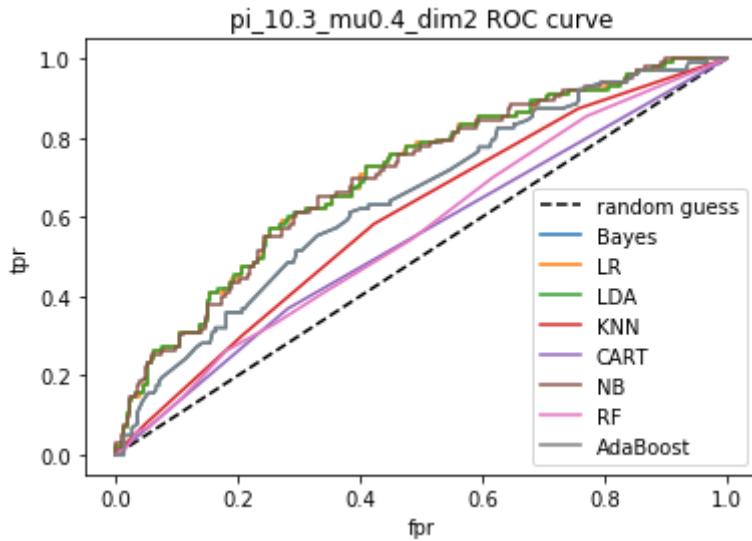
AdaBoost : AUROC = 0.512, AUPRC = 0.334, average precision = 0.323, .  
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then  
0.485, accuracy = 0.639.  
F1 score = 0.242, log loss = 12.455, recall = 0.183.

---

Bayes classifier has AUROC = 0.594, and AUPRC = 0.367.



```
The best model measured by AUROC is RF
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is CART
The best model measured by f1 is CART
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.4 , dim = 2 is 0.311 .
LR : AUROC = 0.702, AUPRC = 0.513, average precision = 0.389, .
Best threshold for ROC = 0.326, accuracy for the best ROC threshold is then
0.645, accuracy = 0.715.
F1 score = 0.373, log loss = 9.838, recall = 0.272.
-----
LDA : AUROC = 0.702, AUPRC = 0.513, average precision = 0.389, .
Best threshold for ROC = 0.324, accuracy for the best ROC threshold is then
0.645, accuracy = 0.715.
F1 score = 0.373, log loss = 9.838, recall = 0.272.
-----
KNN : AUROC = 0.598, AUPRC = 0.387, average precision = 0.338, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.639, accuracy = 0.639.
F1 score = 0.343, log loss = 12.455, recall = 0.301.
-----
CART : AUROC = 0.543, AUPRC = 0.469, average precision = 0.334, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.688, accuracy = 0.609.
F1 score = 0.371, log loss = 13.502, recall = 0.369.
-----
NB : AUROC = 0.701, AUPRC = 0.519, average precision = 0.384, .
Best threshold for ROC = 0.307, accuracy for the best ROC threshold is then
0.645, accuracy = 0.712.
F1 score = 0.362, log loss = 9.943, recall = 0.262.
-----
RF : AUROC = 0.559, AUPRC = 0.358, average precision = 0.334, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.582, accuracy = 0.645.
F1 score = 0.316, log loss = 12.246, recall = 0.262.
-----
AdaBoost : AUROC = 0.646, AUPRC = 0.430, average precision = 0.359, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.612, accuracy = 0.682.
F1 score = 0.348, log loss = 10.990, recall = 0.272.
-----
Bayes classifier has AUROC = 0.701, and AUPRC = 0.516.
```



The best model measured by AUROC is LDA  
The best model measured by AUPRC is NB  
The best model measured by accuracy\_best\_threshold is CART  
The best model measured by accuracy is LR  
The best model measured by average\_precision is LR  
The best model measured by f1 is LR  
The best model measured by log\_loss\_score is LR  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.3 , mu = 0.4 , dim = 4 is 0.296 .  
LR : AUROC = 0.707, AUPRC = 0.453, average precision = 0.359, .  
Best threshold for ROC = 0.303, accuracy for the best ROC threshold is then 0.636, accuracy = 0.718.  
F1 score = 0.331, log loss = 9.734, recall = 0.235.

---

LDA : AUROC = 0.707, AUPRC = 0.461, average precision = 0.366, .  
Best threshold for ROC = 0.302, accuracy for the best ROC threshold is then 0.636, accuracy = 0.724.  
F1 score = 0.336, log loss = 9.524, recall = 0.235.

---

KNN : AUROC = 0.603, AUPRC = 0.391, average precision = 0.331, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then 0.676, accuracy = 0.676.  
F1 score = 0.327, log loss = 11.199, recall = 0.265.

```

CART : AUROC = 0.582, AUPRC = 0.494, average precision = 0.347, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.703, accuracy = 0.670.
F1 score = 0.398, log loss = 11.408, recall = 0.367.

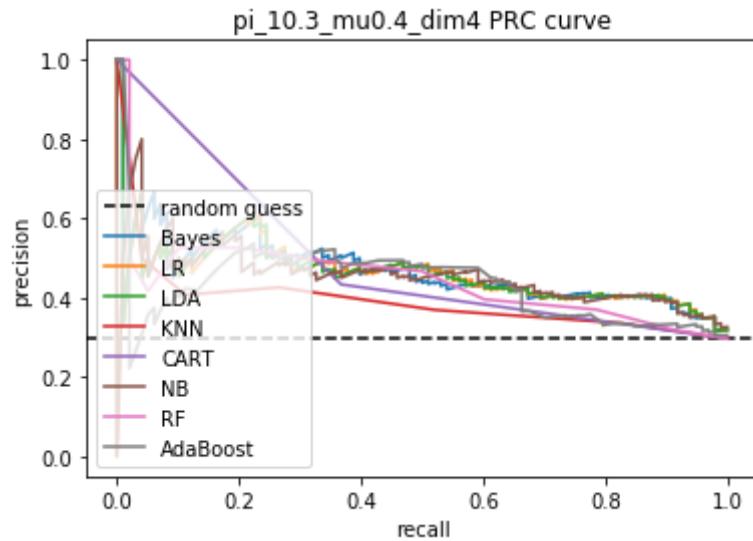
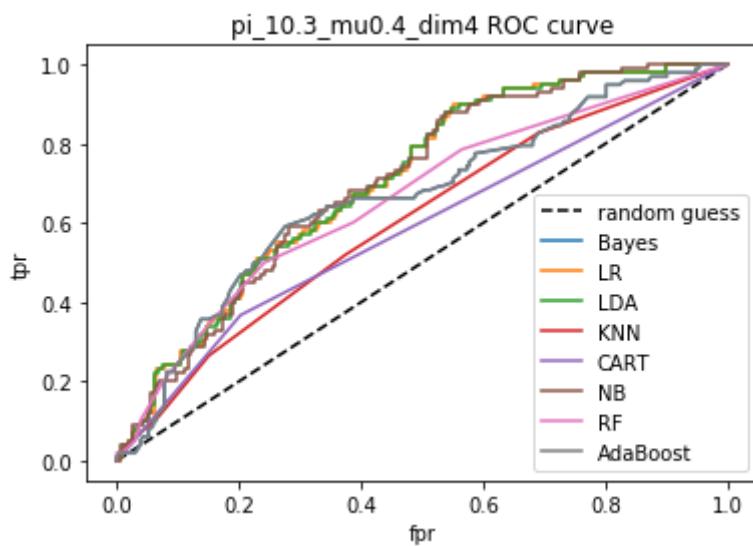
NB : AUROC = 0.704, AUPRC = 0.452, average precision = 0.336, .
Best threshold for ROC = 0.298, accuracy for the best ROC threshold is then
0.645, accuracy = 0.700.
F1 score = 0.288, log loss = 10.362, recall = 0.204.

RF : AUROC = 0.658, AUPRC = 0.443, average precision = 0.344, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.682, accuracy = 0.709.
F1 score = 0.294, log loss = 10.048, recall = 0.204.

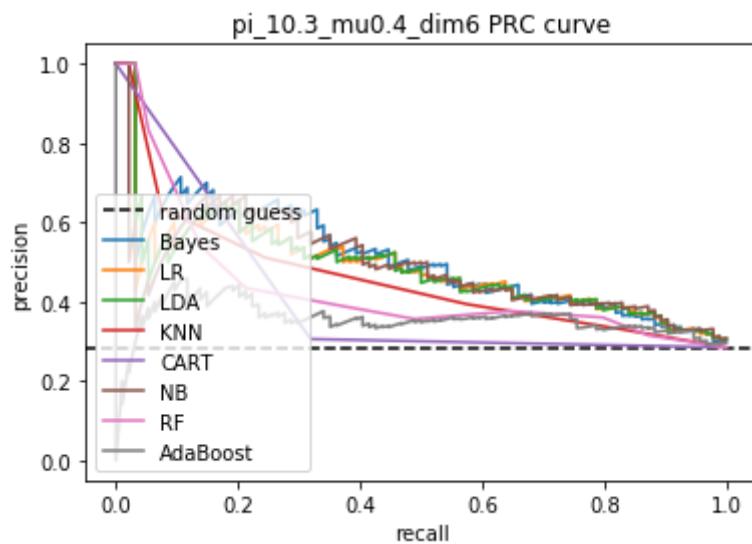
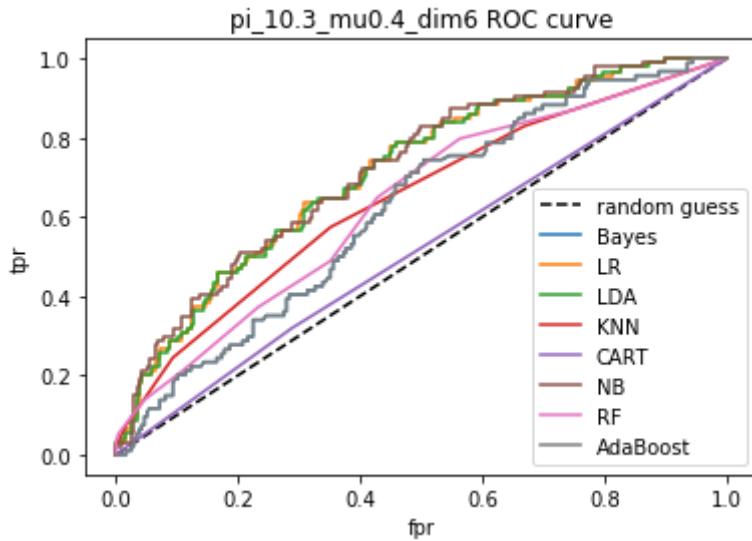
AdaBoost : AUROC = 0.663, AUPRC = 0.431, average precision = 0.351, .
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then
0.642, accuracy = 0.712.
F1 score = 0.317, log loss = 9.943, recall = 0.224.

Bayes classifier has AUROC = 0.705, and AUPRC = 0.466.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is CART
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.4 , dim = 6 is 0.285 .
LR : AUROC = 0.714, AUPRC = 0.486, average precision = 0.347, .
Best threshold for ROC = 0.290, accuracy for the best ROC threshold is then
0.655, accuracy = 0.733.
F1 score = 0.302, log loss = 9.210, recall = 0.202.
-----
LDA : AUROC = 0.713, AUPRC = 0.485, average precision = 0.347, .
Best threshold for ROC = 0.287, accuracy for the best ROC threshold is then
0.661, accuracy = 0.733.
F1 score = 0.302, log loss = 9.210, recall = 0.202.
-----
KNN : AUROC = 0.644, AUPRC = 0.457, average precision = 0.340, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.718, accuracy = 0.718.
F1 score = 0.331, log loss = 9.734, recall = 0.245.
-----
CART : AUROC = 0.516, AUPRC = 0.410, average precision = 0.292, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.715, accuracy = 0.600.
F1 score = 0.312, log loss = 13.816, recall = 0.319.
-----
NB : AUROC = 0.719, AUPRC = 0.489, average precision = 0.357, .
Best threshold for ROC = 0.284, accuracy for the best ROC threshold is then
0.655, accuracy = 0.739.
F1 score = 0.317, log loss = 9.001, recall = 0.213.
-----
RF : AUROC = 0.633, AUPRC = 0.432, average precision = 0.317, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.603, accuracy = 0.697.
F1 score = 0.286, log loss = 10.466, recall = 0.213.
-----
AdaBoost : AUROC = 0.620, AUPRC = 0.354, average precision = 0.315, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.585, accuracy = 0.694.
F1 score = 0.284, log loss = 10.571, recall = 0.213.
-----
Bayes classifier has AUROC = 0.717, and AUPRC = 0.508.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is KNN
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.4 , dim = 8 is 0.299 .
LR : AUROC = 0.755, AUPRC = 0.615, average precision = 0.417, .
Best threshold for ROC = 0.306, accuracy for the best ROC threshold is then
0.712, accuracy = 0.742.
F1 score = 0.459, log loss = 8.896, recall = 0.364.

-----
LDA : AUROC = 0.754, AUPRC = 0.617, average precision = 0.429, .
Best threshold for ROC = 0.299, accuracy for the best ROC threshold is then
0.709, accuracy = 0.752.
F1 score = 0.468, log loss = 8.582, recall = 0.364.

-----
KNN : AUROC = 0.683, AUPRC = 0.443, average precision = 0.363, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.703, accuracy = 0.703.
F1 score = 0.380, log loss = 10.257, recall = 0.303.

```

```

CART : AUROC = 0.572, AUPRC = 0.486, average precision = 0.342, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.700, accuracy = 0.652.
F1 score = 0.392, log loss = 12.036, recall = 0.374.

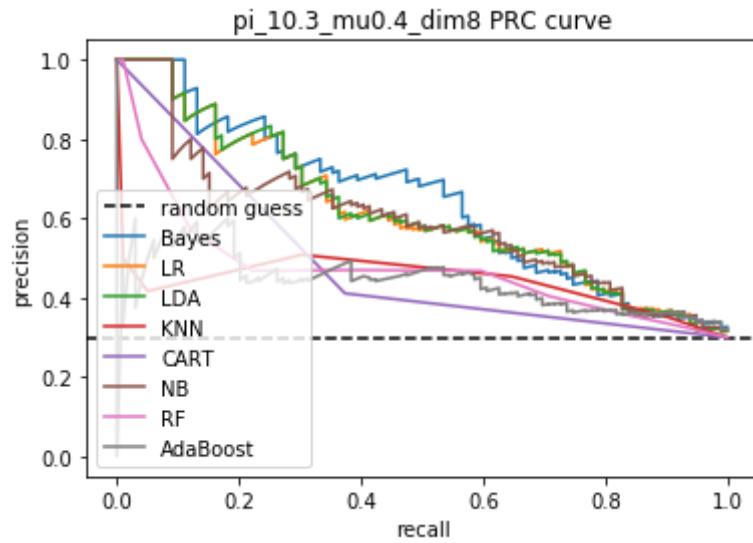
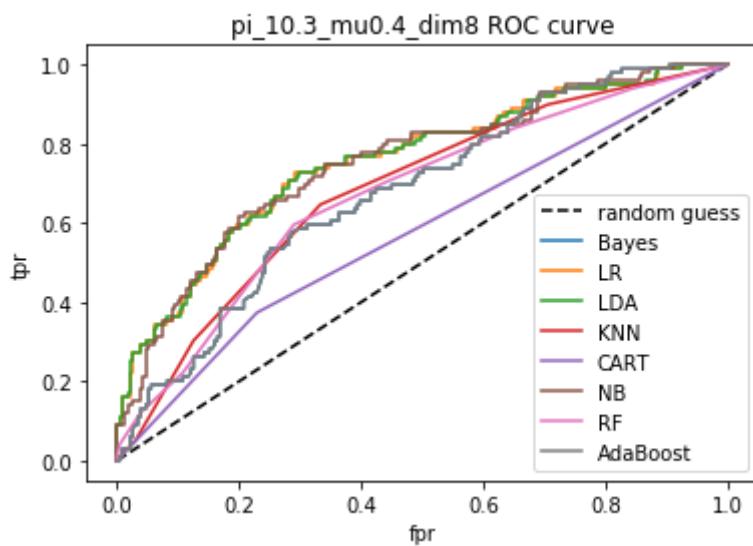
NB : AUROC = 0.752, AUPRC = 0.591, average precision = 0.426, .
Best threshold for ROC = 0.327, accuracy for the best ROC threshold is then
0.691, accuracy = 0.748.
F1 score = 0.471, log loss = 8.687, recall = 0.374.

RF : AUROC = 0.672, AUPRC = 0.472, average precision = 0.337, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.685, accuracy = 0.691.
F1 score = 0.301, log loss = 10.676, recall = 0.222.

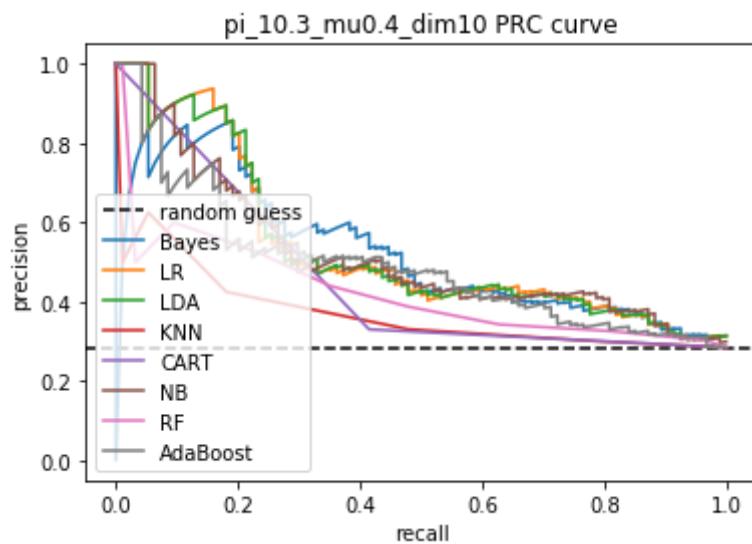
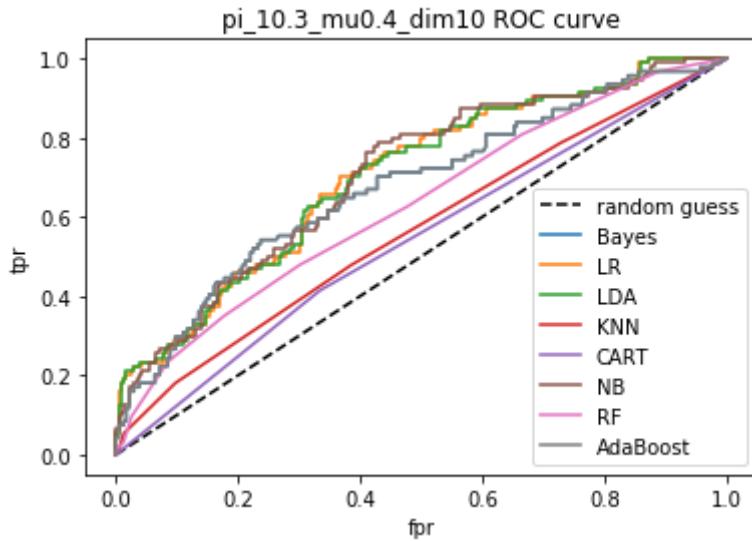
AdaBoost : AUROC = 0.676, AUPRC = 0.436, average precision = 0.341, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.627, accuracy = 0.679.
F1 score = 0.346, log loss = 11.094, recall = 0.283.

Bayes classifier has AUROC = 0.762, and AUPRC = 0.642.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is NB
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.4 , dim = 10  is 0.284 .
LR : AUROC = 0.705, AUPRC = 0.533, average precision = 0.361, .
Best threshold for ROC = 0.275, accuracy for the best ROC threshold is then
0.661, accuracy = 0.739.
F1 score = 0.338, log loss = 9.001, recall = 0.234.
-----
LDA : AUROC = 0.704, AUPRC = 0.532, average precision = 0.370, .
Best threshold for ROC = 0.278, accuracy for the best ROC threshold is then
0.655, accuracy = 0.745.
F1 score = 0.344, log loss = 8.792, recall = 0.234.
-----
KNN : AUROC = 0.565, AUPRC = 0.371, average precision = 0.310, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.697, accuracy = 0.697.
F1 score = 0.254, log loss = 10.466, recall = 0.181.
-----
CART : AUROC = 0.540, AUPRC = 0.456, average precision = 0.304, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.715, accuracy = 0.594.
F1 score = 0.368, log loss = 14.025, recall = 0.415.
-----
NB : AUROC = 0.705, AUPRC = 0.518, average precision = 0.365, .
Best threshold for ROC = 0.270, accuracy for the best ROC threshold is then
0.636, accuracy = 0.742.
F1 score = 0.341, log loss = 8.896, recall = 0.234.
-----
RF : AUROC = 0.629, AUPRC = 0.423, average precision = 0.341, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.636, accuracy = 0.721.
F1 score = 0.324, log loss = 9.629, recall = 0.234.
-----
AdaBoost : AUROC = 0.678, AUPRC = 0.492, average precision = 0.358, .
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then
0.630, accuracy = 0.715.
F1 score = 0.405, log loss = 9.838, recall = 0.340.
-----
Bayes classifier has AUROC = 0.713, and AUPRC = 0.518.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.6 , dim = 2  is 0.306 .
LR : AUROC = 0.814, AUPRC = 0.718, average precision = 0.533, .
Best threshold for ROC = 0.327, accuracy for the best ROC threshold is then
0.718, accuracy = 0.797.
F1 score = 0.621, log loss = 7.012, recall = 0.545.

-----
LDA : AUROC = 0.813, AUPRC = 0.718, average precision = 0.533, .
Best threshold for ROC = 0.332, accuracy for the best ROC threshold is then
0.724, accuracy = 0.797.
F1 score = 0.621, log loss = 7.012, recall = 0.545.

-----
KNN : AUROC = 0.762, AUPRC = 0.646, average precision = 0.465, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.742, accuracy = 0.742.
F1 score = 0.581, log loss = 8.896, recall = 0.584.

```

CART : AUROC = 0.641, AUPRC = 0.580, average precision = 0.400, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.694, accuracy = 0.682.  
F1 score = 0.507, log loss = 10.990, recall = 0.535.

---

NB : AUROC = 0.814, AUPRC = 0.718, average precision = 0.533, .  
Best threshold for ROC = 0.320, accuracy for the best ROC threshold is then  
0.721, accuracy = 0.797.  
F1 score = 0.621, log loss = 7.012, recall = 0.545.

---

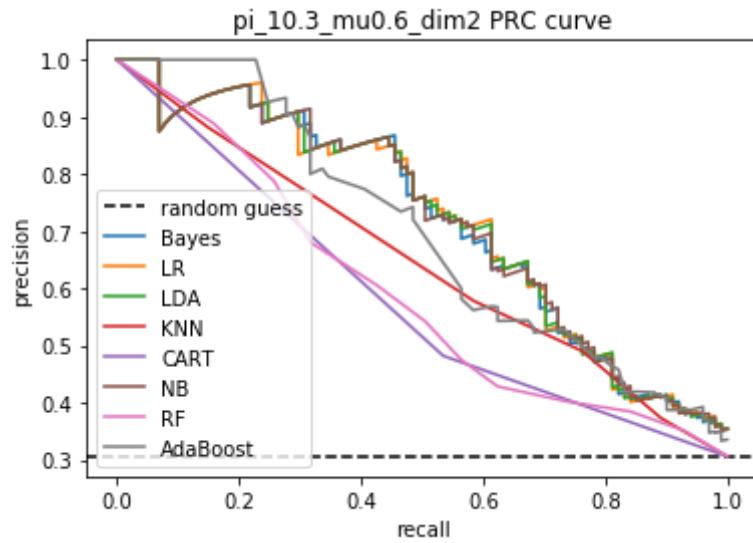
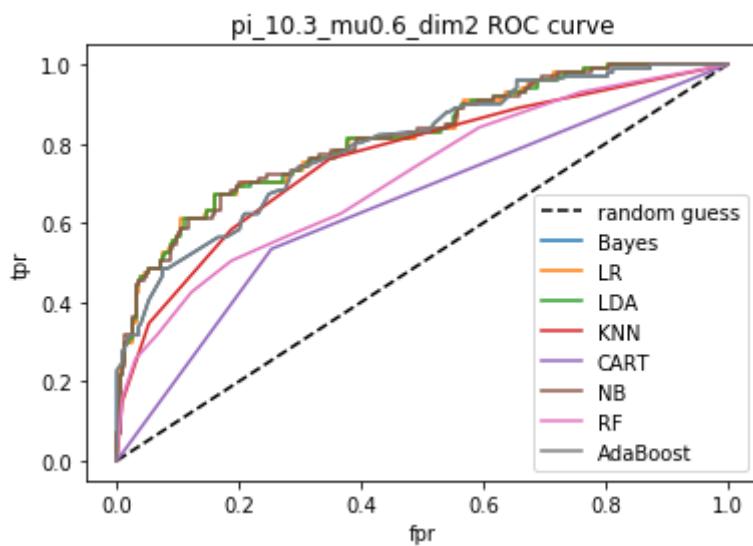
RF : AUROC = 0.713, AUPRC = 0.593, average precision = 0.425, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then  
0.676, accuracy = 0.718.  
F1 score = 0.523, log loss = 9.734, recall = 0.505.

---

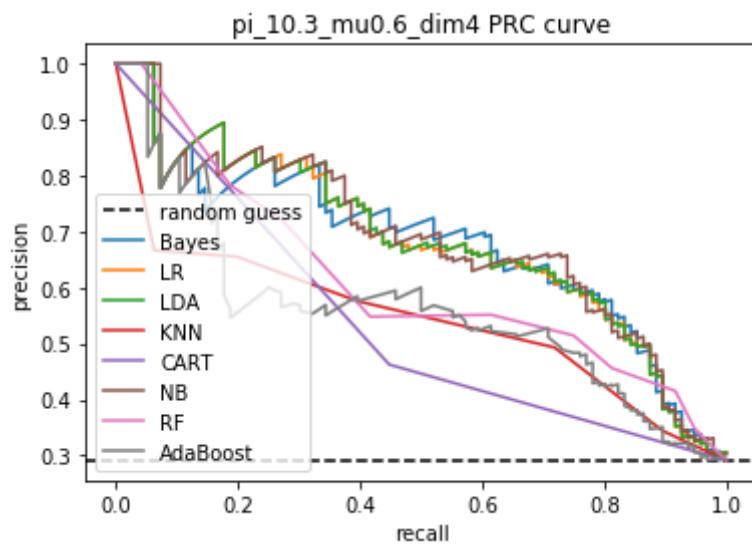
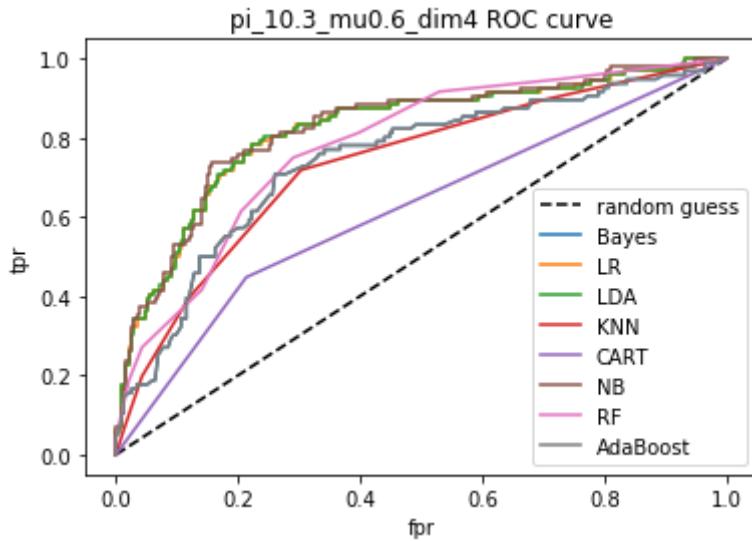
AdaBoost : AUROC = 0.796, AUPRC = 0.698, average precision = 0.505, .  
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then  
0.712, accuracy = 0.785.  
F1 score = 0.570, log loss = 7.431, recall = 0.465.

---

Bayes classifier has AUROC = 0.812, and AUPRC = 0.716.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is KNN
Positive ratio for pi_1 = 0.3 , mu = 0.6 , dim = 4 is 0.292 .
LR : AUROC = 0.822, AUPRC = 0.682, average precision = 0.462, .
Best threshold for ROC = 0.318, accuracy for the best ROC threshold is then
0.776, accuracy = 0.779.
F1 score = 0.523, log loss = 7.640, recall = 0.417.
-----
LDA : AUROC = 0.822, AUPRC = 0.683, average precision = 0.462, .
Best threshold for ROC = 0.316, accuracy for the best ROC threshold is then
0.776, accuracy = 0.779.
F1 score = 0.523, log loss = 7.640, recall = 0.417.
-----
KNN : AUROC = 0.734, AUPRC = 0.543, average precision = 0.404, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.739, accuracy = 0.739.
F1 score = 0.469, log loss = 9.001, recall = 0.396.
-----
CART : AUROC = 0.617, AUPRC = 0.535, average precision = 0.368, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.709, accuracy = 0.688.
F1 score = 0.455, log loss = 10.780, recall = 0.448.
-----
NB : AUROC = 0.826, AUPRC = 0.685, average precision = 0.462, .
Best threshold for ROC = 0.306, accuracy for the best ROC threshold is then
0.782, accuracy = 0.779.
F1 score = 0.523, log loss = 7.640, recall = 0.417.
-----
RF : AUROC = 0.780, AUPRC = 0.612, average precision = 0.398, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.742, accuracy = 0.730.
F1 score = 0.473, log loss = 9.315, recall = 0.417.
-----
AdaBoost : AUROC = 0.743, AUPRC = 0.561, average precision = 0.434, .
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then
0.721, accuracy = 0.752.
F1 score = 0.529, log loss = 8.582, recall = 0.479.
-----
Bayes classifier has AUROC = 0.827, and AUPRC = 0.680.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is LR
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.3 , mu = 0.6 , dim = 6 is 0.308 .
LR : AUROC = 0.770, AUPRC = 0.576, average precision = 0.460, .
Best threshold for ROC = 0.301, accuracy for the best ROC threshold is then
0.706, accuracy = 0.755.
F1 score = 0.526, log loss = 8.478, recall = 0.441.

-----
LDA : AUROC = 0.771, AUPRC = 0.575, average precision = 0.462, .
Best threshold for ROC = 0.303, accuracy for the best ROC threshold is then
0.709, accuracy = 0.755.
F1 score = 0.532, log loss = 8.478, recall = 0.451.

-----
KNN : AUROC = 0.672, AUPRC = 0.492, average precision = 0.363, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.679, accuracy = 0.679.
F1 score = 0.391, log loss = 11.094, recall = 0.333.

```

```

CART : AUROC = 0.628, AUPRC = 0.565, average precision = 0.397, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.691, accuracy = 0.688.
F1 score = 0.482, log loss = 10.780, recall = 0.471.

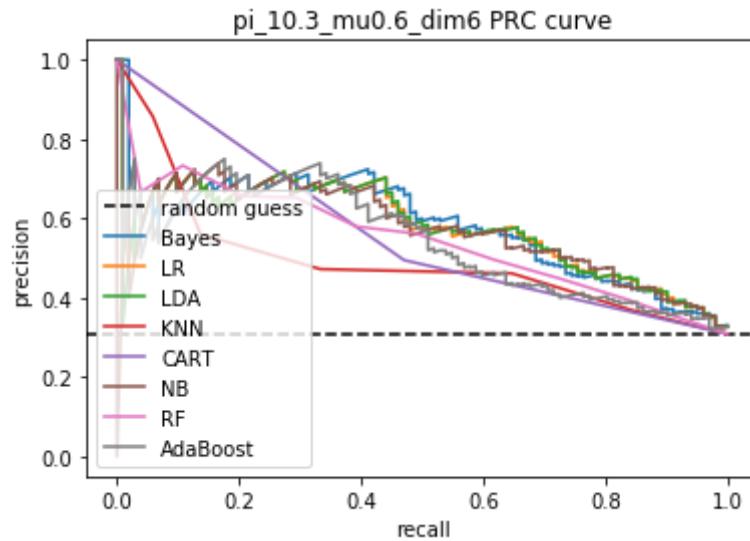
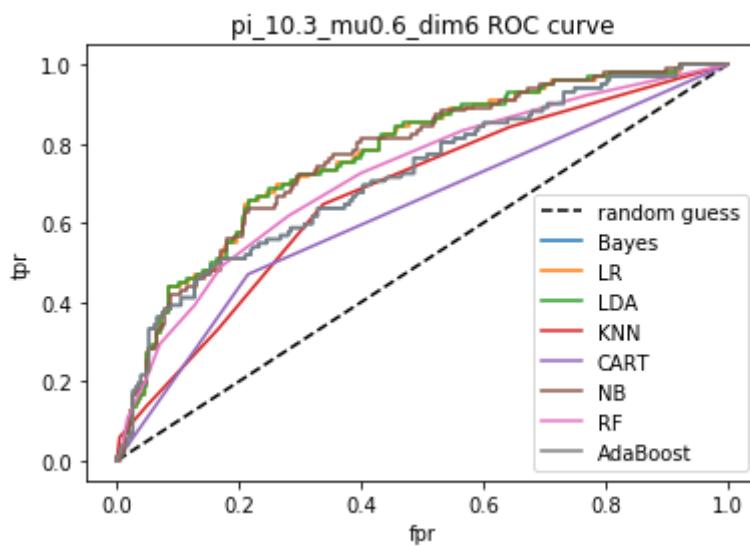
NB : AUROC = 0.768, AUPRC = 0.565, average precision = 0.443, .
Best threshold for ROC = 0.307, accuracy for the best ROC threshold is then
0.706, accuracy = 0.739.
F1 score = 0.517, log loss = 9.001, recall = 0.451.

RF : AUROC = 0.721, AUPRC = 0.546, average precision = 0.415, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.724, accuracy = 0.724.
F1 score = 0.468, log loss = 9.524, recall = 0.392.

AdaBoost : AUROC = 0.717, AUPRC = 0.541, average precision = 0.439, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.633, accuracy = 0.730.
F1 score = 0.529, log loss = 9.315, recall = 0.490.

Bayes classifier has AUROC = 0.763, and AUPRC = 0.579.

```



The best model measured by AUROC is LDA  
The best model measured by AUPRC is LR  
The best model measured by accuracy\_best\_threshold is RF  
The best model measured by accuracy is LR  
The best model measured by average\_precision is LDA  
The best model measured by f1 is LDA  
The best model measured by log\_loss\_score is LR  
The best model measured by recall is AdaBoost  
Positive ratio for pi\_1 = 0.3 , mu = 0.6 , dim = 8 is 0.304 .  
LR : AUROC = 0.829, AUPRC = 0.677, average precision = 0.477, .  
Best threshold for ROC = 0.324, accuracy for the best ROC threshold is then 0.745, accuracy = 0.773.  
F1 score = 0.540, log loss = 7.850, recall = 0.440.

---

LDA : AUROC = 0.829, AUPRC = 0.676, average precision = 0.477, .  
Best threshold for ROC = 0.321, accuracy for the best ROC threshold is then 0.742, accuracy = 0.773.  
F1 score = 0.540, log loss = 7.850, recall = 0.440.

---

KNN : AUROC = 0.724, AUPRC = 0.533, average precision = 0.430, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then 0.736, accuracy = 0.736.  
F1 score = 0.508, log loss = 9.106, recall = 0.450.

---

CART : AUROC = 0.583, AUPRC = 0.501, average precision = 0.354, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then 0.697, accuracy = 0.667.  
F1 score = 0.402, log loss = 11.513, recall = 0.370.

---

NB : AUROC = 0.833, AUPRC = 0.684, average precision = 0.473, .  
Best threshold for ROC = 0.326, accuracy for the best ROC threshold is then 0.764, accuracy = 0.770.  
F1 score = 0.542, log loss = 7.954, recall = 0.450.

---

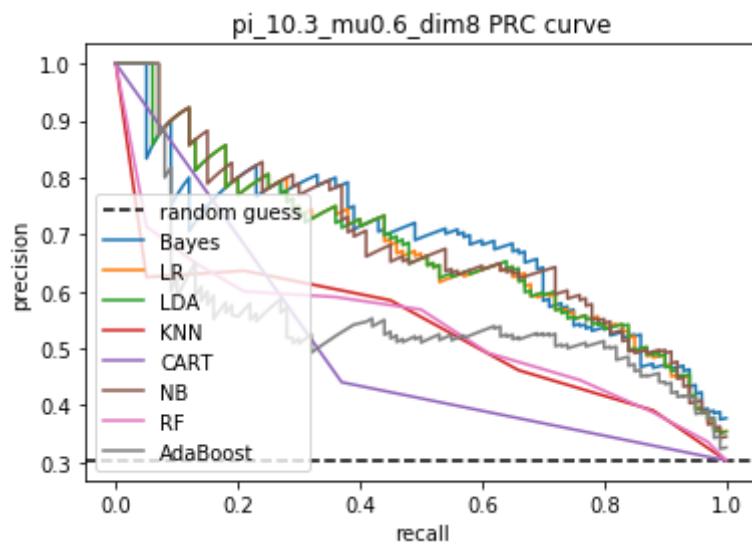
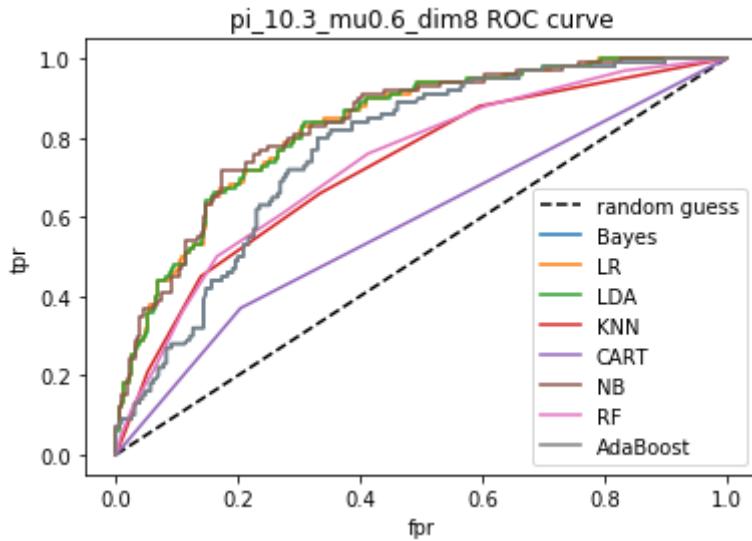
RF : AUROC = 0.734, AUPRC = 0.538, average precision = 0.406, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then 0.733, accuracy = 0.730.  
F1 score = 0.447, log loss = 9.315, recall = 0.360.

---

AdaBoost : AUROC = 0.769, AUPRC = 0.554, average precision = 0.407, .  
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then 0.715, accuracy = 0.718.  
F1 score = 0.480, log loss = 9.734, recall = 0.430.

---

Bayes classifier has AUROC = 0.839, and AUPRC = 0.683.



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is NB
The best model measured by log_loss_score is LR
The best model measured by recall is KNN
Positive ratio for pi_1 = 0.3 , mu = 0.6 , dim = 10  is 0.279 .
LR : AUROC = 0.831, AUPRC = 0.689, average precision = 0.483, .
Best threshold for ROC = 0.256, accuracy for the best ROC threshold is then
0.733, accuracy = 0.800.
F1 score = 0.566, log loss = 6.908, recall = 0.467.

-----
LDA : AUROC = 0.832, AUPRC = 0.692, average precision = 0.483, .
Best threshold for ROC = 0.263, accuracy for the best ROC threshold is then
0.733, accuracy = 0.800.
F1 score = 0.566, log loss = 6.908, recall = 0.467.

-----
KNN : AUROC = 0.685, AUPRC = 0.502, average precision = 0.386, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.748, accuracy = 0.748.
F1 score = 0.443, log loss = 8.687, recall = 0.359.

```

```

CART : AUROC = 0.639, AUPRC = 0.552, average precision = 0.372, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.721, accuracy = 0.700.
F1 score = 0.482, log loss = 10.362, recall = 0.500.

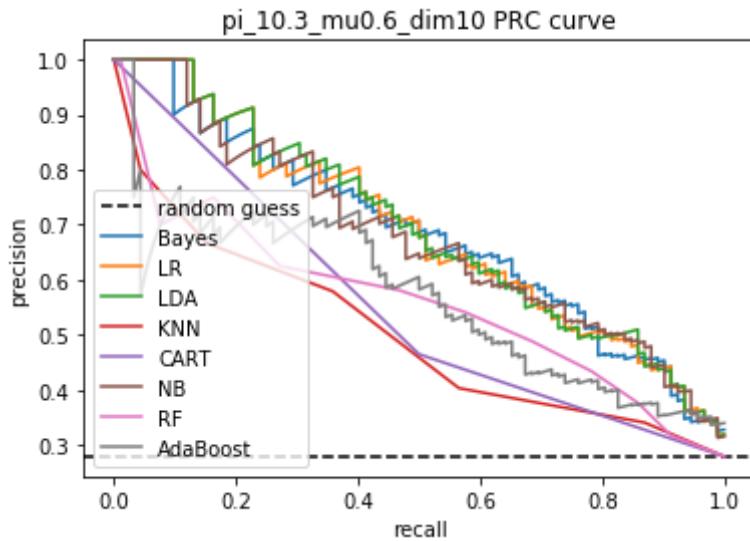
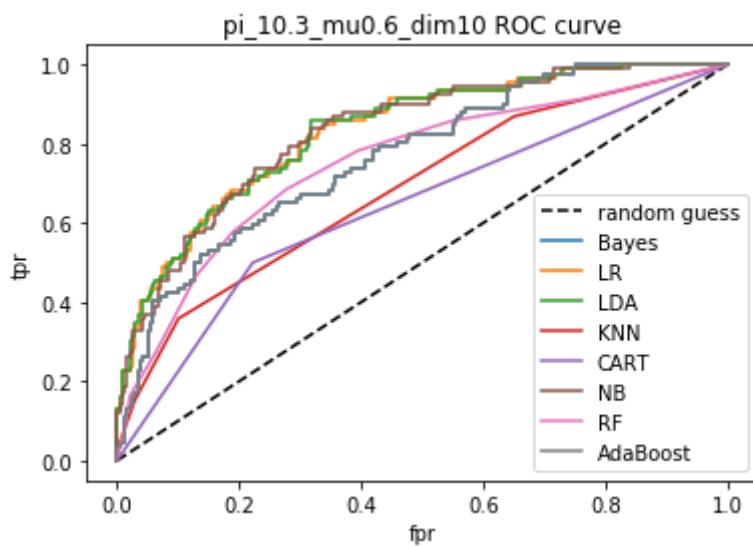
NB : AUROC = 0.830, AUPRC = 0.679, average precision = 0.460, .
Best threshold for ROC = 0.277, accuracy for the best ROC threshold is then
0.742, accuracy = 0.785.
F1 score = 0.553, log loss = 7.431, recall = 0.478.

RF : AUROC = 0.751, AUPRC = 0.560, average precision = 0.420, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.745, accuracy = 0.758.
F1 score = 0.518, log loss = 8.373, recall = 0.467.

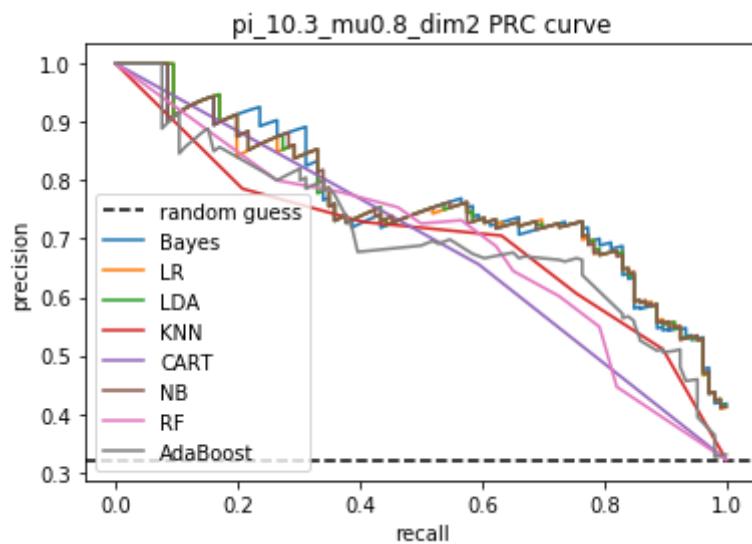
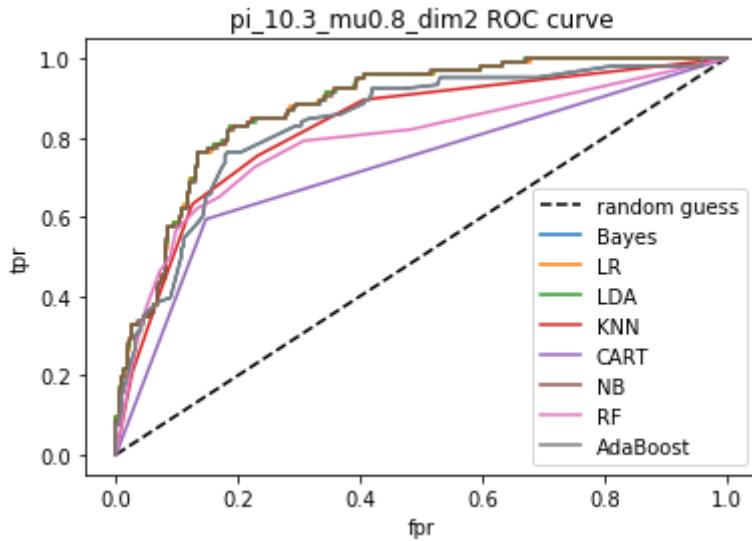
AdaBoost : AUROC = 0.767, AUPRC = 0.569, average precision = 0.427, .
Best threshold for ROC = 0.493, accuracy for the best ROC threshold is then
0.661, accuracy = 0.770.
F1 score = 0.506, log loss = 7.954, recall = 0.424.

Bayes classifier has AUROC = 0.831, and AUPRC = 0.686.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.8 , dim = 2 is 0.32 .
LR : AUROC = 0.879, AUPRC = 0.761, average precision = 0.574, .
Best threshold for ROC = 0.341, accuracy for the best ROC threshold is then
0.815, accuracy = 0.803.
F1 score = 0.673, log loss = 6.803, recall = 0.632.
-----
LDA : AUROC = 0.879, AUPRC = 0.761, average precision = 0.574, .
Best threshold for ROC = 0.338, accuracy for the best ROC threshold is then
0.815, accuracy = 0.803.
F1 score = 0.673, log loss = 6.803, recall = 0.632.
-----
KNN : AUROC = 0.825, AUPRC = 0.700, average precision = 0.564, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.797, accuracy = 0.797.
F1 score = 0.667, log loss = 7.012, recall = 0.632.
-----
CART : AUROC = 0.724, AUPRC = 0.690, average precision = 0.520, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.679, accuracy = 0.770.
F1 score = 0.624, log loss = 7.954, recall = 0.594.
-----
NB : AUROC = 0.879, AUPRC = 0.760, average precision = 0.573, .
Best threshold for ROC = 0.332, accuracy for the best ROC threshold is then
0.815, accuracy = 0.803.
F1 score = 0.670, log loss = 6.803, recall = 0.623.
-----
RF : AUROC = 0.789, AUPRC = 0.695, average precision = 0.554, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.773, accuracy = 0.794.
F1 score = 0.638, log loss = 7.117, recall = 0.566.
-----
AdaBoost : AUROC = 0.837, AUPRC = 0.708, average precision = 0.570, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.788, accuracy = 0.794.
F1 score = 0.694, log loss = 7.117, recall = 0.726.
-----
Bayes classifier has AUROC = 0.879, and AUPRC = 0.763.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is NB
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.3 , mu = 0.8 , dim = 4  is 0.282 .
LR : AUROC = 0.931, AUPRC = 0.840, average precision = 0.624, .
Best threshold for ROC = 0.368, accuracy for the best ROC threshold is then
0.855, accuracy = 0.858.
F1 score = 0.728, log loss = 4.919, recall = 0.677.

-----
LDA : AUROC = 0.931, AUPRC = 0.841, average precision = 0.632, .
Best threshold for ROC = 0.366, accuracy for the best ROC threshold is then
0.852, accuracy = 0.861.
F1 score = 0.736, log loss = 4.815, recall = 0.688.

-----
KNN : AUROC = 0.889, AUPRC = 0.781, average precision = 0.592, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.842, accuracy = 0.842.
F1 score = 0.705, log loss = 5.443, recall = 0.667.

```

```

CART : AUROC = 0.691, AUPRC = 0.618, average precision = 0.434, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.718, accuracy = 0.748.
F1 score = 0.556, log loss = 8.687, recall = 0.559.

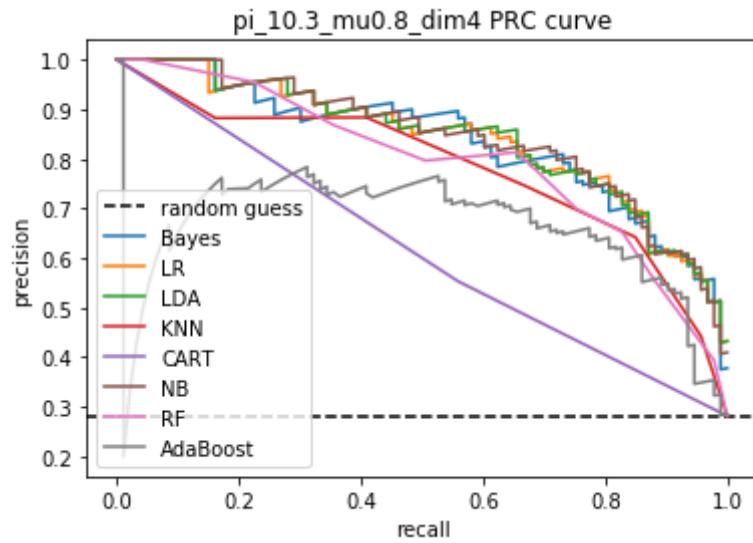
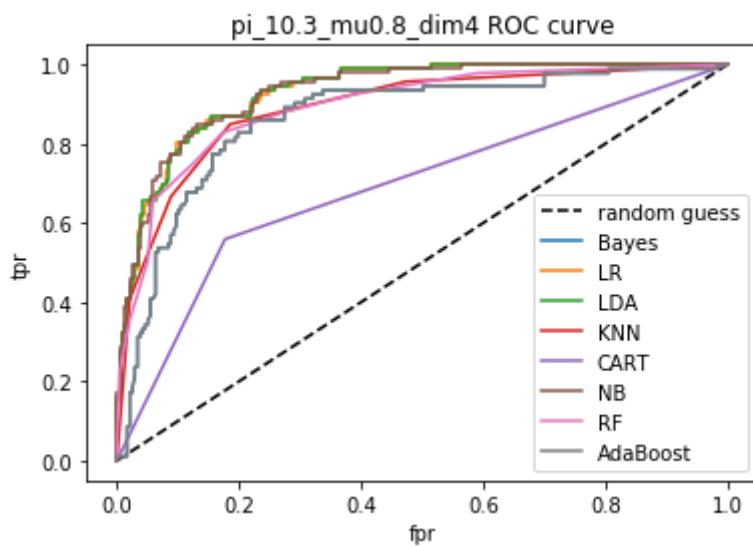
NB : AUROC = 0.931, AUPRC = 0.844, average precision = 0.675, .
Best threshold for ROC = 0.374, accuracy for the best ROC threshold is then
0.848, accuracy = 0.879.
F1 score = 0.778, log loss = 4.187, recall = 0.753.

RF : AUROC = 0.894, AUPRC = 0.795, average precision = 0.630, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.839, accuracy = 0.861.
F1 score = 0.726, log loss = 4.815, recall = 0.656.

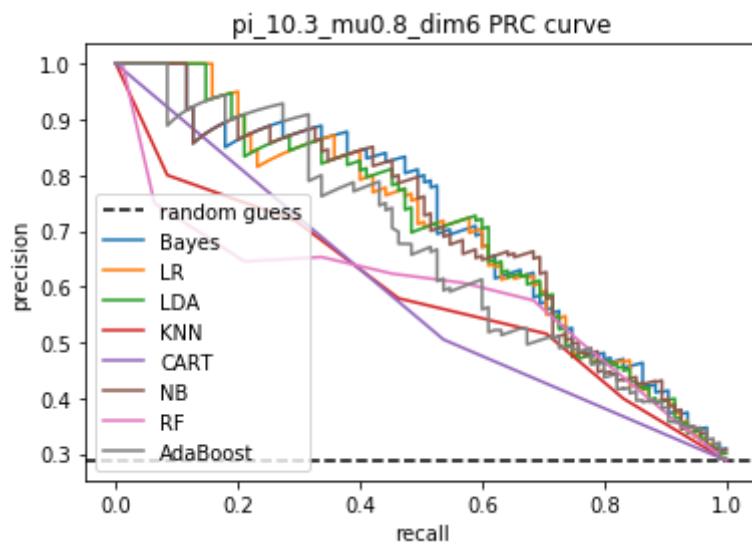
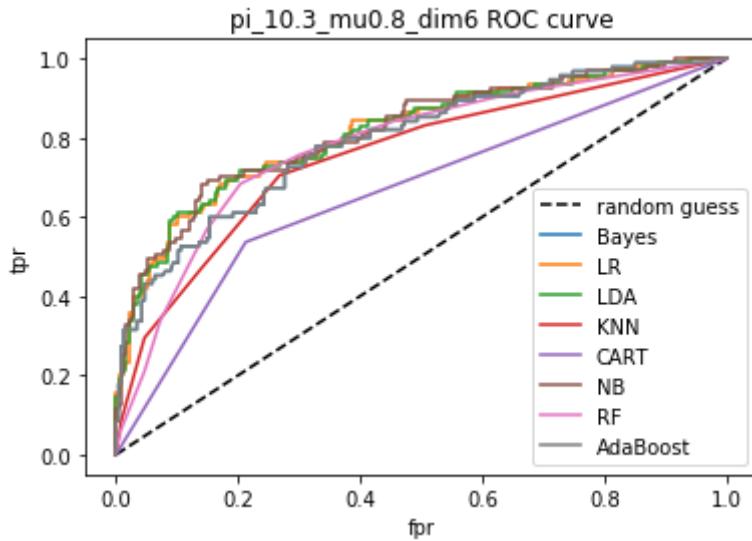
AdaBoost : AUROC = 0.865, AUPRC = 0.660, average precision = 0.550, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.809, accuracy = 0.821.
F1 score = 0.670, log loss = 6.175, recall = 0.645.

Bayes classifier has AUROC = 0.929, and AUPRC = 0.836.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.3 , mu = 0.8 , dim = 6 is 0.289 .
LR : AUROC = 0.814, AUPRC = 0.706, average precision = 0.499, .
Best threshold for ROC = 0.261, accuracy for the best ROC threshold is then
0.745, accuracy = 0.797.
F1 score = 0.589, log loss = 7.012, recall = 0.505.
-----
LDA : AUROC = 0.814, AUPRC = 0.706, average precision = 0.499, .
Best threshold for ROC = 0.241, accuracy for the best ROC threshold is then
0.730, accuracy = 0.797.
F1 score = 0.589, log loss = 7.012, recall = 0.505.
-----
KNN : AUROC = 0.754, AUPRC = 0.593, average precision = 0.423, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.748, accuracy = 0.748.
F1 score = 0.515, log loss = 8.687, recall = 0.463.
-----
CART : AUROC = 0.662, AUPRC = 0.588, average precision = 0.404, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.712, accuracy = 0.715.
F1 score = 0.520, log loss = 9.838, recall = 0.537.
-----
NB : AUROC = 0.817, AUPRC = 0.707, average precision = 0.514, .
Best threshold for ROC = 0.255, accuracy for the best ROC threshold is then
0.721, accuracy = 0.803.
F1 score = 0.611, log loss = 6.803, recall = 0.537.
-----
RF : AUROC = 0.781, AUPRC = 0.590, average precision = 0.440, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.764, accuracy = 0.764.
F1 score = 0.524, log loss = 8.164, recall = 0.453.
-----
AdaBoost : AUROC = 0.792, AUPRC = 0.672, average precision = 0.486, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.721, accuracy = 0.788.
F1 score = 0.583, log loss = 7.326, recall = 0.516.
-----
Bayes classifier has AUROC = 0.821, and AUPRC = 0.712.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is RF
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 0.8 , dim = 8 is 0.291 .
LR : AUROC = 0.838, AUPRC = 0.694, average precision = 0.512, .
Best threshold for ROC = 0.244, accuracy for the best ROC threshold is then
0.745, accuracy = 0.797.
F1 score = 0.617, log loss = 7.012, recall = 0.562.

-----
LDA : AUROC = 0.837, AUPRC = 0.696, average precision = 0.528, .
Best threshold for ROC = 0.232, accuracy for the best ROC threshold is then
0.739, accuracy = 0.806.
F1 score = 0.632, log loss = 6.698, recall = 0.573.

-----
KNN : AUROC = 0.745, AUPRC = 0.542, average precision = 0.419, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.745, accuracy = 0.745.
F1 score = 0.500, log loss = 8.792, recall = 0.438.

```

CART : AUROC = 0.664, AUPRC = 0.593, average precision = 0.414, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.709, accuracy = 0.724.  
F1 score = 0.524, log loss = 9.524, recall = 0.521.

---

NB : AUROC = 0.836, AUPRC = 0.697, average precision = 0.496, .  
Best threshold for ROC = 0.251, accuracy for the best ROC threshold is then  
0.724, accuracy = 0.788.  
F1 score = 0.602, log loss = 7.326, recall = 0.552.

---

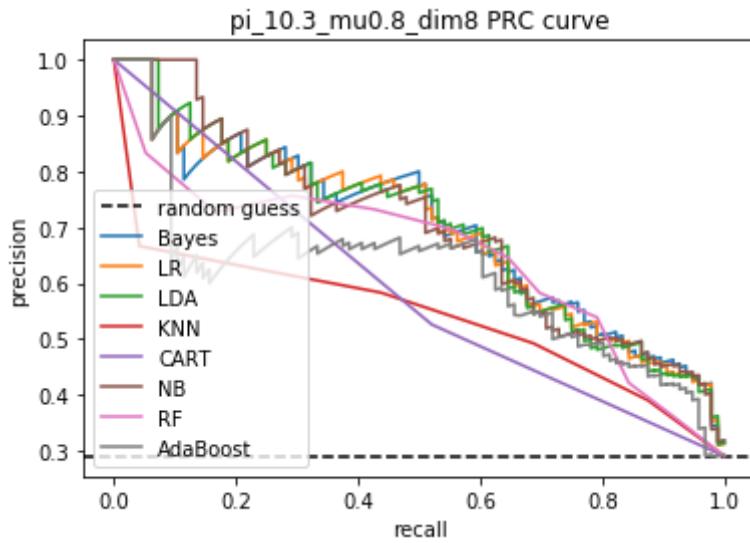
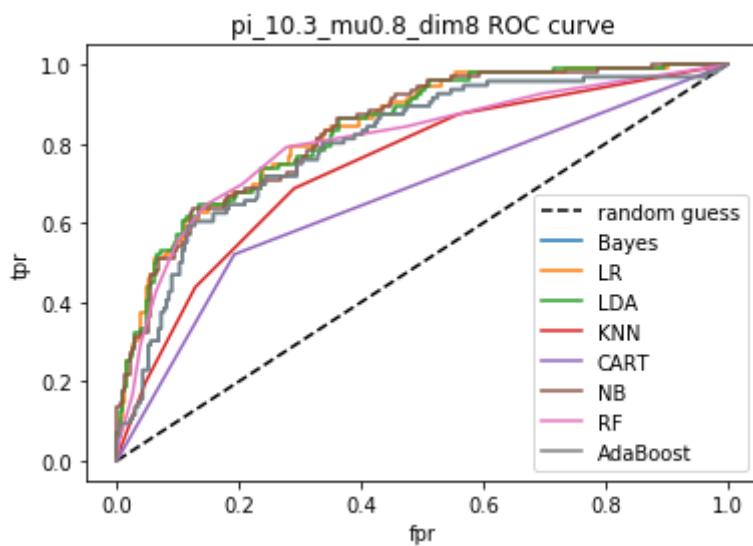
RF : AUROC = 0.804, AUPRC = 0.648, average precision = 0.515, .  
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then  
0.767, accuracy = 0.800.  
F1 score = 0.616, log loss = 6.908, recall = 0.552.

---

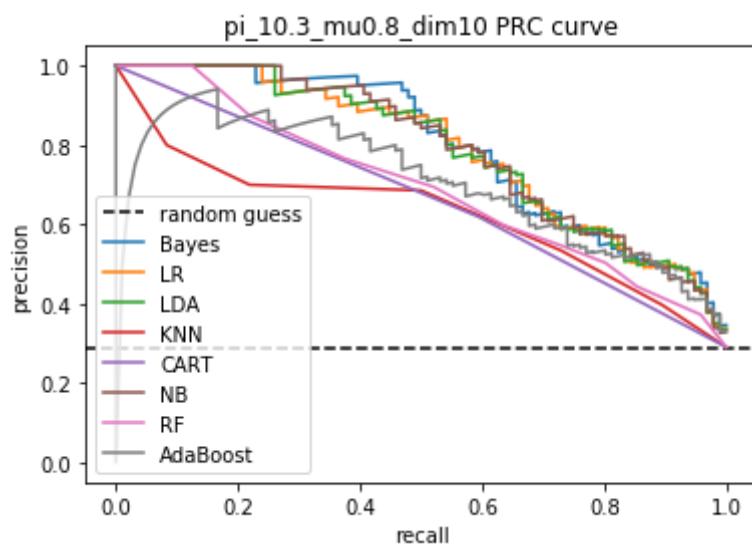
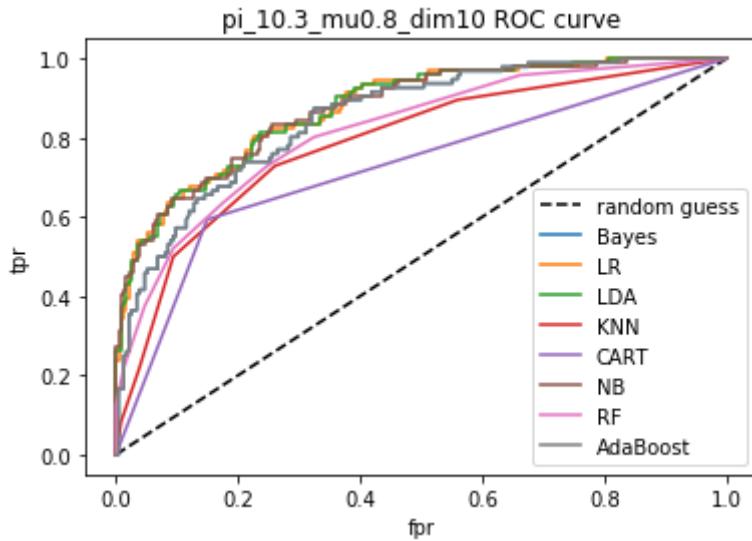
AdaBoost : AUROC = 0.800, AUPRC = 0.614, average precision = 0.516, .  
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then  
0.736, accuracy = 0.797.  
F1 score = 0.630, log loss = 7.012, recall = 0.594.

---

Bayes classifier has AUROC = 0.842, and AUPRC = 0.696.



```
The best model measured by AUROC is LR
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is RF
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.3 , mu = 0.8 , dim = 10 is 0.29 .
LR : AUROC = 0.874, AUPRC = 0.786, average precision = 0.581, .
Best threshold for ROC = 0.287, accuracy for the best ROC threshold is then
0.779, accuracy = 0.833.
F1 score = 0.671, log loss = 5.756, recall = 0.583.
-----
LDA : AUROC = 0.874, AUPRC = 0.787, average precision = 0.575, .
Best threshold for ROC = 0.286, accuracy for the best ROC threshold is then
0.776, accuracy = 0.830.
F1 score = 0.667, log loss = 5.861, recall = 0.583.
-----
KNN : AUROC = 0.788, AUPRC = 0.625, average precision = 0.488, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.788, accuracy = 0.788.
F1 score = 0.578, log loss = 7.326, recall = 0.500.
-----
CART : AUROC = 0.722, AUPRC = 0.666, average precision = 0.486, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.709, accuracy = 0.776.
F1 score = 0.606, log loss = 7.745, recall = 0.594.
-----
NB : AUROC = 0.873, AUPRC = 0.790, average precision = 0.581, .
Best threshold for ROC = 0.269, accuracy for the best ROC threshold is then
0.767, accuracy = 0.833.
F1 score = 0.667, log loss = 5.756, recall = 0.573.
-----
RF : AUROC = 0.816, AUPRC = 0.695, average precision = 0.501, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.770, accuracy = 0.794.
F1 score = 0.595, log loss = 7.117, recall = 0.521.
-----
AdaBoost : AUROC = 0.851, AUPRC = 0.697, average precision = 0.518, .
Best threshold for ROC = 0.493, accuracy for the best ROC threshold is then
0.745, accuracy = 0.800.
F1 score = 0.625, log loss = 6.908, recall = 0.573.
-----
Bayes classifier has AUROC = 0.877, and AUPRC = 0.795.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.3 , mu = 1 , dim = 2  is 0.303 .
LR : AUROC = 0.915, AUPRC = 0.864, average precision = 0.681, .
Best threshold for ROC = 0.333, accuracy for the best ROC threshold is then
0.833, accuracy = 0.870.
F1 score = 0.779, log loss = 4.501, recall = 0.760.

-----
LDA : AUROC = 0.915, AUPRC = 0.864, average precision = 0.681, .
Best threshold for ROC = 0.324, accuracy for the best ROC threshold is then
0.833, accuracy = 0.870.
F1 score = 0.779, log loss = 4.501, recall = 0.760.

-----
KNN : AUROC = 0.870, AUPRC = 0.787, average precision = 0.610, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.833, accuracy = 0.833.
F1 score = 0.729, log loss = 5.757, recall = 0.740.

```

CART : AUROC = 0.732, AUPRC = 0.679, average precision = 0.497, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.697, accuracy = 0.764.  
F1 score = 0.625, log loss = 8.164, recall = 0.650.

---

NB : AUROC = 0.916, AUPRC = 0.865, average precision = 0.674, .  
Best threshold for ROC = 0.341, accuracy for the best ROC threshold is then  
0.836, accuracy = 0.867.  
F1 score = 0.773, log loss = 4.605, recall = 0.750.

---

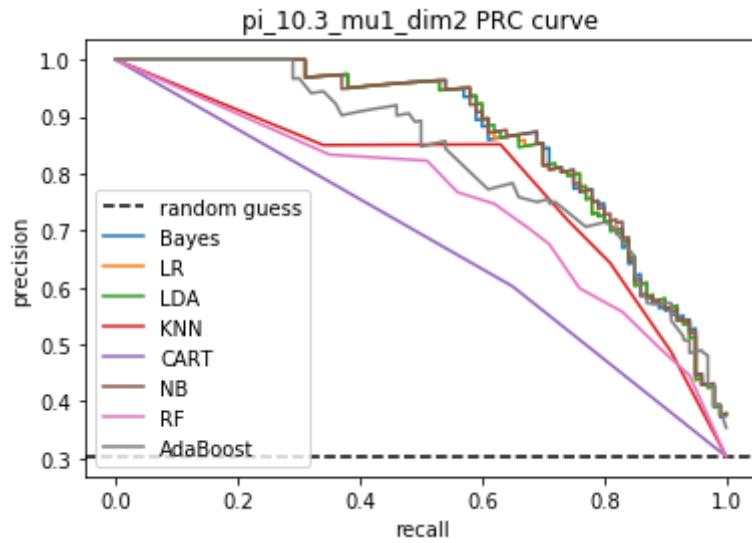
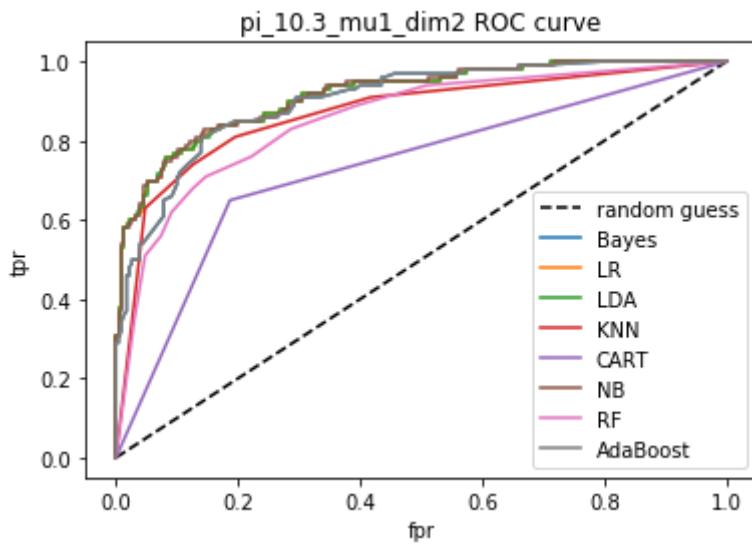
RF : AUROC = 0.854, AUPRC = 0.752, average precision = 0.574, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then  
0.809, accuracy = 0.815.  
F1 score = 0.690, log loss = 6.385, recall = 0.680.

---

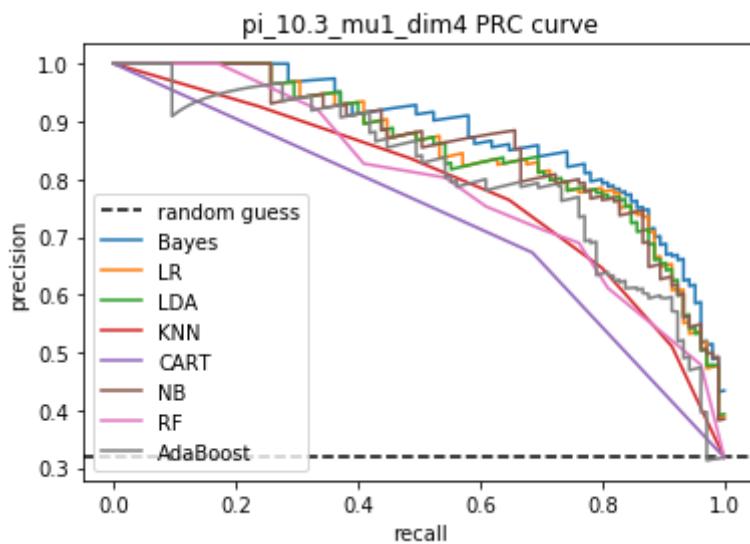
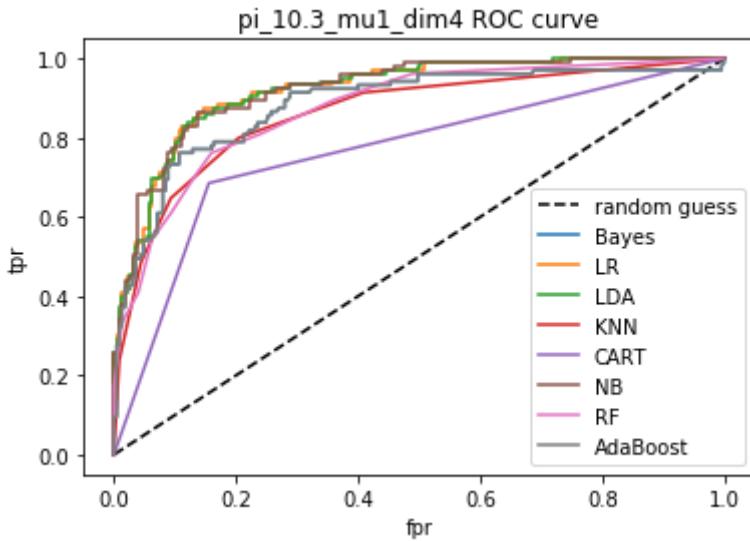
AdaBoost : AUROC = 0.902, AUPRC = 0.827, average precision = 0.625, .  
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then  
0.842, accuracy = 0.842.  
F1 score = 0.735, log loss = 5.443, recall = 0.720.

---

Bayes classifier has AUROC = 0.915, and AUPRC = 0.865.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is AdaBoost
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.3 , mu = 1 , dim = 4 is 0.319 .
LR : AUROC = 0.922, AUPRC = 0.856, average precision = 0.673, .
Best threshold for ROC = 0.305, accuracy for the best ROC threshold is then
0.861, accuracy = 0.858.
F1 score = 0.761, log loss = 4.919, recall = 0.714.
-----
LDA : AUROC = 0.921, AUPRC = 0.855, average precision = 0.667, .
Best threshold for ROC = 0.293, accuracy for the best ROC threshold is then
0.852, accuracy = 0.855.
F1 score = 0.755, log loss = 5.024, recall = 0.705.
-----
KNN : AUROC = 0.863, AUPRC = 0.786, average precision = 0.607, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.824, accuracy = 0.824.
F1 score = 0.701, log loss = 6.071, recall = 0.648.
-----
CART : AUROC = 0.765, AUPRC = 0.729, average precision = 0.561, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.682, accuracy = 0.794.
F1 score = 0.679, log loss = 7.117, recall = 0.686.
-----
NB : AUROC = 0.922, AUPRC = 0.857, average precision = 0.661, .
Best threshold for ROC = 0.272, accuracy for the best ROC threshold is then
0.861, accuracy = 0.852.
F1 score = 0.751, log loss = 5.129, recall = 0.705.
-----
RF : AUROC = 0.874, AUPRC = 0.793, average precision = 0.583, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.815, accuracy = 0.812.
F1 score = 0.674, log loss = 6.489, recall = 0.610.
-----
AdaBoost : AUROC = 0.883, AUPRC = 0.810, average precision = 0.661, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.791, accuracy = 0.852.
F1 score = 0.759, log loss = 5.129, recall = 0.733.
-----
Bayes classifier has AUROC = 0.935, and AUPRC = 0.880.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.3 , mu = 1 , dim = 6  is 0.306 .
LR : AUROC = 0.923, AUPRC = 0.856, average precision = 0.671, .
Best threshold for ROC = 0.271, accuracy for the best ROC threshold is then
0.842, accuracy = 0.864.
F1 score = 0.757, log loss = 4.710, recall = 0.693.

-----
LDA : AUROC = 0.926, AUPRC = 0.858, average precision = 0.665, .
Best threshold for ROC = 0.279, accuracy for the best ROC threshold is then
0.858, accuracy = 0.861.
F1 score = 0.750, log loss = 4.815, recall = 0.683.

-----
KNN : AUROC = 0.879, AUPRC = 0.770, average precision = 0.619, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.839, accuracy = 0.839.
F1 score = 0.704, log loss = 5.547, recall = 0.624.

```

CART : AUROC = 0.776, AUPRC = 0.739, average precision = 0.573, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.694, accuracy = 0.812.  
F1 score = 0.690, log loss = 6.489, recall = 0.683.

---

NB : AUROC = 0.927, AUPRC = 0.859, average precision = 0.665, .  
Best threshold for ROC = 0.297, accuracy for the best ROC threshold is then  
0.842, accuracy = 0.861.  
F1 score = 0.753, log loss = 4.815, recall = 0.693.

---

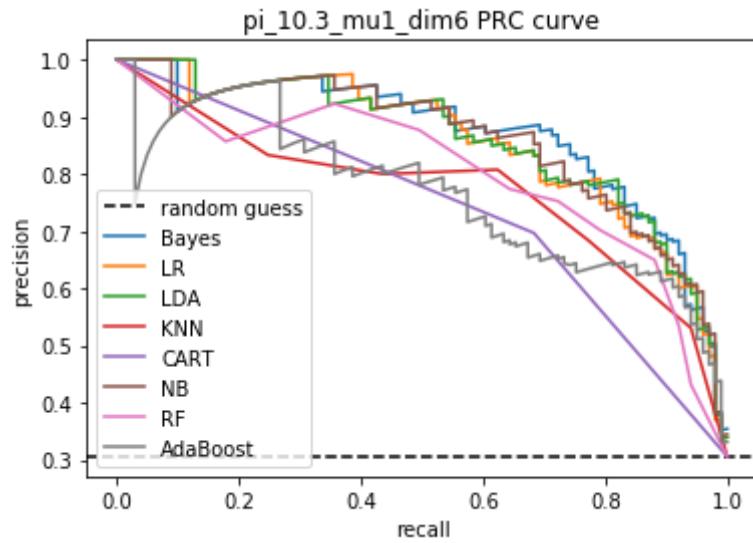
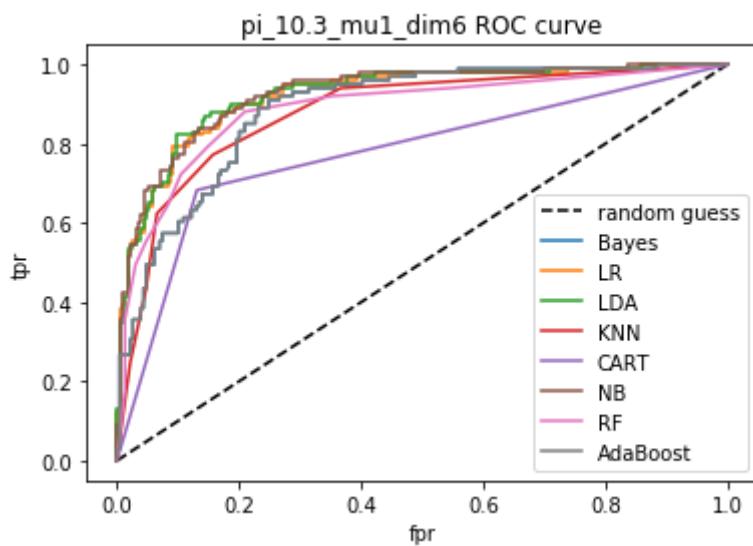
RF : AUROC = 0.887, AUPRC = 0.797, average precision = 0.607, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then  
0.842, accuracy = 0.833.  
F1 score = 0.703, log loss = 5.757, recall = 0.644.

---

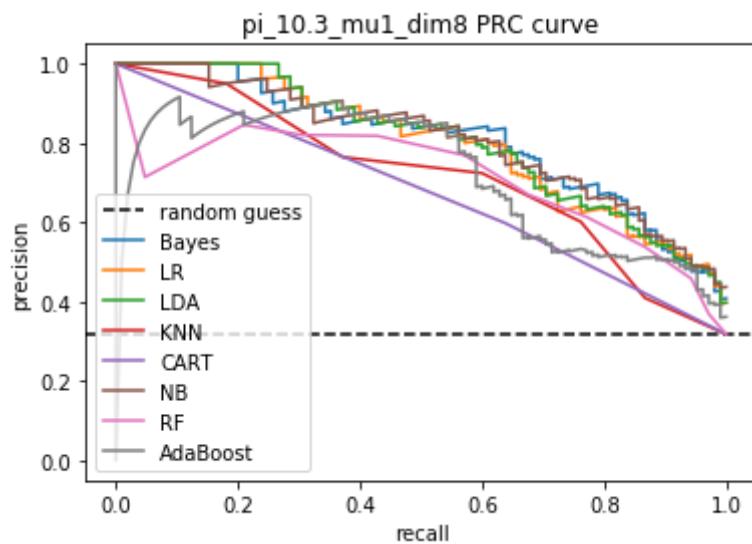
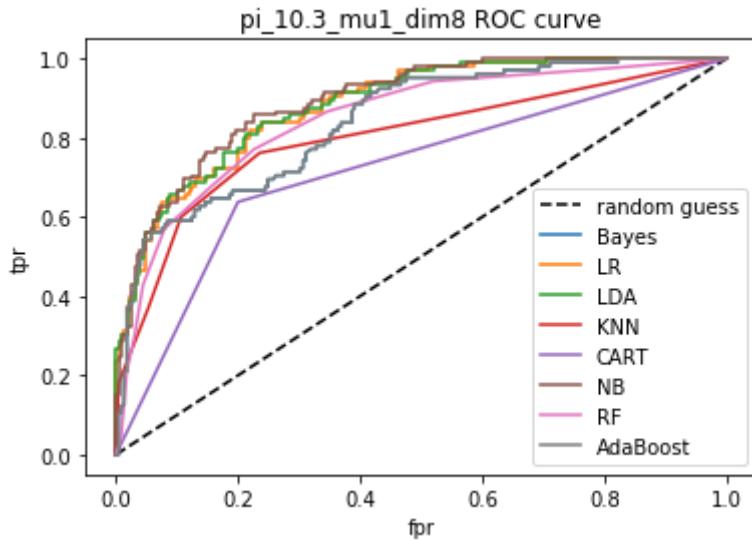
AdaBoost : AUROC = 0.887, AUPRC = 0.763, average precision = 0.553, .  
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then  
0.803, accuracy = 0.800.  
F1 score = 0.673, log loss = 6.908, recall = 0.673.

---

Bayes classifier has AUROC = 0.932, and AUPRC = 0.869.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LDA
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.3 , mu = 1 , dim = 8 is 0.319 .
LR : AUROC = 0.883, AUPRC = 0.801, average precision = 0.613, .
Best threshold for ROC = 0.329, accuracy for the best ROC threshold is then
0.788, accuracy = 0.827.
F1 score = 0.705, log loss = 5.966, recall = 0.648.
-----
LDA : AUROC = 0.884, AUPRC = 0.804, average precision = 0.619, .
Best threshold for ROC = 0.332, accuracy for the best ROC threshold is then
0.791, accuracy = 0.830.
F1 score = 0.711, log loss = 5.861, recall = 0.657.
-----
KNN : AUROC = 0.800, AUPRC = 0.719, average precision = 0.562, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.800, accuracy = 0.800.
F1 score = 0.656, log loss = 6.908, recall = 0.600.
-----
CART : AUROC = 0.719, AUPRC = 0.676, average precision = 0.497, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.682, accuracy = 0.748.
F1 score = 0.618, log loss = 8.687, recall = 0.638.
-----
NB : AUROC = 0.893, AUPRC = 0.806, average precision = 0.596, .
Best threshold for ROC = 0.327, accuracy for the best ROC threshold is then
0.806, accuracy = 0.818.
F1 score = 0.691, log loss = 6.280, recall = 0.638.
-----
RF : AUROC = 0.847, AUPRC = 0.712, average precision = 0.576, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.791, accuracy = 0.809.
F1 score = 0.656, log loss = 6.594, recall = 0.571.
-----
AdaBoost : AUROC = 0.841, AUPRC = 0.716, average precision = 0.551, .
Best threshold for ROC = 0.494, accuracy for the best ROC threshold is then
0.718, accuracy = 0.794.
F1 score = 0.646, log loss = 7.117, recall = 0.590.
-----
Bayes classifier has AUROC = 0.891, and AUPRC = 0.808.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is LDA
Positive ratio for pi_1 = 0.3 , mu = 1 , dim = 10  is 0.299 .
LR : AUROC = 0.937, AUPRC = 0.878, average precision = 0.684, .
Best threshold for ROC = 0.324, accuracy for the best ROC threshold is then
0.855, accuracy = 0.873.
F1 score = 0.772, log loss = 4.396, recall = 0.717.

-----
LDA : AUROC = 0.937, AUPRC = 0.877, average precision = 0.691, .
Best threshold for ROC = 0.322, accuracy for the best ROC threshold is then
0.848, accuracy = 0.876.
F1 score = 0.778, log loss = 4.291, recall = 0.727.

-----
KNN : AUROC = 0.845, AUPRC = 0.741, average precision = 0.558, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.815, accuracy = 0.815.
F1 score = 0.643, log loss = 6.384, recall = 0.556.

```

```

CART : AUROC = 0.759, AUPRC = 0.708, average precision = 0.530, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.700, accuracy = 0.788.
F1 score = 0.660, log loss = 7.327, recall = 0.687.

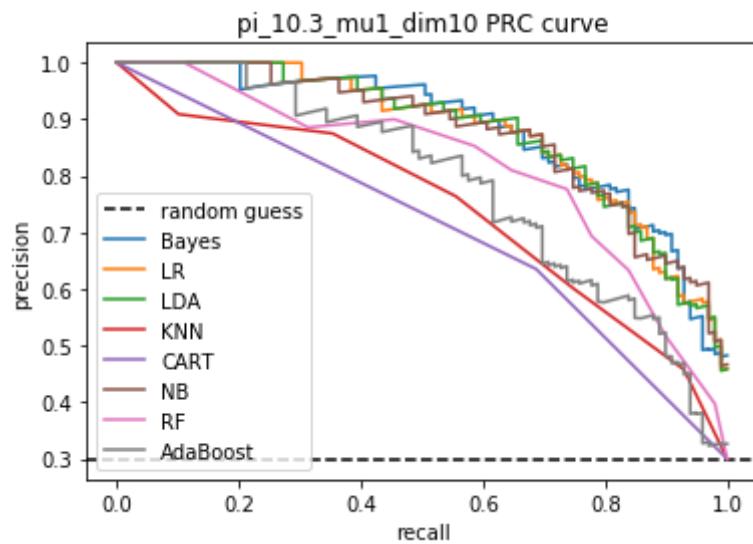
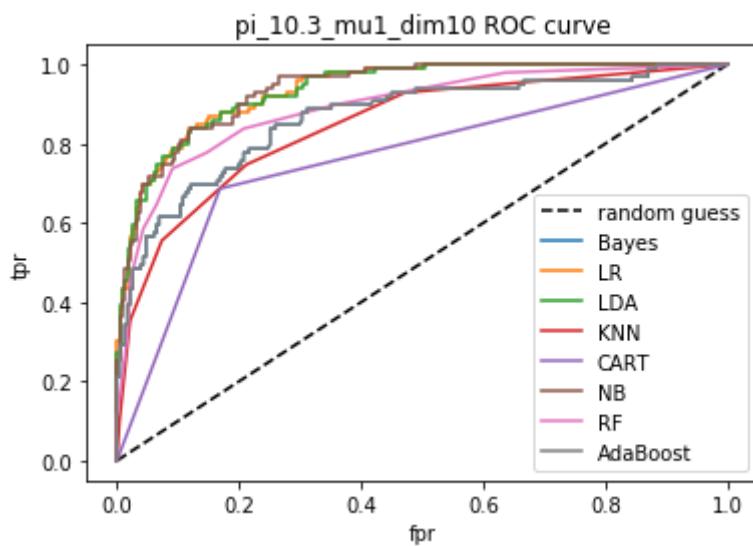
NB : AUROC = 0.937, AUPRC = 0.875, average precision = 0.684, .
Best threshold for ROC = 0.315, accuracy for the best ROC threshold is then
0.842, accuracy = 0.873.
F1 score = 0.772, log loss = 4.396, recall = 0.717.

RF : AUROC = 0.891, AUPRC = 0.814, average precision = 0.630, .
Best threshold for ROC = 0.300, accuracy for the best ROC threshold is then
0.830, accuracy = 0.848.
F1 score = 0.719, log loss = 5.233, recall = 0.646.

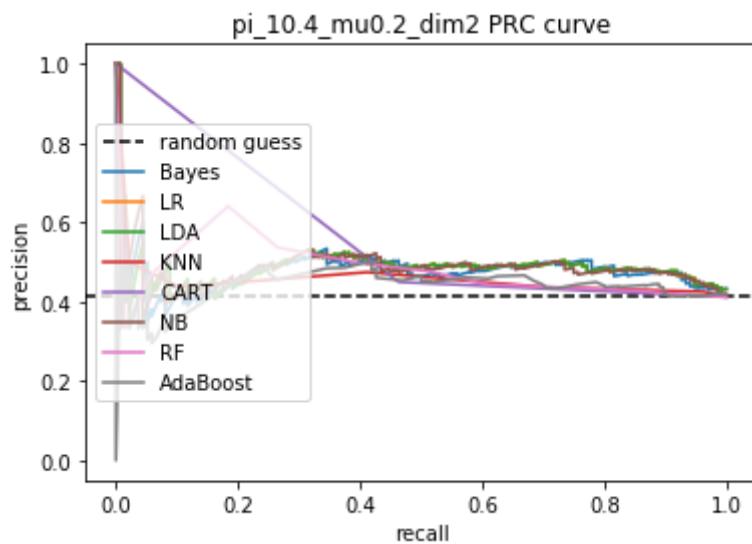
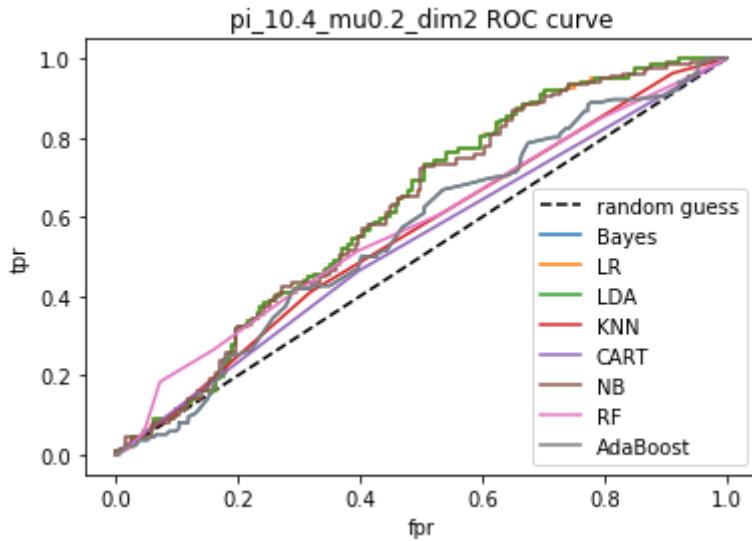
AdaBoost : AUROC = 0.865, AUPRC = 0.787, average precision = 0.570, .
Best threshold for ROC = 0.493, accuracy for the best ROC threshold is then
0.782, accuracy = 0.818.
F1 score = 0.677, log loss = 6.280, recall = 0.636.

Bayes classifier has AUROC = 0.938, and AUPRC = 0.880.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is LDA
Positive ratio for pi_1 = 0.4 , mu = 0.2 , dim = 2 is 0.413 .
LR : AUROC = 0.622, AUPRC = 0.483, average precision = 0.428, .
Best threshold for ROC = 0.423, accuracy for the best ROC threshold is then
0.579, accuracy = 0.579.
F1 score = 0.315, log loss = 14.548, recall = 0.235.
-----
LDA : AUROC = 0.622, AUPRC = 0.483, average precision = 0.428, .
Best threshold for ROC = 0.422, accuracy for the best ROC threshold is then
0.579, accuracy = 0.579.
F1 score = 0.315, log loss = 14.548, recall = 0.235.
-----
KNN : AUROC = 0.556, AUPRC = 0.456, average precision = 0.438, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.576, accuracy = 0.570.
F1 score = 0.441, log loss = 14.862, recall = 0.412.
-----
CART : AUROC = 0.533, AUPRC = 0.567, average precision = 0.430, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.588, accuracy = 0.545.
F1 score = 0.457, log loss = 15.700, recall = 0.463.
-----
NB : AUROC = 0.617, AUPRC = 0.484, average precision = 0.431, .
Best threshold for ROC = 0.405, accuracy for the best ROC threshold is then
0.582, accuracy = 0.585.
F1 score = 0.318, log loss = 14.339, recall = 0.235.
-----
RF : AUROC = 0.574, AUPRC = 0.482, average precision = 0.446, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.588, accuracy = 0.588.
F1 score = 0.438, log loss = 14.234, recall = 0.390.
-----
AdaBoost : AUROC = 0.561, AUPRC = 0.438, average precision = 0.420, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.542, accuracy = 0.570.
F1 score = 0.276, log loss = 14.862, recall = 0.199.
-----
Bayes classifier has AUROC = 0.612, and AUPRC = 0.477.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is RF
The best model measured by average_precision is RF
The best model measured by f1 is CART
The best model measured by log_loss_score is RF
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 0.2 , dim = 4 is 0.411 .
LR : AUROC = 0.584, AUPRC = 0.485, average precision = 0.416, .
Best threshold for ROC = 0.417, accuracy for the best ROC threshold is then
0.564, accuracy = 0.573.
F1 score = 0.203, log loss = 14.758, recall = 0.132.

-----
LDA : AUROC = 0.584, AUPRC = 0.485, average precision = 0.416, .
Best threshold for ROC = 0.416, accuracy for the best ROC threshold is then
0.564, accuracy = 0.573.
F1 score = 0.203, log loss = 14.758, recall = 0.132.

-----
KNN : AUROC = 0.472, AUPRC = 0.386, average precision = 0.401, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.506, accuracy = 0.506.
F1 score = 0.329, log loss = 17.060, recall = 0.294.

```

```

CART : AUROC = 0.496, AUPRC = 0.517, average precision = 0.410, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.588, accuracy = 0.518.
F1 score = 0.386, log loss = 16.642, recall = 0.368.

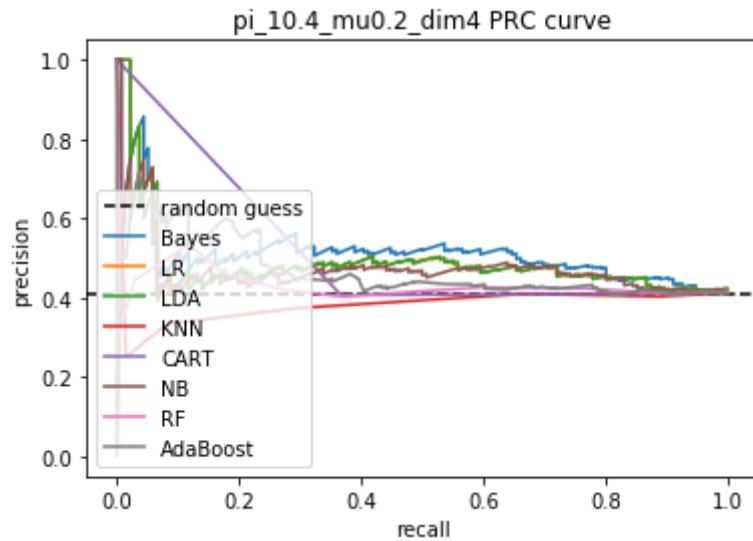
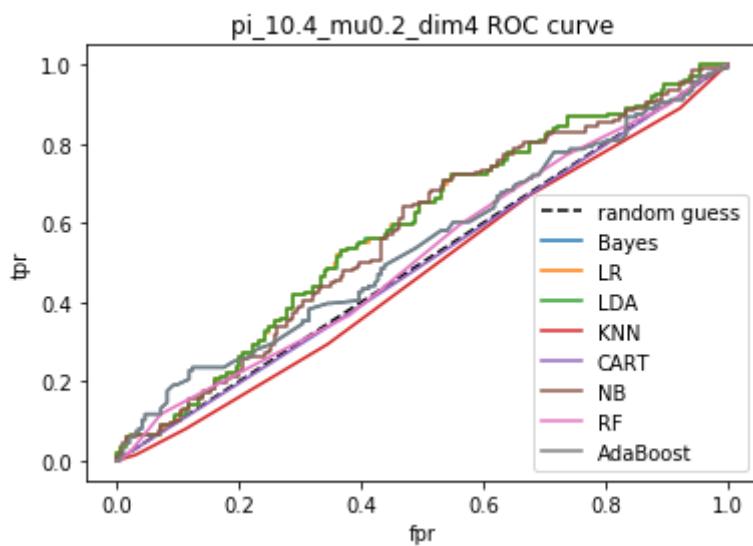
NB : AUROC = 0.573, AUPRC = 0.470, average precision = 0.422, .
Best threshold for ROC = 0.419, accuracy for the best ROC threshold is then
0.561, accuracy = 0.582.
F1 score = 0.233, log loss = 14.444, recall = 0.154.

RF : AUROC = 0.517, AUPRC = 0.432, average precision = 0.414, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.515, accuracy = 0.545.
F1 score = 0.330, log loss = 15.700, recall = 0.272.

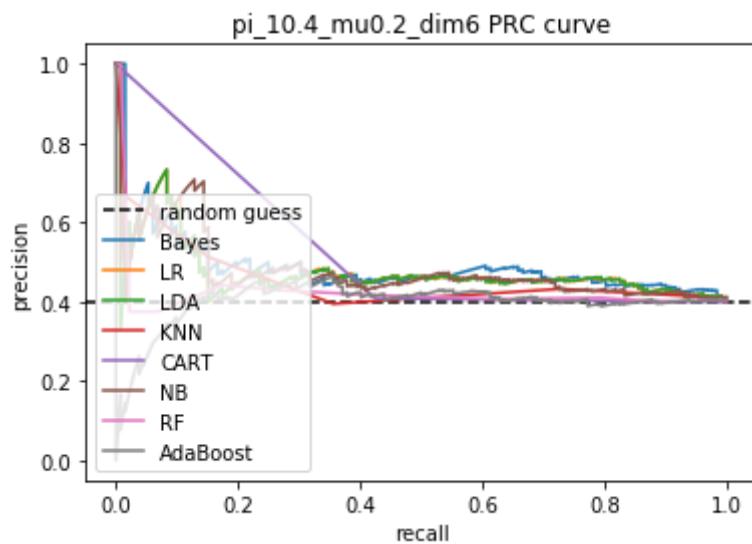
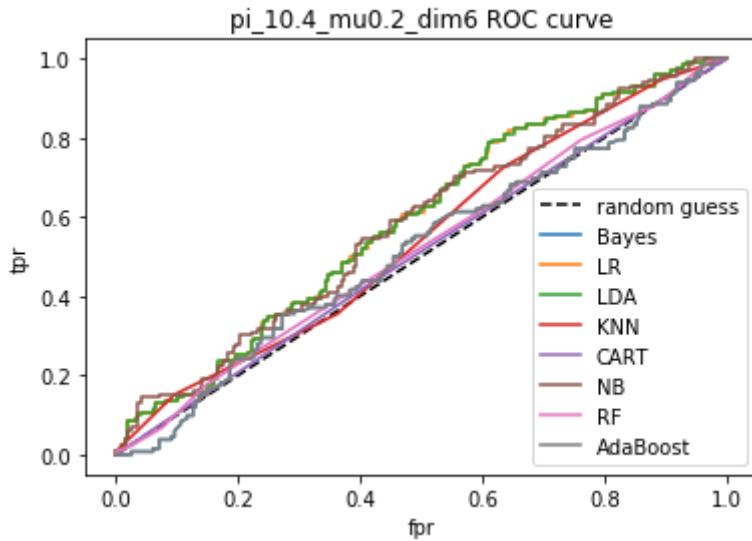
AdaBoost : AUROC = 0.538, AUPRC = 0.466, average precision = 0.423, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.533, accuracy = 0.552.
F1 score = 0.388, log loss = 15.490, recall = 0.346.

Bayes classifier has AUROC = 0.617, and AUPRC = 0.510.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is NB
The best model measured by average_precision is AdaBoost
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 0.2 , dim = 6 is 0.401 .
LR : AUROC = 0.589, AUPRC = 0.473, average precision = 0.410, .
Best threshold for ROC = 0.396, accuracy for the best ROC threshold is then
0.561, accuracy = 0.582.
F1 score = 0.274, log loss = 14.444, recall = 0.197.
-----
LDA : AUROC = 0.589, AUPRC = 0.473, average precision = 0.410, .
Best threshold for ROC = 0.396, accuracy for the best ROC threshold is then
0.561, accuracy = 0.582.
F1 score = 0.274, log loss = 14.444, recall = 0.197.
-----
KNN : AUROC = 0.542, AUPRC = 0.454, average precision = 0.398, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.603, accuracy = 0.524.
F1 score = 0.375, log loss = 16.432, recall = 0.356.
-----
CART : AUROC = 0.508, AUPRC = 0.532, average precision = 0.404, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.600, accuracy = 0.524.
F1 score = 0.416, log loss = 16.432, recall = 0.424.
-----
NB : AUROC = 0.579, AUPRC = 0.475, average precision = 0.409, .
Best threshold for ROC = 0.388, accuracy for the best ROC threshold is then
0.558, accuracy = 0.582.
F1 score = 0.266, log loss = 14.444, recall = 0.189.
-----
RF : AUROC = 0.520, AUPRC = 0.420, average precision = 0.408, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.564, accuracy = 0.564.
F1 score = 0.333, log loss = 15.072, recall = 0.273.
-----
AdaBoost : AUROC = 0.515, AUPRC = 0.397, average precision = 0.411, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.527, accuracy = 0.567.
F1 score = 0.353, log loss = 14.967, recall = 0.295.
-----
Bayes classifier has AUROC = 0.603, and AUPRC = 0.486.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LR
The best model measured by average_precision is AdaBoost
The best model measured by f1 is CART
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 0.2 , dim = 8 is 0.415 .
LR : AUROC = 0.607, AUPRC = 0.475, average precision = 0.430, .
Best threshold for ROC = 0.409, accuracy for the best ROC threshold is then
0.603, accuracy = 0.579.
F1 score = 0.294, log loss = 14.548, recall = 0.212.

-----
LDA : AUROC = 0.607, AUPRC = 0.475, average precision = 0.428, .
Best threshold for ROC = 0.407, accuracy for the best ROC threshold is then
0.600, accuracy = 0.576.
F1 score = 0.293, log loss = 14.653, recall = 0.212.

-----
KNN : AUROC = 0.534, AUPRC = 0.456, average precision = 0.416, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.530, accuracy = 0.530.
F1 score = 0.367, log loss = 16.223, recall = 0.328.

```

```

CART : AUROC = 0.510, AUPRC = 0.555, average precision = 0.420, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.585, accuracy = 0.518.
F1 score = 0.442, log loss = 16.642, recall = 0.460.

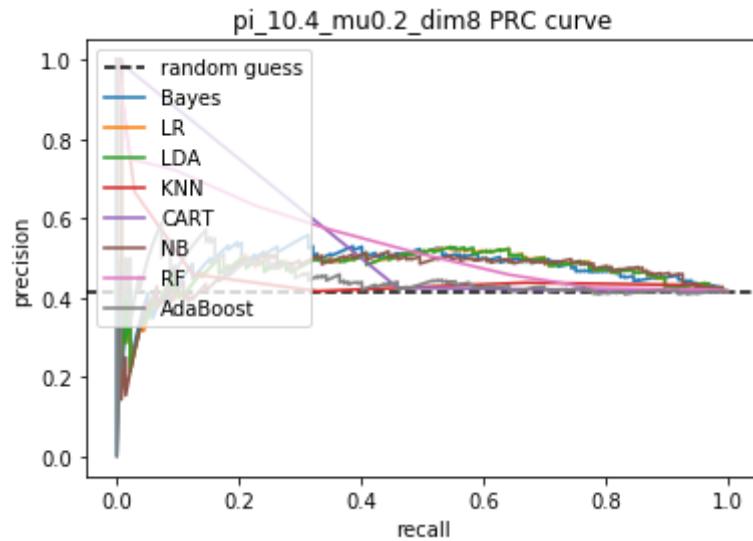
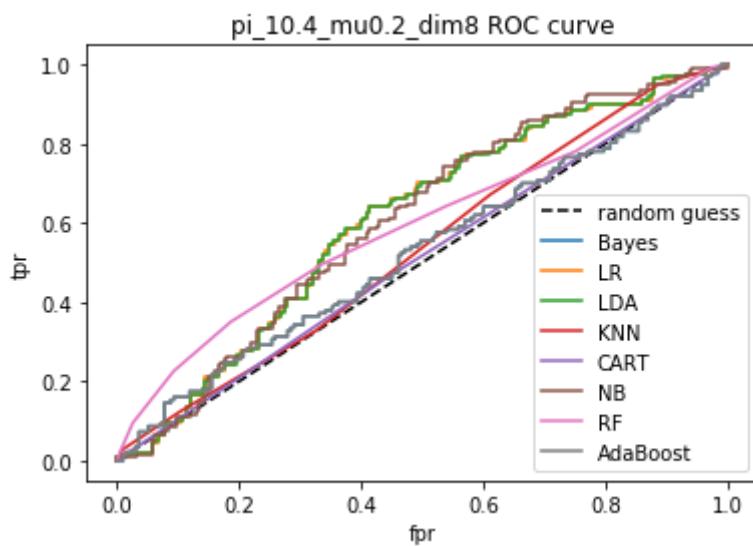
NB : AUROC = 0.606, AUPRC = 0.470, average precision = 0.431, .
Best threshold for ROC = 0.402, accuracy for the best ROC threshold is then
0.582, accuracy = 0.582.
F1 score = 0.296, log loss = 14.444, recall = 0.212.

RF : AUROC = 0.592, AUPRC = 0.540, average precision = 0.470, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.621, accuracy = 0.621.
F1 score = 0.434, log loss = 13.083, recall = 0.350.

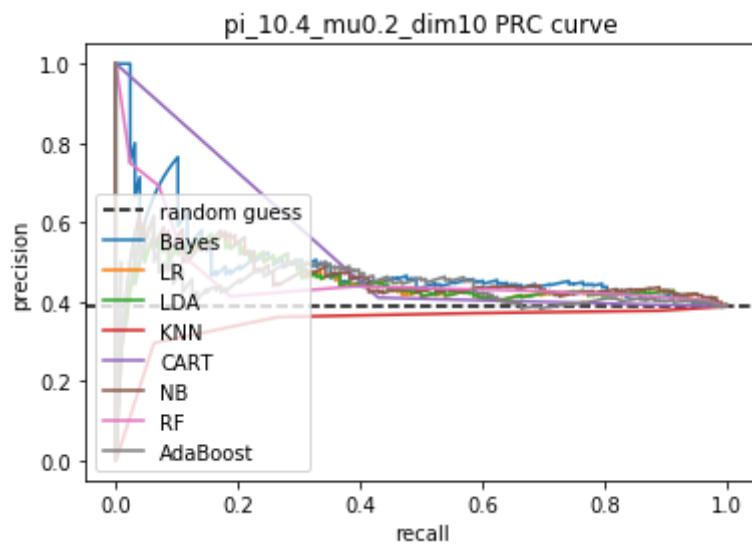
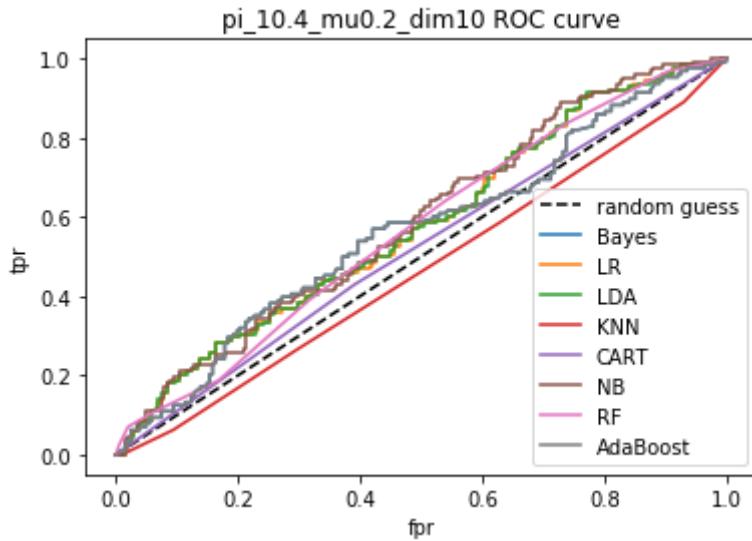
AdaBoost : AUROC = 0.526, AUPRC = 0.443, average precision = 0.426, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.530, accuracy = 0.552.
F1 score = 0.388, log loss = 15.490, recall = 0.343.

Bayes classifier has AUROC = 0.610, and AUPRC = 0.477.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is RF
The best model measured by accuracy is RF
The best model measured by average_precision is RF
The best model measured by f1 is CART
The best model measured by log_loss_score is RF
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 0.2 , dim = 10  is 0.387 .
LR : AUROC = 0.576, AUPRC = 0.449, average precision = 0.407, .
Best threshold for ROC = 0.356, accuracy for the best ROC threshold is then
0.533, accuracy = 0.618.
F1 score = 0.212, log loss = 13.188, recall = 0.133.
-----
LDA : AUROC = 0.576, AUPRC = 0.450, average precision = 0.412, .
Best threshold for ROC = 0.355, accuracy for the best ROC threshold is then
0.536, accuracy = 0.624.
F1 score = 0.225, log loss = 12.978, recall = 0.141.
-----
KNN : AUROC = 0.466, AUPRC = 0.349, average precision = 0.381, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.533, accuracy = 0.533.
F1 score = 0.306, log loss = 16.118, recall = 0.266.
-----
CART : AUROC = 0.519, AUPRC = 0.531, average precision = 0.398, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.612, accuracy = 0.539.
F1 score = 0.420, log loss = 15.909, recall = 0.430.
-----
NB : AUROC = 0.589, AUPRC = 0.457, average precision = 0.414, .
Best threshold for ROC = 0.351, accuracy for the best ROC threshold is then
0.542, accuracy = 0.624.
F1 score = 0.244, log loss = 12.978, recall = 0.156.
-----
RF : AUROC = 0.569, AUPRC = 0.459, average precision = 0.393, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.570, accuracy = 0.582.
F1 score = 0.258, log loss = 14.444, recall = 0.188.
-----
AdaBoost : AUROC = 0.562, AUPRC = 0.439, average precision = 0.414, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.573, accuracy = 0.606.
F1 score = 0.343, log loss = 13.606, recall = 0.266.
-----
Bayes classifier has AUROC = 0.596, and AUPRC = 0.488.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is CART
The best model measured by accuracy is LDA
The best model measured by average_precision is NB
The best model measured by f1 is CART
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 0.4 , dim = 2  is 0.377 .
LR : AUROC = 0.706, AUPRC = 0.596, average precision = 0.488, .
Best threshold for ROC = 0.353, accuracy for the best ROC threshold is then
0.658, accuracy = 0.691.
F1 score = 0.528, log loss = 10.676, recall = 0.460.

-----
LDA : AUROC = 0.706, AUPRC = 0.596, average precision = 0.488, .
Best threshold for ROC = 0.352, accuracy for the best ROC threshold is then
0.658, accuracy = 0.691.
F1 score = 0.528, log loss = 10.676, recall = 0.460.

-----
KNN : AUROC = 0.650, AUPRC = 0.567, average precision = 0.451, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.645, accuracy = 0.645.
F1 score = 0.506, log loss = 12.246, recall = 0.484.

```

```

CART : AUROC = 0.568, AUPRC = 0.560, average precision = 0.415, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.624, accuracy = 0.597.
F1 score = 0.457, log loss = 13.920, recall = 0.452.

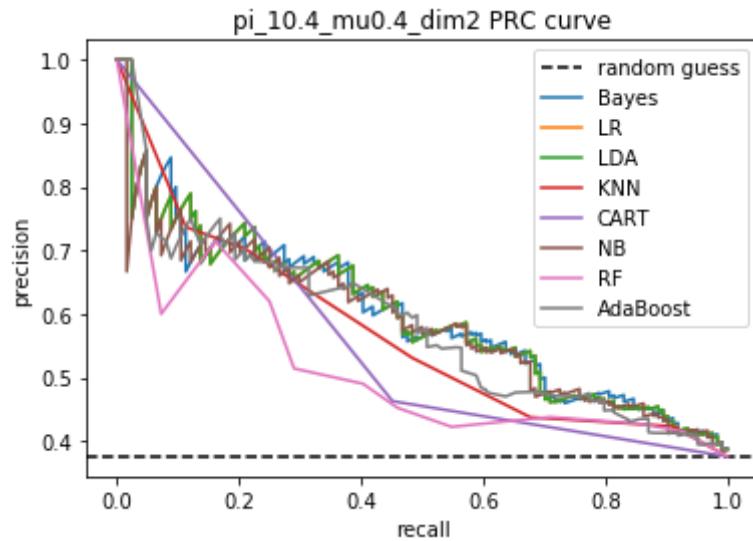
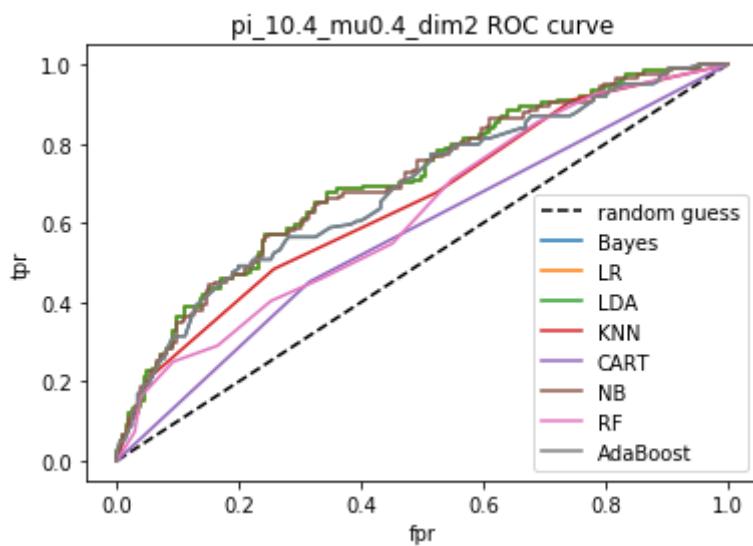
NB : AUROC = 0.702, AUPRC = 0.588, average precision = 0.487, .
Best threshold for ROC = 0.350, accuracy for the best ROC threshold is then
0.658, accuracy = 0.691.
F1 score = 0.523, log loss = 10.676, recall = 0.452.

RF : AUROC = 0.621, AUPRC = 0.512, average precision = 0.422, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.588, accuracy = 0.618.
F1 score = 0.442, log loss = 13.188, recall = 0.403.

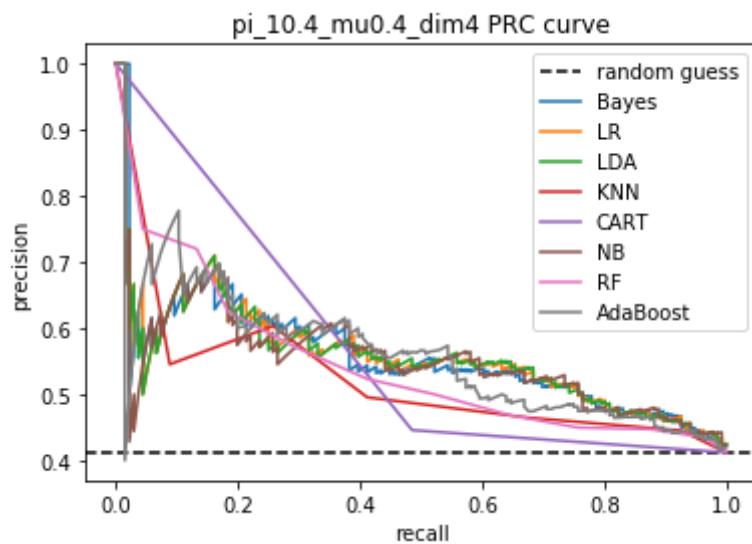
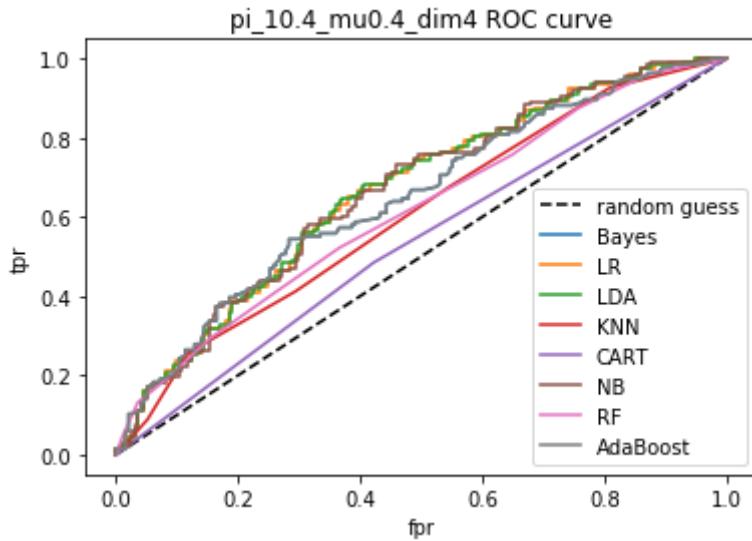
AdaBoost : AUROC = 0.683, AUPRC = 0.581, average precision = 0.482, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.609, accuracy = 0.685.
F1 score = 0.523, log loss = 10.885, recall = 0.460.

Bayes classifier has AUROC = 0.708, and AUPRC = 0.597.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is NB
The best model measured by recall is KNN
Positive ratio for pi_1 = 0.4 , mu = 0.4 , dim = 4 is 0.413 .
LR : AUROC = 0.665, AUPRC = 0.556, average precision = 0.471, .
Best threshold for ROC = 0.413, accuracy for the best ROC threshold is then
0.630, accuracy = 0.621.
F1 score = 0.473, log loss = 13.083, recall = 0.412.
-----
LDA : AUROC = 0.664, AUPRC = 0.556, average precision = 0.473, .
Best threshold for ROC = 0.414, accuracy for the best ROC threshold is then
0.636, accuracy = 0.624.
F1 score = 0.475, log loss = 12.978, recall = 0.412.
-----
KNN : AUROC = 0.604, AUPRC = 0.523, average precision = 0.446, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.585, accuracy = 0.585.
F1 score = 0.450, log loss = 14.339, recall = 0.412.
-----
CART : AUROC = 0.531, AUPRC = 0.572, average precision = 0.429, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.588, accuracy = 0.539.
F1 score = 0.465, log loss = 15.909, recall = 0.485.
-----
NB : AUROC = 0.664, AUPRC = 0.553, average precision = 0.479, .
Best threshold for ROC = 0.414, accuracy for the best ROC threshold is then
0.615, accuracy = 0.630.
F1 score = 0.492, log loss = 12.769, recall = 0.434.
-----
RF : AUROC = 0.614, AUPRC = 0.543, average precision = 0.458, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.603, accuracy = 0.603.
F1 score = 0.461, log loss = 13.711, recall = 0.412.
-----
AdaBoost : AUROC = 0.648, AUPRC = 0.557, average precision = 0.482, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.600, accuracy = 0.630.
F1 score = 0.508, log loss = 12.769, recall = 0.463.
-----
Bayes classifier has AUROC = 0.661, and AUPRC = 0.556.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is LDA
The best model measured by accuracy is NB
The best model measured by average_precision is AdaBoost
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is NB
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 0.4 , dim = 6 is 0.411 .
LR : AUROC = 0.727, AUPRC = 0.635, average precision = 0.525, .
Best threshold for ROC = 0.415, accuracy for the best ROC threshold is then
0.682, accuracy = 0.679.
F1 score = 0.539, log loss = 11.094, recall = 0.456.

-----
LDA : AUROC = 0.726, AUPRC = 0.632, average precision = 0.532, .
Best threshold for ROC = 0.409, accuracy for the best ROC threshold is then
0.682, accuracy = 0.685.
F1 score = 0.552, log loss = 10.885, recall = 0.471.

-----
KNN : AUROC = 0.625, AUPRC = 0.551, average precision = 0.477, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.627, accuracy = 0.627.
F1 score = 0.490, log loss = 12.874, recall = 0.434.

```

```

CART : AUROC = 0.560, AUPRC = 0.587, average precision = 0.446, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.588, accuracy = 0.576.
F1 score = 0.478, log loss = 14.653, recall = 0.471.

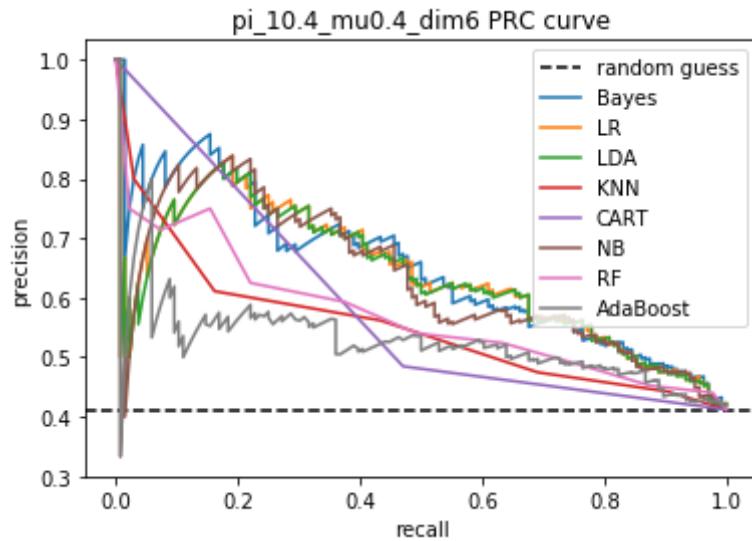
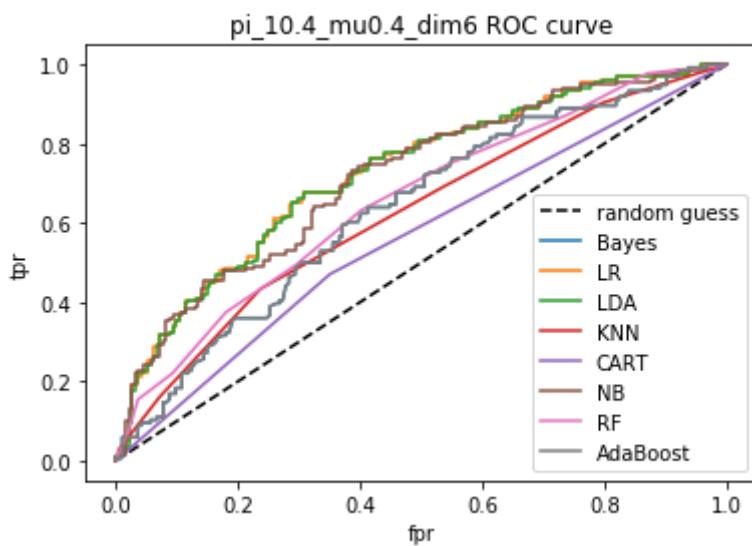
NB : AUROC = 0.716, AUPRC = 0.628, average precision = 0.522, .
Best threshold for ROC = 0.392, accuracy for the best ROC threshold is then
0.645, accuracy = 0.676.
F1 score = 0.537, log loss = 11.199, recall = 0.456.

RF : AUROC = 0.655, AUPRC = 0.571, average precision = 0.480, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.618, accuracy = 0.636.
F1 score = 0.459, log loss = 12.560, recall = 0.375.

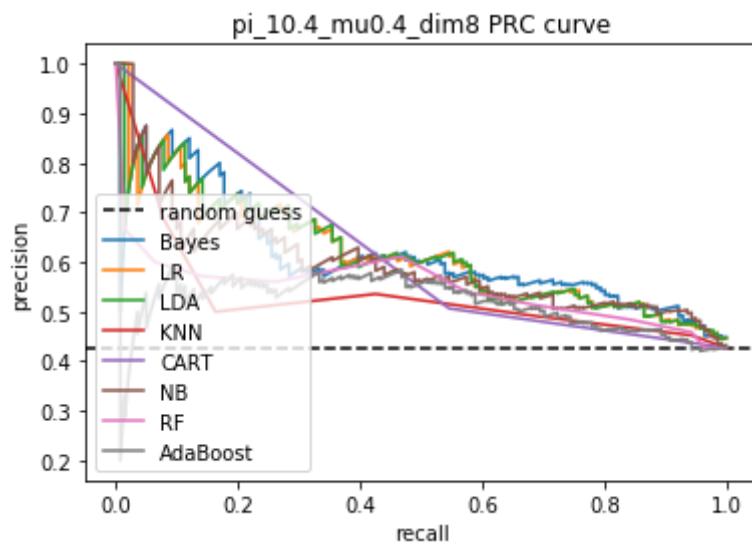
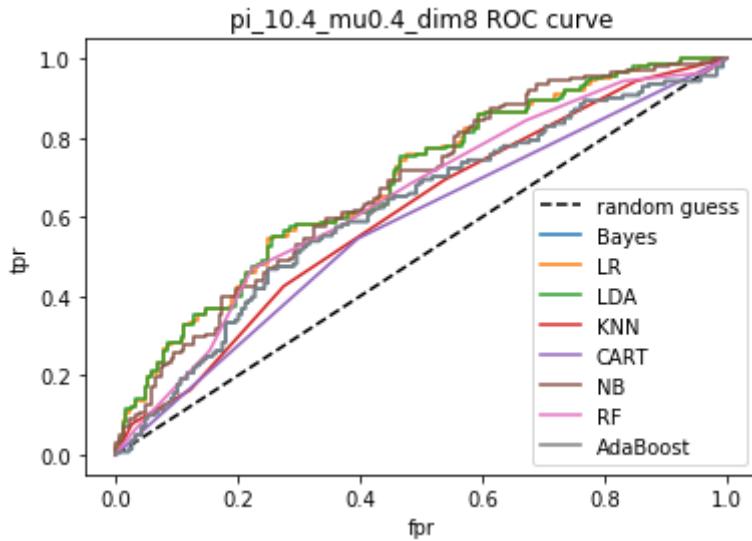
AdaBoost : AUROC = 0.635, AUPRC = 0.525, average precision = 0.451, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.606, accuracy = 0.597.
F1 score = 0.439, log loss = 13.920, recall = 0.382.

Bayes classifier has AUROC = 0.726, and AUPRC = 0.648.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is LDA
Positive ratio for pi_1 = 0.4 , mu = 0.4 , dim = 8 is 0.426 .
LR : AUROC = 0.687, AUPRC = 0.616, average precision = 0.509, .
Best threshold for ROC = 0.431, accuracy for the best ROC threshold is then
0.606, accuracy = 0.639.
F1 score = 0.533, log loss = 12.455, recall = 0.482.
-----
LDA : AUROC = 0.686, AUPRC = 0.615, average precision = 0.512, .
Best threshold for ROC = 0.433, accuracy for the best ROC threshold is then
0.612, accuracy = 0.642.
F1 score = 0.539, log loss = 12.350, recall = 0.489.
-----
KNN : AUROC = 0.606, AUPRC = 0.532, average precision = 0.473, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.597, accuracy = 0.597.
F1 score = 0.474, log loss = 13.920, recall = 0.426.
-----
CART : AUROC = 0.575, AUPRC = 0.623, average precision = 0.471, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.573, accuracy = 0.579.
F1 score = 0.526, log loss = 14.548, recall = 0.546.
-----
NB : AUROC = 0.676, AUPRC = 0.595, average precision = 0.502, .
Best threshold for ROC = 0.423, accuracy for the best ROC threshold is then
0.612, accuracy = 0.630.
F1 score = 0.531, log loss = 12.769, recall = 0.489.
-----
RF : AUROC = 0.644, AUPRC = 0.548, average precision = 0.513, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.645, accuracy = 0.645.
F1 score = 0.530, log loss = 12.246, recall = 0.468.
-----
AdaBoost : AUROC = 0.619, AUPRC = 0.518, average precision = 0.501, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.591, accuracy = 0.630.
F1 score = 0.520, log loss = 12.769, recall = 0.468.
-----
Bayes classifier has AUROC = 0.695, and AUPRC = 0.614.
```



The best model measured by AUROC is LR  
The best model measured by AUPRC is CART  
The best model measured by accuracy\_best\_threshold is RF  
The best model measured by accuracy is RF  
The best model measured by average\_precision is RF  
The best model measured by f1 is LDA  
The best model measured by log\_loss\_score is RF  
The best model measured by recall is CART  
Positive ratio for pi\_1 = 0.4 , mu = 0.4 , dim = 10 is 0.393 .  
LR : AUROC = 0.712, AUPRC = 0.638, average precision = 0.508, .  
Best threshold for ROC = 0.389, accuracy for the best ROC threshold is then 0.627, accuracy = 0.688.  
F1 score = 0.516, log loss = 10.780, recall = 0.423.

---

LDA : AUROC = 0.711, AUPRC = 0.638, average precision = 0.508, .  
Best threshold for ROC = 0.392, accuracy for the best ROC threshold is then 0.630, accuracy = 0.688.  
F1 score = 0.516, log loss = 10.780, recall = 0.423.

---

KNN : AUROC = 0.615, AUPRC = 0.464, average precision = 0.423, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then 0.591, accuracy = 0.591.  
F1 score = 0.410, log loss = 14.130, recall = 0.362.

```

CART : AUROC = 0.542, AUPRC = 0.549, average precision = 0.416, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.606, accuracy = 0.567.
F1 score = 0.435, log loss = 14.967, recall = 0.423.

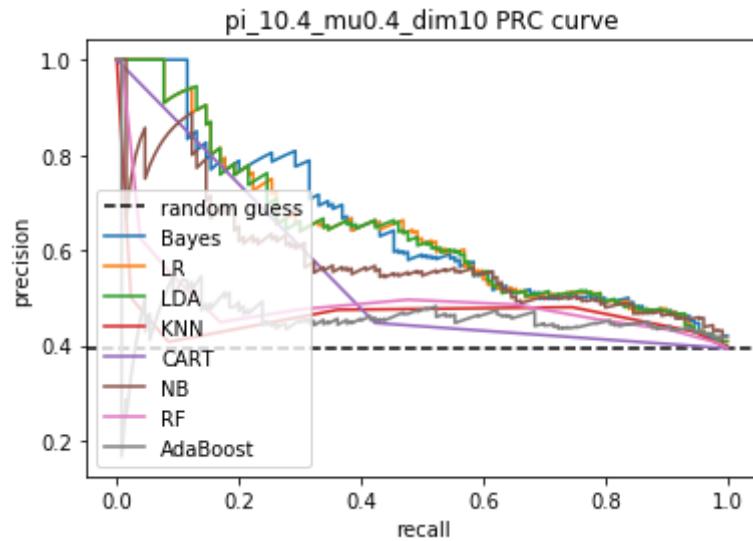
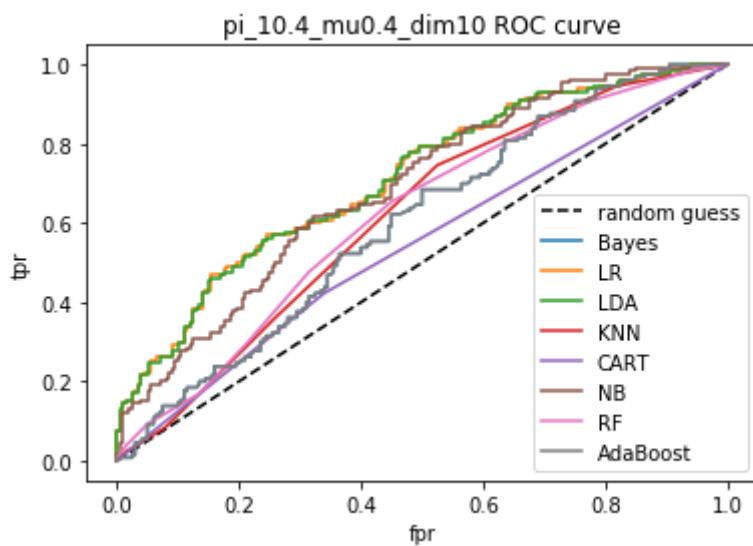
NB : AUROC = 0.688, AUPRC = 0.582, average precision = 0.458, .
Best threshold for ROC = 0.392, accuracy for the best ROC threshold is then
0.633, accuracy = 0.639.
F1 score = 0.452, log loss = 12.455, recall = 0.377.

RF : AUROC = 0.618, AUPRC = 0.490, average precision = 0.418, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.603, accuracy = 0.594.
F1 score = 0.368, log loss = 14.025, recall = 0.300.

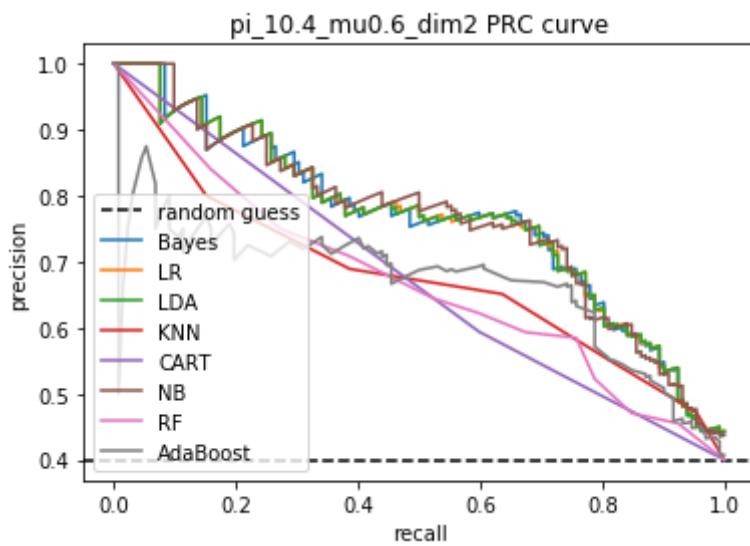
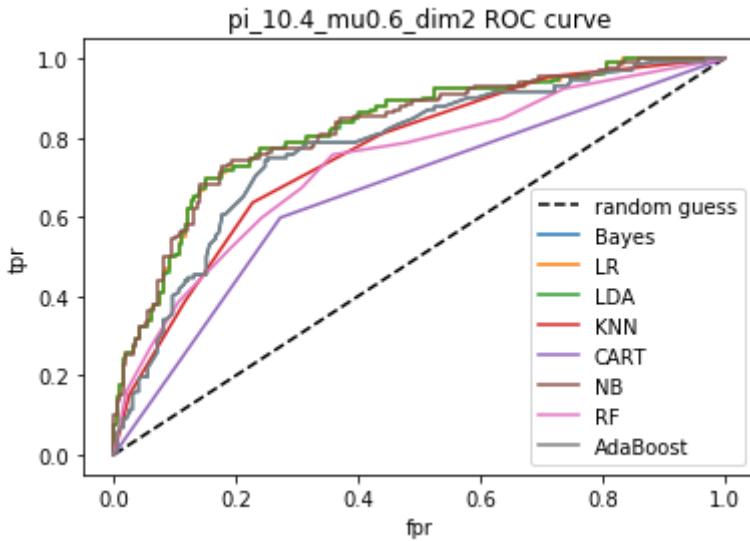
AdaBoost : AUROC = 0.601, AUPRC = 0.459, average precision = 0.413, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.561, accuracy = 0.570.
F1 score = 0.408, log loss = 14.862, recall = 0.377.

Bayes classifier has AUROC = 0.714, and AUPRC = 0.646.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.6 , dim = 2 is 0.399 .
LR : AUROC = 0.824, AUPRC = 0.764, average precision = 0.643, .
Best threshold for ROC = 0.437, accuracy for the best ROC threshold is then
0.764, accuracy = 0.785.
F1 score = 0.722, log loss = 7.431, recall = 0.697.
-----
LDA : AUROC = 0.824, AUPRC = 0.764, average precision = 0.643, .
Best threshold for ROC = 0.433, accuracy for the best ROC threshold is then
0.764, accuracy = 0.785.
F1 score = 0.719, log loss = 7.431, recall = 0.689.
-----
KNN : AUROC = 0.759, AUPRC = 0.677, average precision = 0.560, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.685, accuracy = 0.718.
F1 score = 0.644, log loss = 9.734, recall = 0.636.
-----
CART : AUROC = 0.663, AUPRC = 0.677, average precision = 0.516, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.600, accuracy = 0.676.
F1 score = 0.596, log loss = 11.199, recall = 0.598.
-----
NB : AUROC = 0.822, AUPRC = 0.764, average precision = 0.639, .
Best threshold for ROC = 0.427, accuracy for the best ROC threshold is then
0.758, accuracy = 0.782.
F1 score = 0.714, log loss = 7.536, recall = 0.682.
-----
RF : AUROC = 0.735, AUPRC = 0.669, average precision = 0.533, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.694, accuracy = 0.694.
F1 score = 0.610, log loss = 10.571, recall = 0.598.
-----
AdaBoost : AUROC = 0.775, AUPRC = 0.668, average precision = 0.577, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.745, accuracy = 0.733.
F1 score = 0.659, log loss = 9.210, recall = 0.644.
-----
Bayes classifier has AUROC = 0.823, and AUPRC = 0.764.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LDA
The best model measured by f1 is LR
The best model measured by log_loss_score is LDA
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.6 , dim = 4  is 0.403 .
LR : AUROC = 0.797, AUPRC = 0.703, average precision = 0.556, .
Best threshold for ROC = 0.389, accuracy for the best ROC threshold is then
0.727, accuracy = 0.715.
F1 score = 0.595, log loss = 9.838, recall = 0.519.

-----
LDA : AUROC = 0.797, AUPRC = 0.703, average precision = 0.556, .
Best threshold for ROC = 0.390, accuracy for the best ROC threshold is then
0.727, accuracy = 0.715.
F1 score = 0.595, log loss = 9.838, recall = 0.519.

-----
KNN : AUROC = 0.735, AUPRC = 0.639, average precision = 0.533, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.694, accuracy = 0.694.
F1 score = 0.588, log loss = 10.571, recall = 0.541.

```

```

CART : AUROC = 0.641, AUPRC = 0.659, average precision = 0.498, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.597, accuracy = 0.652.
F1 score = 0.576, log loss = 12.036, recall = 0.586.

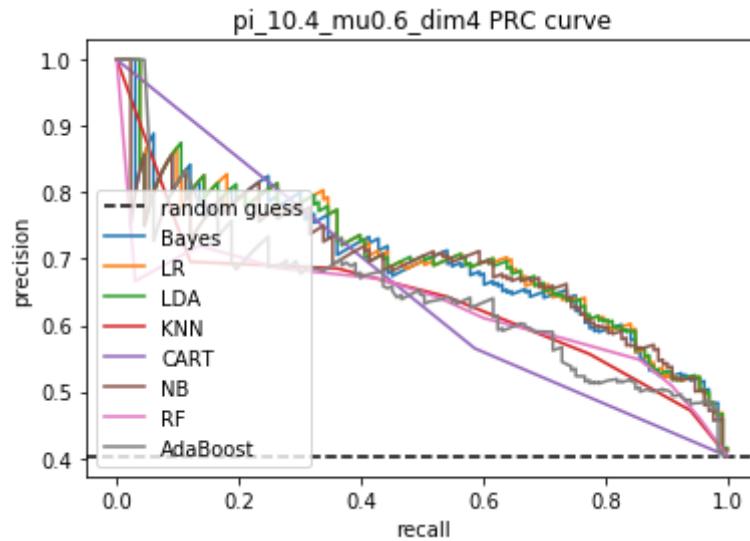
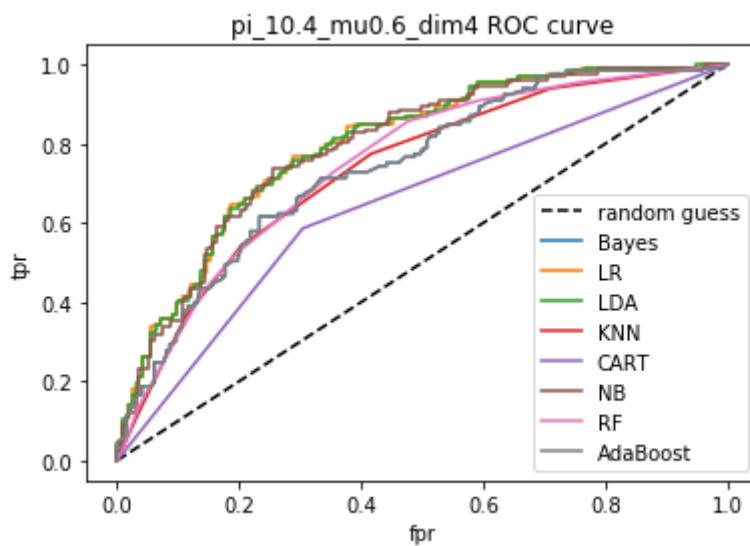
NB : AUROC = 0.793, AUPRC = 0.691, average precision = 0.563, .
Best threshold for ROC = 0.406, accuracy for the best ROC threshold is then
0.739, accuracy = 0.721.
F1 score = 0.613, log loss = 9.629, recall = 0.549.

RF : AUROC = 0.747, AUPRC = 0.629, average precision = 0.529, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.685, accuracy = 0.691.
F1 score = 0.579, log loss = 10.676, recall = 0.526.

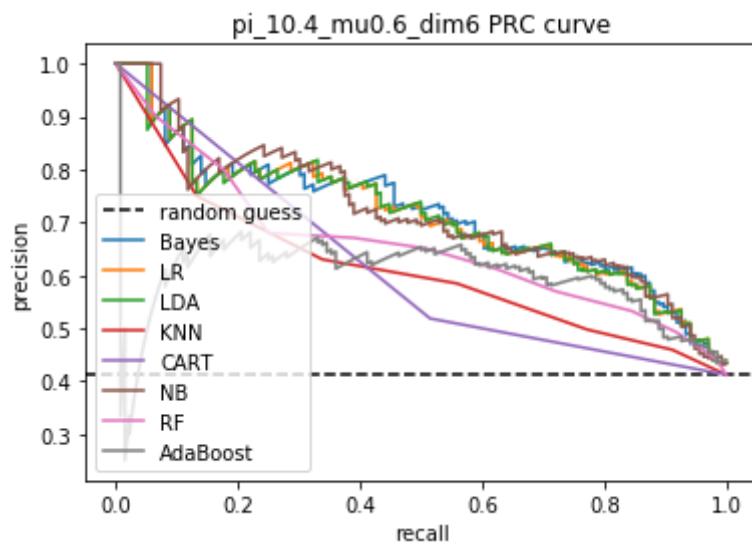
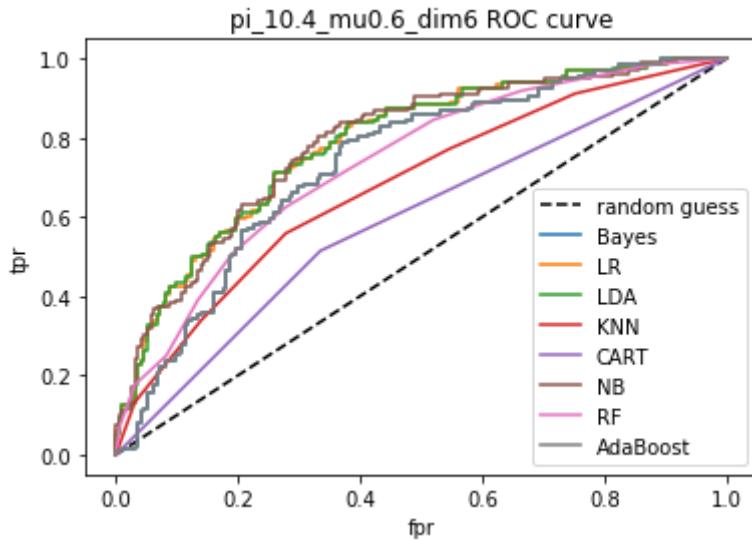
AdaBoost : AUROC = 0.742, AUPRC = 0.647, average precision = 0.546, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.685, accuracy = 0.703.
F1 score = 0.626, log loss = 10.257, recall = 0.617.

Bayes classifier has AUROC = 0.792, and AUPRC = 0.697.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is NB
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.4 , mu = 0.6 , dim = 6 is 0.411 .
LR : AUROC = 0.786, AUPRC = 0.712, average precision = 0.557, .
Best threshold for ROC = 0.440, accuracy for the best ROC threshold is then
0.718, accuracy = 0.703.
F1 score = 0.637, log loss = 10.257, recall = 0.632.
-----
LDA : AUROC = 0.786, AUPRC = 0.712, average precision = 0.557, .
Best threshold for ROC = 0.442, accuracy for the best ROC threshold is then
0.718, accuracy = 0.703.
F1 score = 0.637, log loss = 10.257, recall = 0.632.
-----
KNN : AUROC = 0.678, AUPRC = 0.613, average precision = 0.509, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.645, accuracy = 0.655.
F1 score = 0.571, log loss = 11.932, recall = 0.559.
-----
CART : AUROC = 0.590, AUPRC = 0.617, average precision = 0.467, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.588, accuracy = 0.603.
F1 score = 0.517, log loss = 13.711, recall = 0.515.
-----
NB : AUROC = 0.788, AUPRC = 0.717, average precision = 0.570, .
Best threshold for ROC = 0.445, accuracy for the best ROC threshold is then
0.718, accuracy = 0.715.
F1 score = 0.647, log loss = 9.838, recall = 0.632.
-----
RF : AUROC = 0.735, AUPRC = 0.658, average precision = 0.533, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.685, accuracy = 0.685.
F1 score = 0.570, log loss = 10.885, recall = 0.507.
-----
AdaBoost : AUROC = 0.737, AUPRC = 0.596, average precision = 0.535, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.685, accuracy = 0.682.
F1 score = 0.607, log loss = 10.990, recall = 0.596.
-----
Bayes classifier has AUROC = 0.790, and AUPRC = 0.716.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.6 , dim = 8 is 0.381 .
LR : AUROC = 0.844, AUPRC = 0.780, average precision = 0.582, .
Best threshold for ROC = 0.406, accuracy for the best ROC threshold is then
0.748, accuracy = 0.755.
F1 score = 0.669, log loss = 8.478, recall = 0.651.

-----
LDA : AUROC = 0.844, AUPRC = 0.776, average precision = 0.578, .
Best threshold for ROC = 0.414, accuracy for the best ROC threshold is then
0.742, accuracy = 0.752.
F1 score = 0.667, log loss = 8.582, recall = 0.651.

-----
KNN : AUROC = 0.706, AUPRC = 0.552, average precision = 0.497, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.645, accuracy = 0.682.
F1 score = 0.575, log loss = 10.990, recall = 0.563.

```

```

CART : AUROC = 0.635, AUPRC = 0.638, average precision = 0.472, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.618, accuracy = 0.648.
F1 score = 0.557, log loss = 12.141, recall = 0.579.

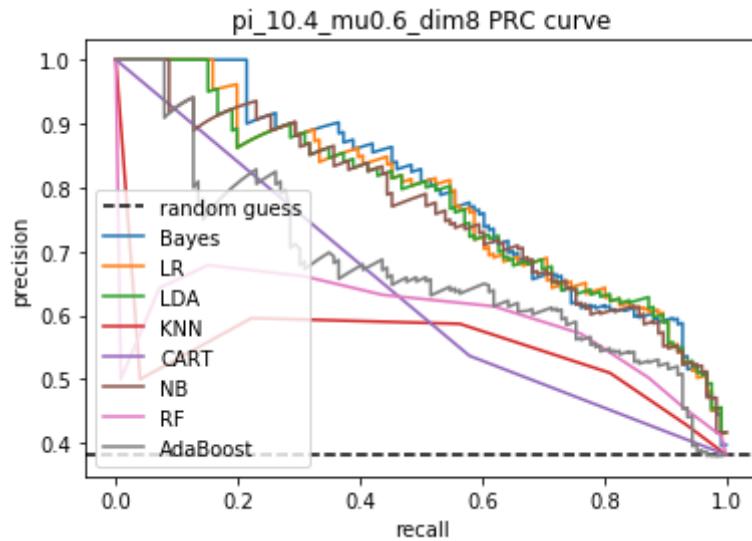
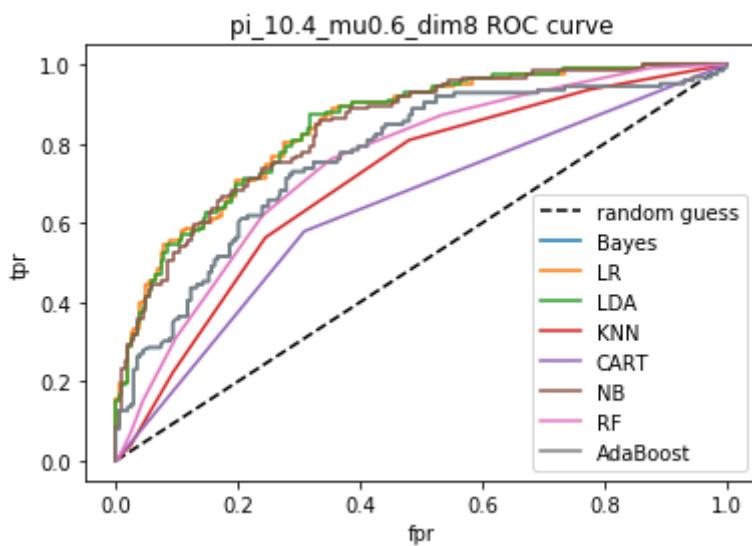
NB : AUROC = 0.837, AUPRC = 0.766, average precision = 0.586, .
Best threshold for ROC = 0.419, accuracy for the best ROC threshold is then
0.742, accuracy = 0.758.
F1 score = 0.677, log loss = 8.373, recall = 0.667.

RF : AUROC = 0.750, AUPRC = 0.599, average precision = 0.491, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.706, accuracy = 0.688.
F1 score = 0.516, log loss = 10.780, recall = 0.437.

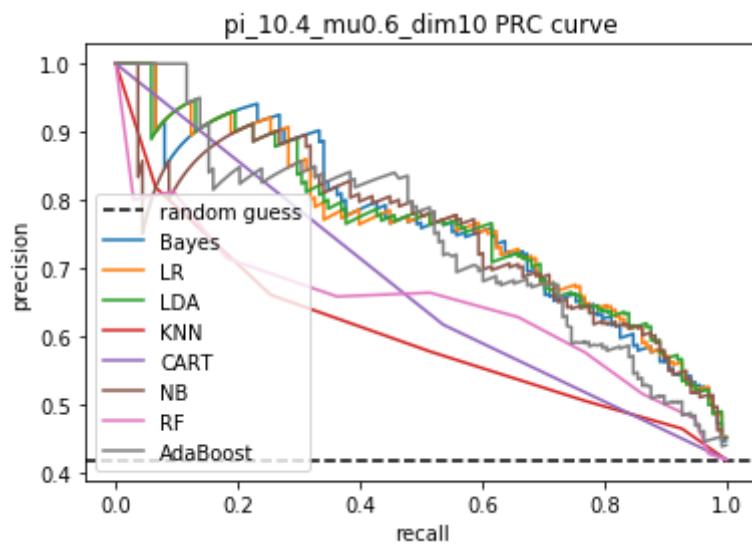
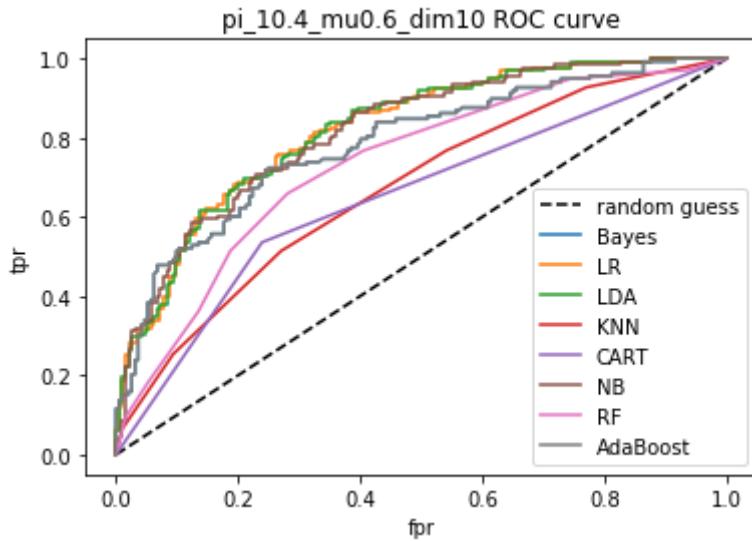
AdaBoost : AUROC = 0.766, AUPRC = 0.676, average precision = 0.527, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.718, accuracy = 0.712.
F1 score = 0.599, log loss = 9.943, recall = 0.563.

Bayes classifier has AUROC = 0.845, and AUPRC = 0.789.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.4 , mu = 0.6 , dim = 10  is 0.417 .
LR : AUROC = 0.821, AUPRC = 0.764, average precision = 0.619, .
Best threshold for ROC = 0.411, accuracy for the best ROC threshold is then
0.742, accuracy = 0.752.
F1 score = 0.687, log loss = 8.582, recall = 0.652.
-----
LDA : AUROC = 0.821, AUPRC = 0.763, average precision = 0.615, .
Best threshold for ROC = 0.418, accuracy for the best ROC threshold is then
0.730, accuracy = 0.748.
F1 score = 0.684, log loss = 8.687, recall = 0.652.
-----
KNN : AUROC = 0.670, AUPRC = 0.606, average precision = 0.500, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.633, accuracy = 0.639.
F1 score = 0.544, log loss = 12.455, recall = 0.514.
-----
CART : AUROC = 0.648, AUPRC = 0.673, average precision = 0.525, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.582, accuracy = 0.667.
F1 score = 0.574, log loss = 11.513, recall = 0.536.
-----
NB : AUROC = 0.817, AUPRC = 0.752, average precision = 0.597, .
Best threshold for ROC = 0.416, accuracy for the best ROC threshold is then
0.724, accuracy = 0.733.
F1 score = 0.664, log loss = 9.210, recall = 0.630.
-----
RF : AUROC = 0.733, AUPRC = 0.646, average precision = 0.544, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.688, accuracy = 0.688.
F1 score = 0.580, log loss = 10.780, recall = 0.514.
-----
AdaBoost : AUROC = 0.785, AUPRC = 0.744, average precision = 0.586, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.727, accuracy = 0.724.
F1 score = 0.654, log loss = 9.524, recall = 0.623.
-----
Bayes classifier has AUROC = 0.818, and AUPRC = 0.765.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.8 , dim = 2  is 0.387 .
LR : AUROC = 0.877, AUPRC = 0.825, average precision = 0.647, .
Best threshold for ROC = 0.399, accuracy for the best ROC threshold is then
0.782, accuracy = 0.797.
F1 score = 0.737, log loss = 7.012, recall = 0.734.

-----
LDA : AUROC = 0.877, AUPRC = 0.826, average precision = 0.647, .
Best threshold for ROC = 0.403, accuracy for the best ROC threshold is then
0.779, accuracy = 0.797.
F1 score = 0.737, log loss = 7.012, recall = 0.734.

-----
KNN : AUROC = 0.845, AUPRC = 0.815, average precision = 0.634, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.785, accuracy = 0.788.
F1 score = 0.727, log loss = 7.326, recall = 0.727.

```

```

CART : AUROC = 0.743, AUPRC = 0.745, average precision = 0.587, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.612, accuracy = 0.752.
F1 score = 0.687, log loss = 8.582, recall = 0.703.

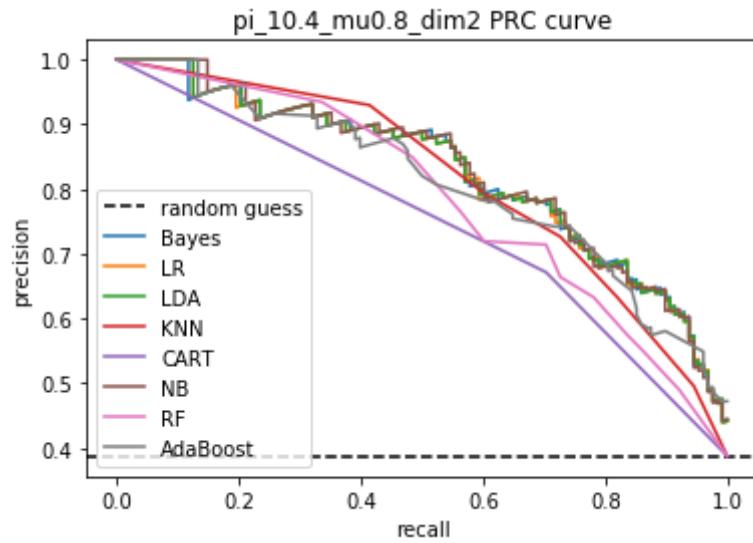
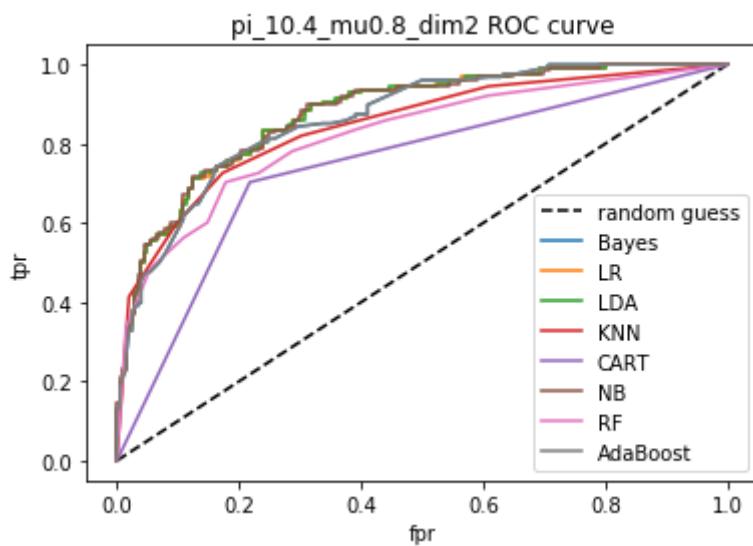
NB : AUROC = 0.877, AUPRC = 0.828, average precision = 0.651, .
Best threshold for ROC = 0.387, accuracy for the best ROC threshold is then
0.776, accuracy = 0.800.
F1 score = 0.740, log loss = 6.908, recall = 0.734.

RF : AUROC = 0.821, AUPRC = 0.787, average precision = 0.617, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.776, accuracy = 0.776.
F1 score = 0.709, log loss = 7.745, recall = 0.703.

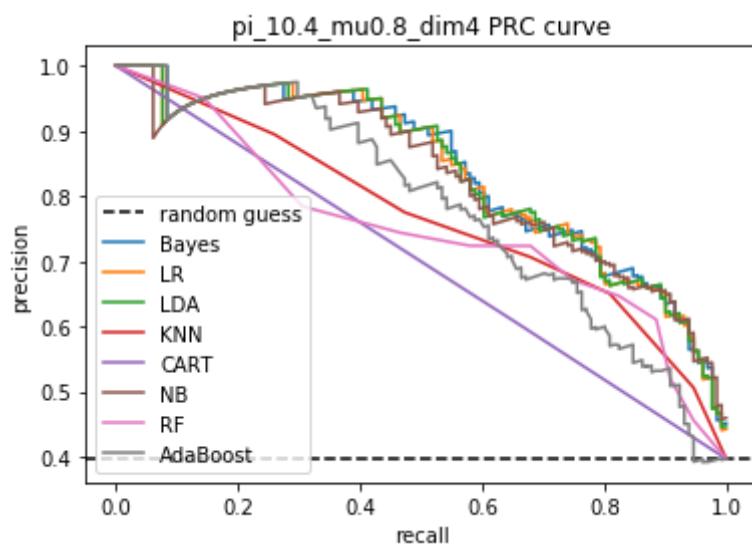
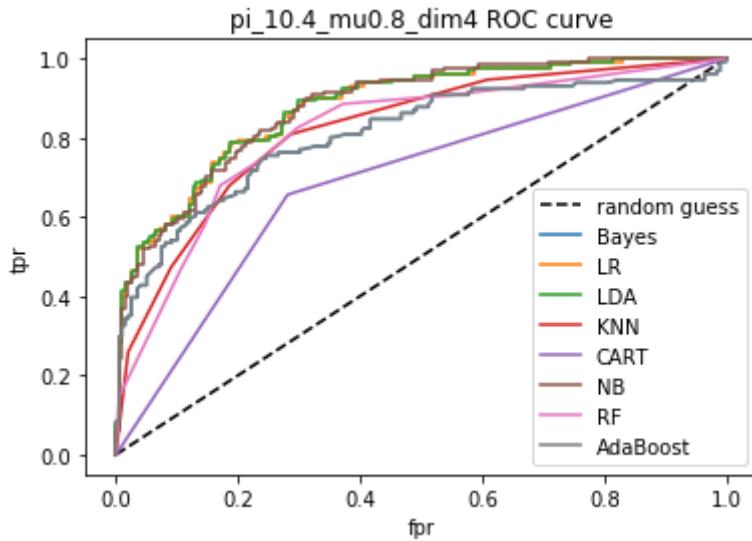
AdaBoost : AUROC = 0.865, AUPRC = 0.810, average precision = 0.651, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.800, accuracy = 0.800.
F1 score = 0.740, log loss = 6.908, recall = 0.734.

Bayes classifier has AUROC = 0.877, and AUPRC = 0.826.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is AdaBoost
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.8 , dim = 4 is 0.397 .
LR : AUROC = 0.878, AUPRC = 0.836, average precision = 0.664, .
Best threshold for ROC = 0.434, accuracy for the best ROC threshold is then
0.794, accuracy = 0.803.
F1 score = 0.749, log loss = 6.803, recall = 0.740.
-----
LDA : AUROC = 0.878, AUPRC = 0.836, average precision = 0.652, .
Best threshold for ROC = 0.426, accuracy for the best ROC threshold is then
0.788, accuracy = 0.794.
F1 score = 0.736, log loss = 7.117, recall = 0.725.
-----
KNN : AUROC = 0.822, AUPRC = 0.769, average precision = 0.607, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.761, accuracy = 0.761.
F1 score = 0.693, log loss = 8.268, recall = 0.679.
-----
CART : AUROC = 0.688, AUPRC = 0.699, average precision = 0.534, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.603, accuracy = 0.694.
F1 score = 0.630, log loss = 10.571, recall = 0.656.
-----
NB : AUROC = 0.878, AUPRC = 0.829, average precision = 0.648, .
Best threshold for ROC = 0.434, accuracy for the best ROC threshold is then
0.785, accuracy = 0.791.
F1 score = 0.727, log loss = 7.222, recall = 0.702.
-----
RF : AUROC = 0.815, AUPRC = 0.750, average precision = 0.619, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.770, accuracy = 0.770.
F1 score = 0.701, log loss = 7.954, recall = 0.679.
-----
AdaBoost : AUROC = 0.809, AUPRC = 0.782, average precision = 0.585, .
Best threshold for ROC = 0.498, accuracy for the best ROC threshold is then
0.752, accuracy = 0.742.
F1 score = 0.677, log loss = 8.896, recall = 0.679.
-----
Bayes classifier has AUROC = 0.880, and AUPRC = 0.839.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.8 , dim = 6 is 0.42 .
LR : AUROC = 0.880, AUPRC = 0.850, average precision = 0.697, .
Best threshold for ROC = 0.485, accuracy for the best ROC threshold is then
0.809, accuracy = 0.812.
F1 score = 0.780, log loss = 6.489, recall = 0.791.

-----
LDA : AUROC = 0.880, AUPRC = 0.849, average precision = 0.701, .
Best threshold for ROC = 0.482, accuracy for the best ROC threshold is then
0.803, accuracy = 0.815.
F1 score = 0.783, log loss = 6.385, recall = 0.791.

-----
KNN : AUROC = 0.803, AUPRC = 0.731, average precision = 0.642, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.736, accuracy = 0.770.
F1 score = 0.741, log loss = 7.954, recall = 0.784.

```

```

CART : AUROC = 0.695, AUPRC = 0.722, average precision = 0.565, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.579, accuracy = 0.700.
F1 score = 0.650, log loss = 10.362, recall = 0.662.

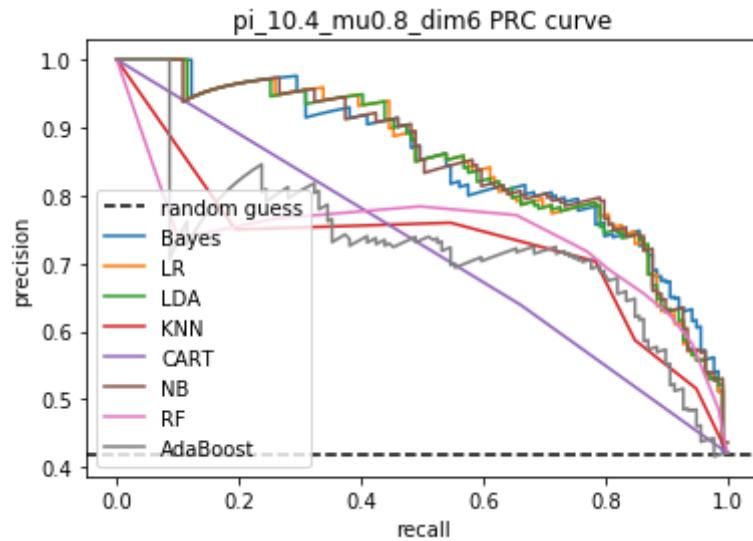
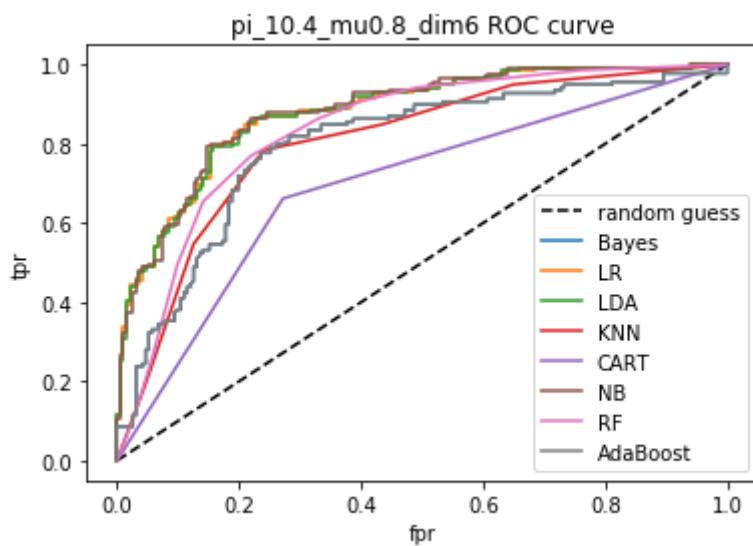
NB : AUROC = 0.883, AUPRC = 0.850, average precision = 0.700, .
Best threshold for ROC = 0.478, accuracy for the best ROC threshold is then
0.809, accuracy = 0.815.
F1 score = 0.786, log loss = 6.385, recall = 0.806.

RF : AUROC = 0.836, AUPRC = 0.742, average precision = 0.650, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.773, accuracy = 0.776.
F1 score = 0.743, log loss = 7.745, recall = 0.770.

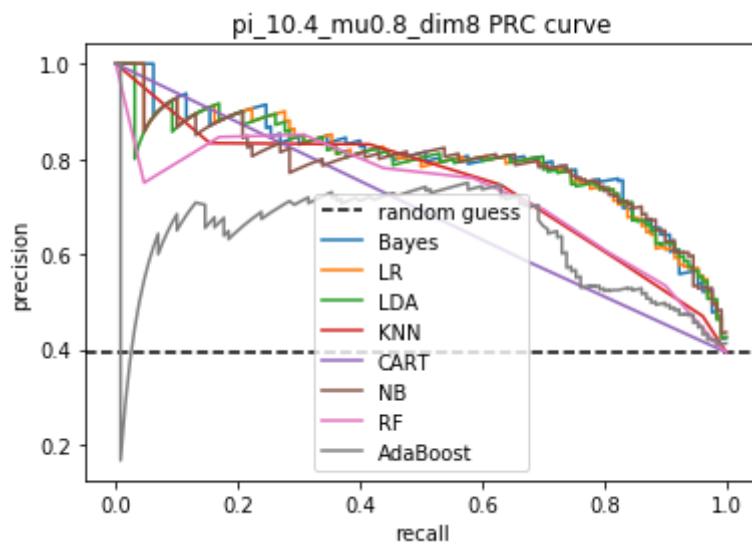
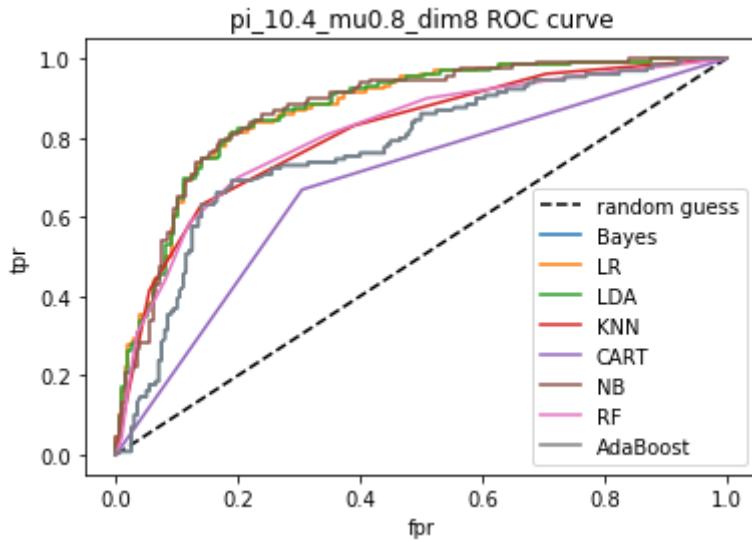
AdaBoost : AUROC = 0.798, AUPRC = 0.729, average precision = 0.635, .
Best threshold for ROC = 0.502, accuracy for the best ROC threshold is then
0.767, accuracy = 0.764.
F1 score = 0.740, log loss = 8.164, recall = 0.799.

Bayes classifier has AUROC = 0.885, and AUPRC = 0.850.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is NB
The best model measured by log_loss_score is LDA
The best model measured by recall is NB
Positive ratio for pi_1 = 0.4 , mu = 0.8 , dim = 8 is 0.393 .
LR : AUROC = 0.870, AUPRC = 0.794, average precision = 0.667, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.812, accuracy = 0.806.
F1 score = 0.740, log loss = 6.698, recall = 0.700.
-----
LDA : AUROC = 0.871, AUPRC = 0.791, average precision = 0.667, .
Best threshold for ROC = 0.403, accuracy for the best ROC threshold is then
0.812, accuracy = 0.806.
F1 score = 0.740, log loss = 6.698, recall = 0.700.
-----
KNN : AUROC = 0.810, AUPRC = 0.746, average precision = 0.616, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.770, accuracy = 0.770.
F1 score = 0.683, log loss = 7.954, recall = 0.631.
-----
CART : AUROC = 0.682, AUPRC = 0.694, average precision = 0.524, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.606, accuracy = 0.685.
F1 score = 0.626, log loss = 10.885, recall = 0.669.
-----
NB : AUROC = 0.872, AUPRC = 0.787, average precision = 0.673, .
Best threshold for ROC = 0.374, accuracy for the best ROC threshold is then
0.806, accuracy = 0.809.
F1 score = 0.741, log loss = 6.594, recall = 0.692.
-----
RF : AUROC = 0.811, AUPRC = 0.728, average precision = 0.608, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.764, accuracy = 0.764.
F1 score = 0.661, log loss = 8.164, recall = 0.585.
-----
AdaBoost : AUROC = 0.772, AUPRC = 0.637, average precision = 0.611, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.727, accuracy = 0.767.
F1 score = 0.691, log loss = 8.059, recall = 0.662.
-----
Bayes classifier has AUROC = 0.873, and AUPRC = 0.800.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 0.8 , dim = 10  is 0.399 .
LR : AUROC = 0.895, AUPRC = 0.836, average precision = 0.668, .
Best threshold for ROC = 0.384, accuracy for the best ROC threshold is then
0.803, accuracy = 0.803.
F1 score = 0.747, log loss = 6.803, recall = 0.727.

-----
LDA : AUROC = 0.895, AUPRC = 0.839, average precision = 0.672, .
Best threshold for ROC = 0.407, accuracy for the best ROC threshold is then
0.806, accuracy = 0.806.
F1 score = 0.752, log loss = 6.698, recall = 0.735.

-----
KNN : AUROC = 0.824, AUPRC = 0.777, average precision = 0.618, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.745, accuracy = 0.767.
F1 score = 0.693, log loss = 8.059, recall = 0.659.

```

CART : AUROC = 0.751, AUPRC = 0.760, average precision = 0.605, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.600, accuracy = 0.755.  
F1 score = 0.705, log loss = 8.478, recall = 0.735.

---

NB : AUROC = 0.890, AUPRC = 0.832, average precision = 0.646, .  
Best threshold for ROC = 0.438, accuracy for the best ROC threshold is then  
0.797, accuracy = 0.788.  
F1 score = 0.731, log loss = 7.326, recall = 0.720.

---

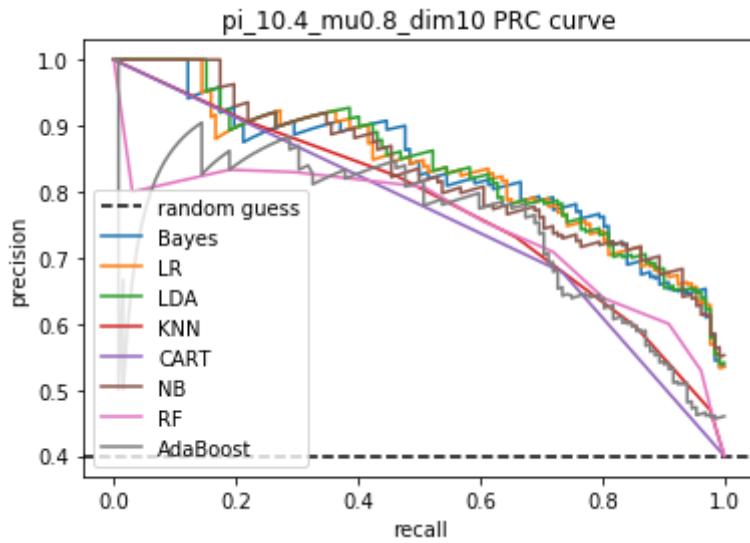
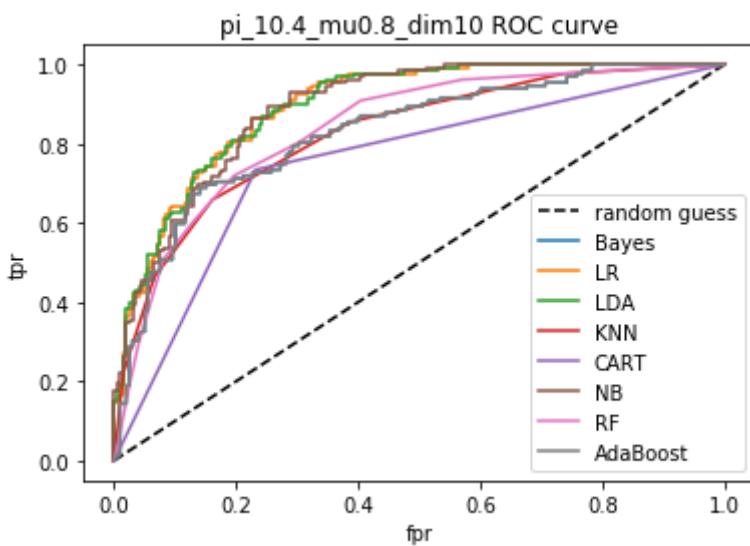
RF : AUROC = 0.838, AUPRC = 0.748, average precision = 0.615, .  
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then  
0.764, accuracy = 0.764.  
F1 score = 0.672, log loss = 8.164, recall = 0.606.

---

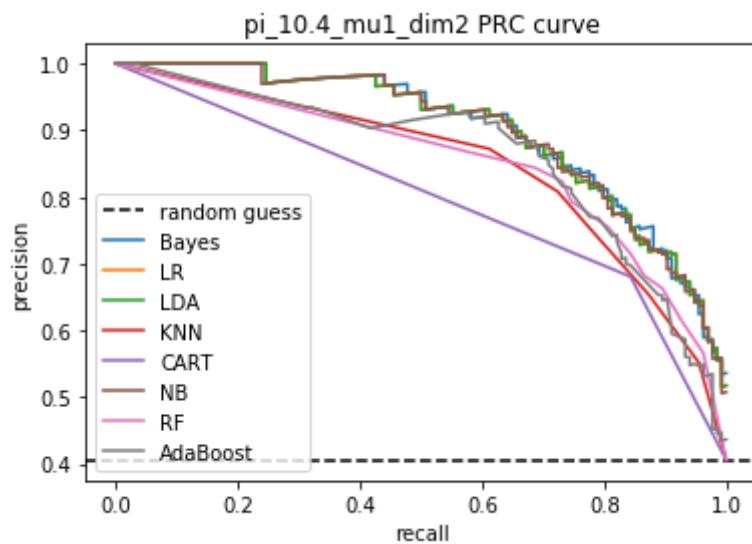
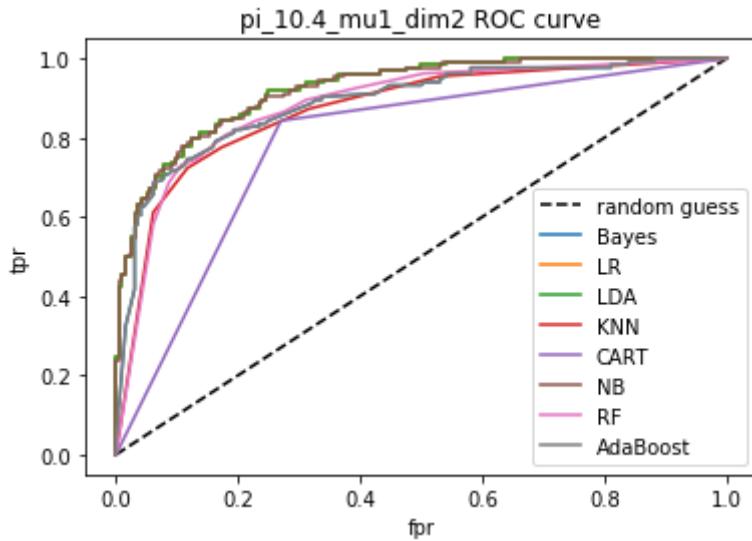
AdaBoost : AUROC = 0.829, AUPRC = 0.745, average precision = 0.648, .  
Best threshold for ROC = 0.495, accuracy for the best ROC threshold is then  
0.733, accuracy = 0.788.  
F1 score = 0.718, log loss = 7.326, recall = 0.674.

---

Bayes classifier has AUROC = 0.895, and AUPRC = 0.836.



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LDA
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is LDA
Positive ratio for pi_1 = 0.4 , mu = 1 , dim = 2 is 0.405 .
LR : AUROC = 0.923, AUPRC = 0.899, average precision = 0.705, .
Best threshold for ROC = 0.469, accuracy for the best ROC threshold is then
0.833, accuracy = 0.827.
F1 score = 0.793, log loss = 5.966, recall = 0.813.
-----
LDA : AUROC = 0.923, AUPRC = 0.899, average precision = 0.714, .
Best threshold for ROC = 0.453, accuracy for the best ROC threshold is then
0.833, accuracy = 0.833.
F1 score = 0.799, log loss = 5.757, recall = 0.813.
-----
KNN : AUROC = 0.871, AUPRC = 0.847, average precision = 0.676, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.818, accuracy = 0.806.
F1 score = 0.765, log loss = 6.699, recall = 0.776.
-----
CART : AUROC = 0.786, AUPRC = 0.794, average precision = 0.638, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.594, accuracy = 0.776.
F1 score = 0.753, log loss = 7.745, recall = 0.843.
-----
NB : AUROC = 0.922, AUPRC = 0.898, average precision = 0.714, .
Best threshold for ROC = 0.459, accuracy for the best ROC threshold is then
0.833, accuracy = 0.833.
F1 score = 0.799, log loss = 5.757, recall = 0.813.
-----
RF : AUROC = 0.882, AUPRC = 0.851, average precision = 0.687, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.818, accuracy = 0.815.
F1 score = 0.780, log loss = 6.385, recall = 0.806.
-----
AdaBoost : AUROC = 0.889, AUPRC = 0.860, average precision = 0.689, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.818, accuracy = 0.815.
F1 score = 0.773, log loss = 6.385, recall = 0.776.
-----
Bayes classifier has AUROC = 0.924, and AUPRC = 0.900.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is CART
Positive ratio for pi_1 = 0.4 , mu = 1 , dim = 4  is 0.386 .
LR : AUROC = 0.911, AUPRC = 0.877, average precision = 0.697, .
Best threshold for ROC = 0.327, accuracy for the best ROC threshold is then
0.833, accuracy = 0.830.
F1 score = 0.765, log loss = 5.861, recall = 0.717.

-----
LDA : AUROC = 0.911, AUPRC = 0.877, average precision = 0.697, .
Best threshold for ROC = 0.305, accuracy for the best ROC threshold is then
0.830, accuracy = 0.830.
F1 score = 0.765, log loss = 5.861, recall = 0.717.

-----
KNN : AUROC = 0.875, AUPRC = 0.831, average precision = 0.660, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.806, accuracy = 0.806.
F1 score = 0.722, log loss = 6.698, recall = 0.654.

```

CART : AUROC = 0.743, AUPRC = 0.745, average precision = 0.590, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.615, accuracy = 0.758.  
F1 score = 0.683, log loss = 8.373, recall = 0.677.

---

NB : AUROC = 0.908, AUPRC = 0.872, average precision = 0.697, .  
Best threshold for ROC = 0.325, accuracy for the best ROC threshold is then  
0.818, accuracy = 0.830.  
F1 score = 0.763, log loss = 5.861, recall = 0.709.

---

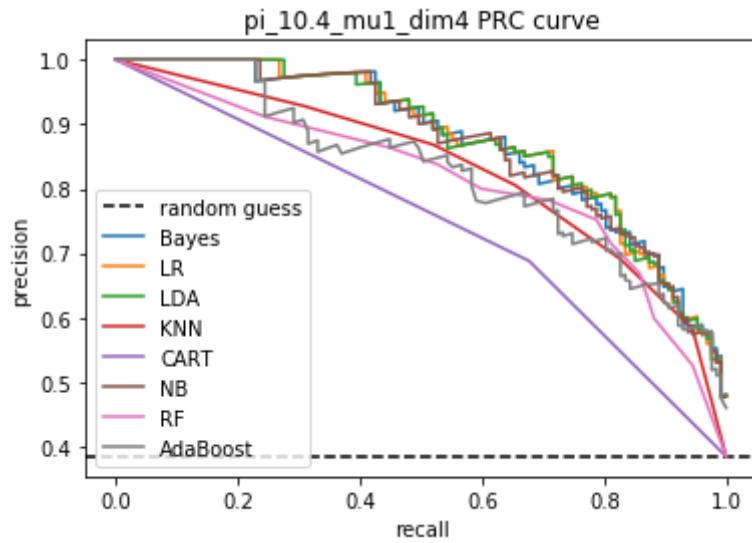
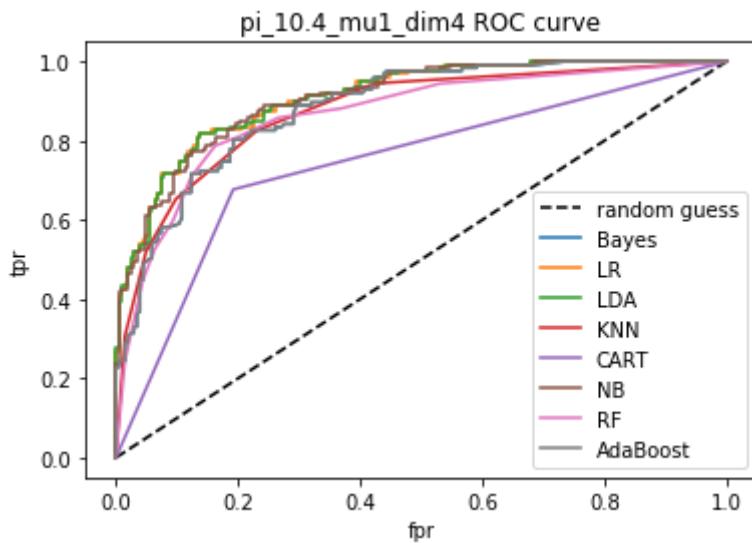
RF : AUROC = 0.866, AUPRC = 0.813, average precision = 0.667, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then  
0.818, accuracy = 0.812.  
F1 score = 0.744, log loss = 6.489, recall = 0.709.

---

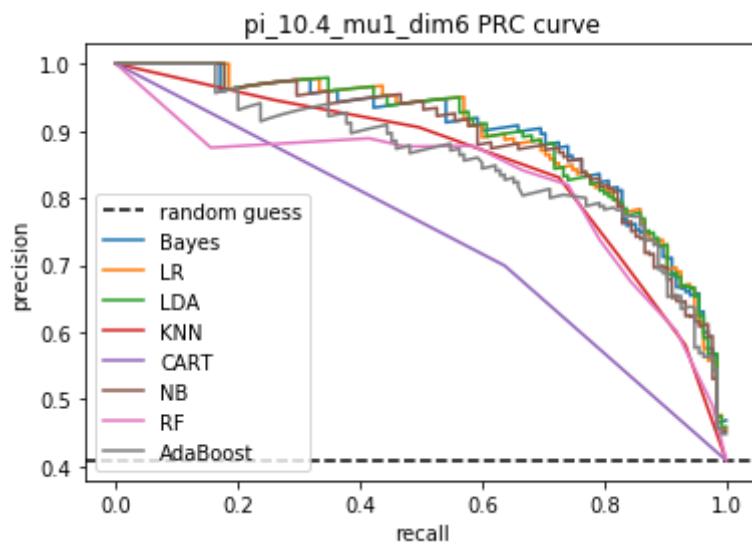
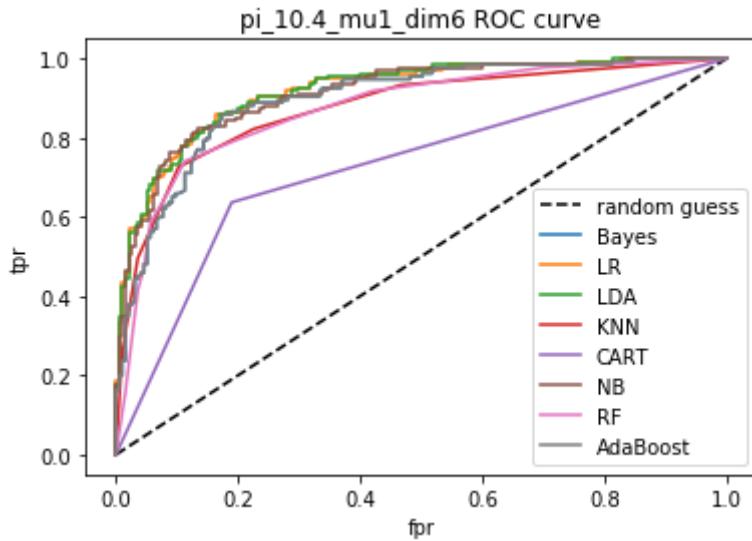
AdaBoost : AUROC = 0.884, AUPRC = 0.827, average precision = 0.657, .  
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then  
0.803, accuracy = 0.806.  
F1 score = 0.742, log loss = 6.698, recall = 0.724.

---

Bayes classifier has AUROC = 0.910, and AUPRC = 0.874.



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is NB
The best model measured by f1 is LR
The best model measured by log_loss_score is NB
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.4 , mu = 1 , dim = 6 is 0.409 .
LR : AUROC = 0.918, AUPRC = 0.894, average precision = 0.730, .
Best threshold for ROC = 0.337, accuracy for the best ROC threshold is then
0.836, accuracy = 0.833.
F1 score = 0.774, log loss = 5.756, recall = 0.696.
-----
LDA : AUROC = 0.919, AUPRC = 0.894, average precision = 0.743, .
Best threshold for ROC = 0.351, accuracy for the best ROC threshold is then
0.836, accuracy = 0.842.
F1 score = 0.789, log loss = 5.443, recall = 0.719.
-----
KNN : AUROC = 0.874, AUPRC = 0.850, average precision = 0.715, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.827, accuracy = 0.827.
F1 score = 0.775, log loss = 5.966, recall = 0.726.
-----
CART : AUROC = 0.724, AUPRC = 0.742, average precision = 0.594, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.591, accuracy = 0.739.
F1 score = 0.667, log loss = 9.001, recall = 0.637.
-----
NB : AUROC = 0.912, AUPRC = 0.886, average precision = 0.743, .
Best threshold for ROC = 0.320, accuracy for the best ROC threshold is then
0.827, accuracy = 0.842.
F1 score = 0.789, log loss = 5.443, recall = 0.719.
-----
RF : AUROC = 0.872, AUPRC = 0.822, average precision = 0.697, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.827, accuracy = 0.812.
F1 score = 0.744, log loss = 6.489, recall = 0.667.
-----
AdaBoost : AUROC = 0.897, AUPRC = 0.857, average precision = 0.687, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.833, accuracy = 0.809.
F1 score = 0.753, log loss = 6.594, recall = 0.711.
-----
Bayes classifier has AUROC = 0.919, and AUPRC = 0.893.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is NB
The best model measured by recall is KNN
Positive ratio for pi_1 = 0.4 , mu = 1 , dim = 8  is 0.379 .
LR : AUROC = 0.912, AUPRC = 0.881, average precision = 0.699, .
Best threshold for ROC = 0.331, accuracy for the best ROC threshold is then
0.824, accuracy = 0.836.
F1 score = 0.775, log loss = 5.652, recall = 0.744.

-----
LDA : AUROC = 0.910, AUPRC = 0.877, average precision = 0.689, .
Best threshold for ROC = 0.319, accuracy for the best ROC threshold is then
0.818, accuracy = 0.830.
F1 score = 0.767, log loss = 5.861, recall = 0.736.

-----
KNN : AUROC = 0.862, AUPRC = 0.836, average precision = 0.695, .
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then
0.833, accuracy = 0.833.
F1 score = 0.768, log loss = 5.757, recall = 0.728.

```

CART : AUROC = 0.755, AUPRC = 0.754, average precision = 0.600, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.621, accuracy = 0.770.  
F1 score = 0.696, log loss = 7.954, recall = 0.696.

---

NB : AUROC = 0.912, AUPRC = 0.877, average precision = 0.684, .  
Best threshold for ROC = 0.321, accuracy for the best ROC threshold is then  
0.815, accuracy = 0.827.  
F1 score = 0.763, log loss = 5.966, recall = 0.736.

---

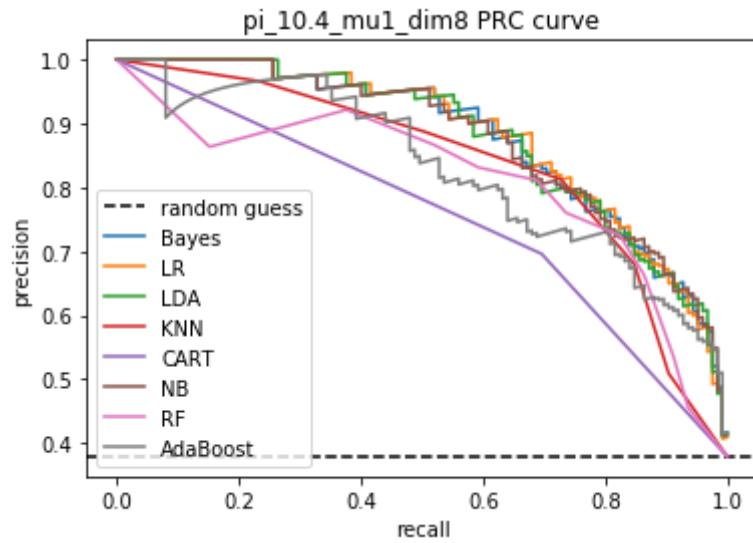
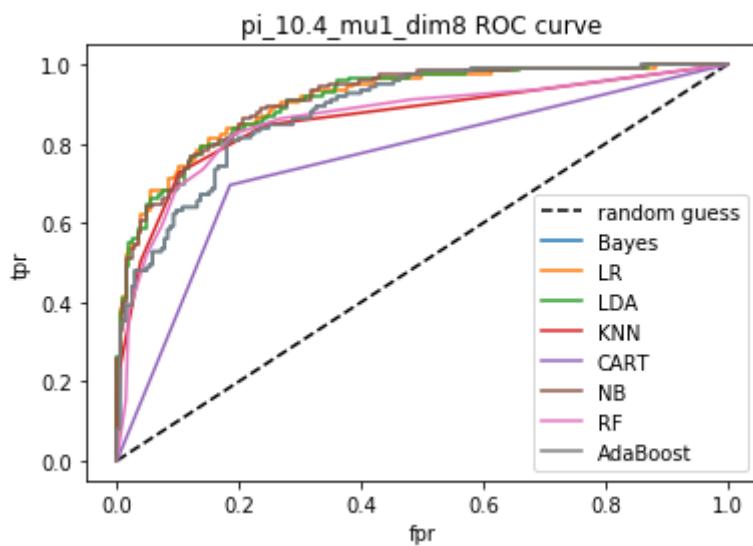
RF : AUROC = 0.862, AUPRC = 0.808, average precision = 0.676, .  
Best threshold for ROC = 0.400, accuracy for the best ROC threshold is then  
0.812, accuracy = 0.821.  
F1 score = 0.745, log loss = 6.175, recall = 0.688.

---

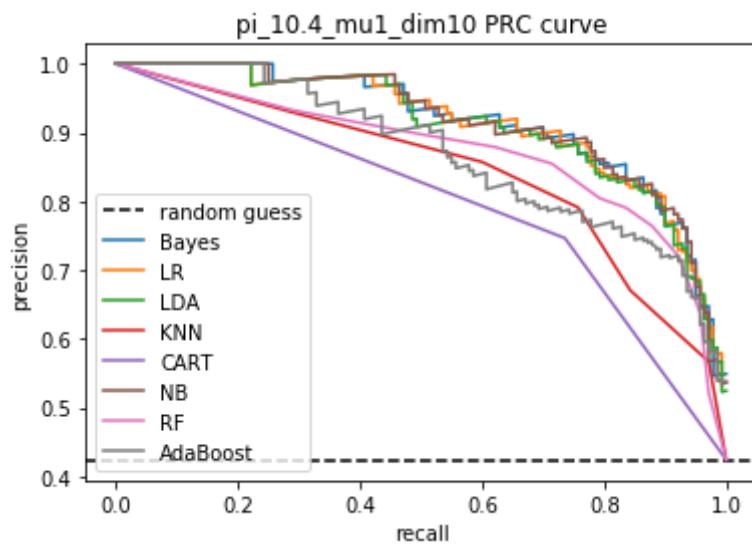
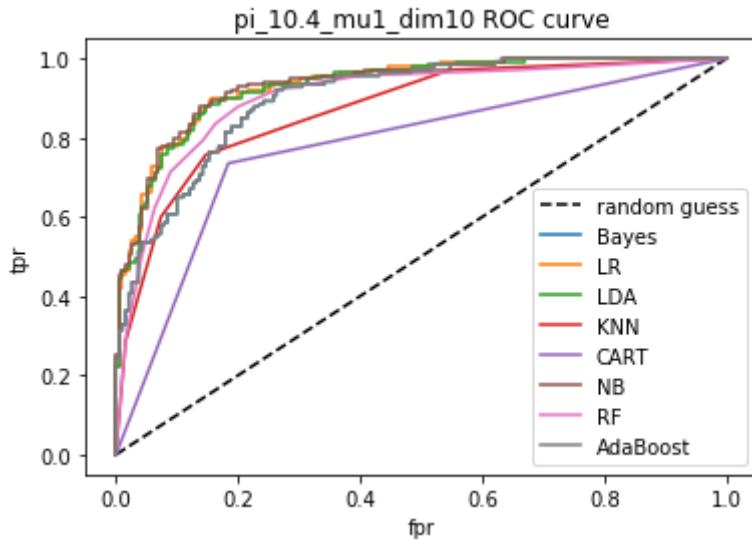
AdaBoost : AUROC = 0.884, AUPRC = 0.828, average precision = 0.629, .  
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then  
0.812, accuracy = 0.791.  
F1 score = 0.721, log loss = 7.222, recall = 0.712.

---

Bayes classifier has AUROC = 0.912, and AUPRC = 0.878.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is LR
The best model measured by accuracy_best_threshold is KNN
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.4 , mu = 1 , dim = 10  is 0.423 .
LR : AUROC = 0.933, AUPRC = 0.913, average precision = 0.761, .
Best threshold for ROC = 0.431, accuracy for the best ROC threshold is then
0.864, accuracy = 0.855.
F1 score = 0.826, log loss = 5.024, recall = 0.814.
-----
LDA : AUROC = 0.931, AUPRC = 0.910, average precision = 0.756, .
Best threshold for ROC = 0.417, accuracy for the best ROC threshold is then
0.861, accuracy = 0.852.
F1 score = 0.823, log loss = 5.129, recall = 0.814.
-----
KNN : AUROC = 0.870, AUPRC = 0.842, average precision = 0.702, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.788, accuracy = 0.812.
F1 score = 0.774, log loss = 6.489, recall = 0.757.
-----
CART : AUROC = 0.776, AUPRC = 0.797, average precision = 0.661, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.576, accuracy = 0.782.
F1 score = 0.741, log loss = 7.536, recall = 0.736.
-----
NB : AUROC = 0.934, AUPRC = 0.916, average precision = 0.766, .
Best threshold for ROC = 0.436, accuracy for the best ROC threshold is then
0.864, accuracy = 0.858.
F1 score = 0.829, log loss = 4.919, recall = 0.814.
-----
RF : AUROC = 0.902, AUPRC = 0.871, average precision = 0.726, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.830, accuracy = 0.830.
F1 score = 0.799, log loss = 5.861, recall = 0.793.
-----
AdaBoost : AUROC = 0.901, AUPRC = 0.870, average precision = 0.694, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.815, accuracy = 0.806.
F1 score = 0.766, log loss = 6.698, recall = 0.750.
-----
Bayes classifier has AUROC = 0.934, and AUPRC = 0.915.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.2 , dim = 2  is 0.483 .
LR : AUROC = 0.677, AUPRC = 0.628, average precision = 0.551, .
Best threshold for ROC = 0.468, accuracy for the best ROC threshold is then
0.621, accuracy = 0.612.
F1 score = 0.556, log loss = 13.397, recall = 0.503.

-----
LDA : AUROC = 0.677, AUPRC = 0.628, average precision = 0.551, .
Best threshold for ROC = 0.468, accuracy for the best ROC threshold is then
0.621, accuracy = 0.612.
F1 score = 0.556, log loss = 13.397, recall = 0.503.

-----
KNN : AUROC = 0.566, AUPRC = 0.520, average precision = 0.511, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.533, accuracy = 0.555.
F1 score = 0.521, log loss = 15.386, recall = 0.503.

```

```

CART : AUROC = 0.539, AUPRC = 0.636, average precision = 0.503, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.518, accuracy = 0.539.
F1 score = 0.519, log loss = 15.909, recall = 0.516.

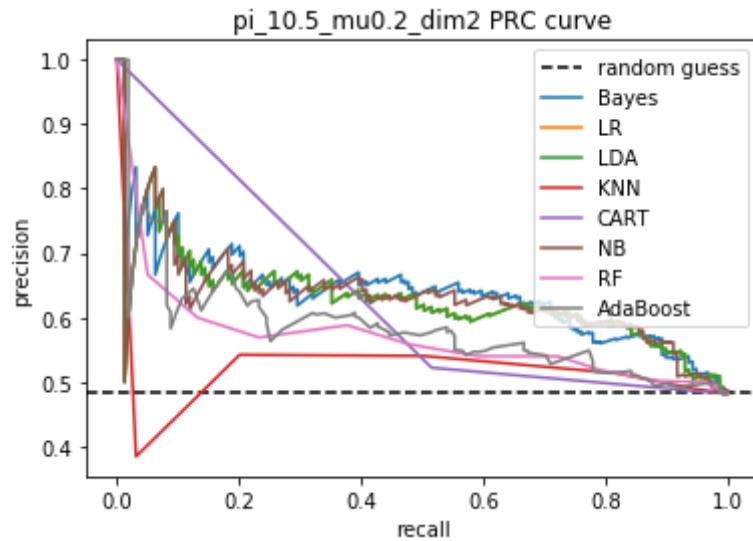
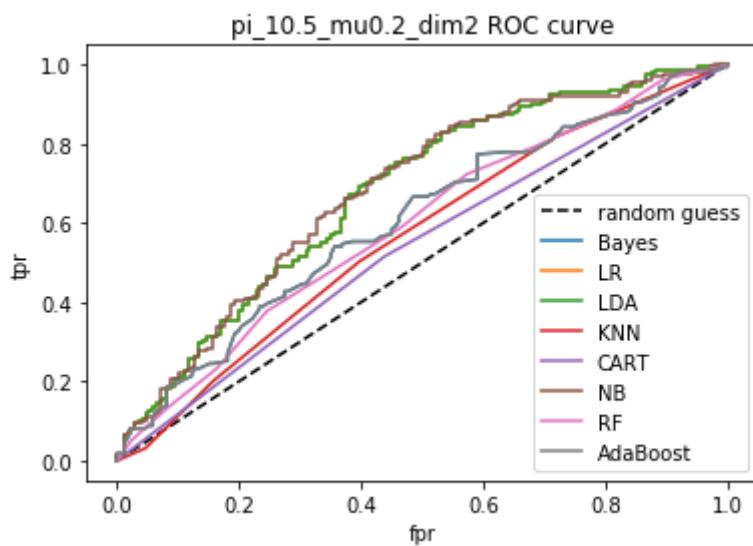
NB : AUROC = 0.681, AUPRC = 0.631, average precision = 0.547, .
Best threshold for ROC = 0.447, accuracy for the best ROC threshold is then
0.639, accuracy = 0.606.
F1 score = 0.519, log loss = 13.606, recall = 0.440.

RF : AUROC = 0.593, AUPRC = 0.569, average precision = 0.519, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.567, accuracy = 0.567.
F1 score = 0.515, log loss = 14.967, recall = 0.478.

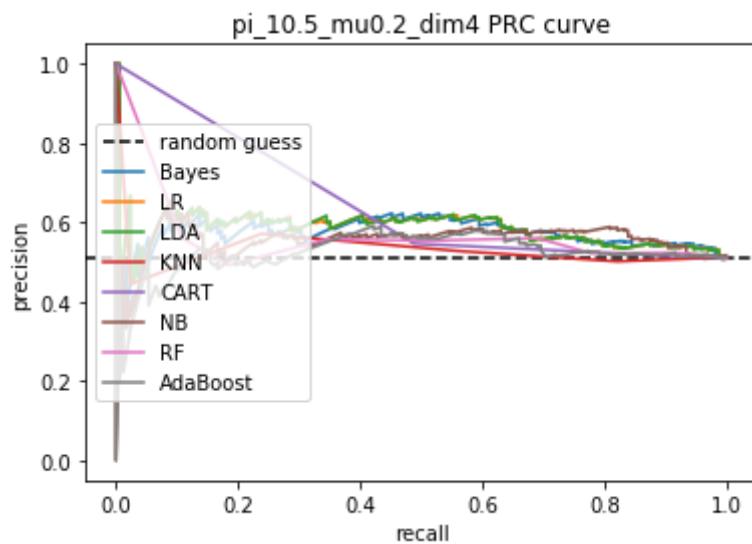
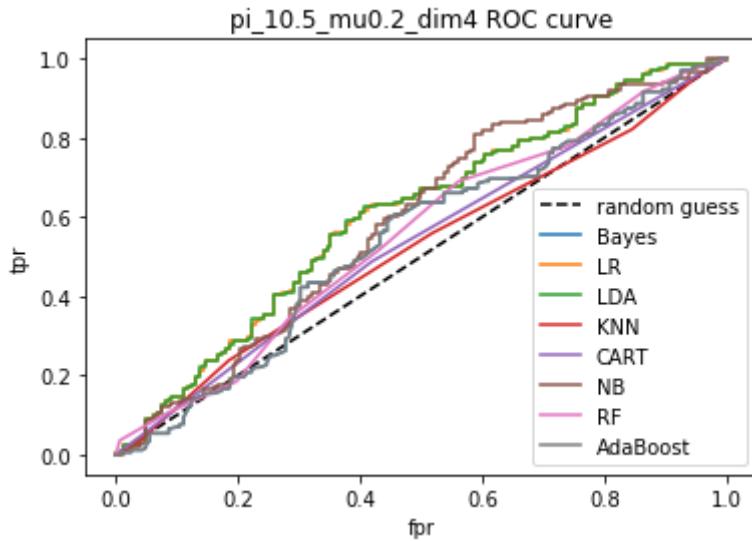
AdaBoost : AUROC = 0.606, AUPRC = 0.584, average precision = 0.527, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.567, accuracy = 0.579.
F1 score = 0.522, log loss = 14.548, recall = 0.478.

Bayes classifier has AUROC = 0.684, and AUPRC = 0.637.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is CART
Positive ratio for pi_1 = 0.5 , mu = 0.2 , dim = 4 is 0.509 .
LR : AUROC = 0.607, AUPRC = 0.583, average precision = 0.554, .
Best threshold for ROC = 0.526, accuracy for the best ROC threshold is then
0.600, accuracy = 0.582.
F1 score = 0.621, log loss = 14.444, recall = 0.673.
-----
LDA : AUROC = 0.607, AUPRC = 0.583, average precision = 0.554, .
Best threshold for ROC = 0.526, accuracy for the best ROC threshold is then
0.600, accuracy = 0.582.
F1 score = 0.621, log loss = 14.444, recall = 0.673.
-----
KNN : AUROC = 0.521, AUPRC = 0.528, average precision = 0.520, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.521, accuracy = 0.521.
F1 score = 0.543, log loss = 16.537, recall = 0.560.
-----
CART : AUROC = 0.534, AUPRC = 0.648, average precision = 0.527, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.491, accuracy = 0.533.
F1 score = 0.516, log loss = 16.118, recall = 0.488.
-----
NB : AUROC = 0.591, AUPRC = 0.554, average precision = 0.549, .
Best threshold for ROC = 0.519, accuracy for the best ROC threshold is then
0.576, accuracy = 0.573.
F1 score = 0.603, log loss = 14.758, recall = 0.637.
-----
RF : AUROC = 0.554, AUPRC = 0.564, average precision = 0.532, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.527, accuracy = 0.542.
F1 score = 0.535, log loss = 15.804, recall = 0.518.
-----
AdaBoost : AUROC = 0.546, AUPRC = 0.521, average precision = 0.547, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.564, accuracy = 0.570.
F1 score = 0.601, log loss = 14.862, recall = 0.637.
-----
Bayes classifier has AUROC = 0.607, and AUPRC = 0.575.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.2 , dim = 6 is 0.486 .
LR : AUROC = 0.631, AUPRC = 0.625, average precision = 0.554, .
Best threshold for ROC = 0.475, accuracy for the best ROC threshold is then
0.582, accuracy = 0.612.
F1 score = 0.573, log loss = 13.397, recall = 0.537.

-----
LDA : AUROC = 0.631, AUPRC = 0.625, average precision = 0.554, .
Best threshold for ROC = 0.475, accuracy for the best ROC threshold is then
0.582, accuracy = 0.612.
F1 score = 0.573, log loss = 13.397, recall = 0.537.

-----
KNN : AUROC = 0.549, AUPRC = 0.517, average precision = 0.502, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.506, accuracy = 0.533.
F1 score = 0.516, log loss = 16.118, recall = 0.512.

```

```

CART : AUROC = 0.534, AUPRC = 0.625, average precision = 0.503, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.515, accuracy = 0.536.
F1 score = 0.495, log loss = 16.014, recall = 0.469.

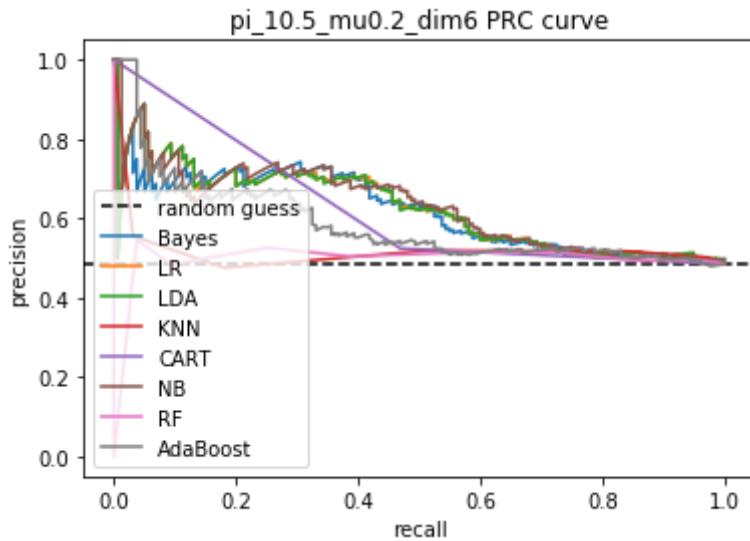
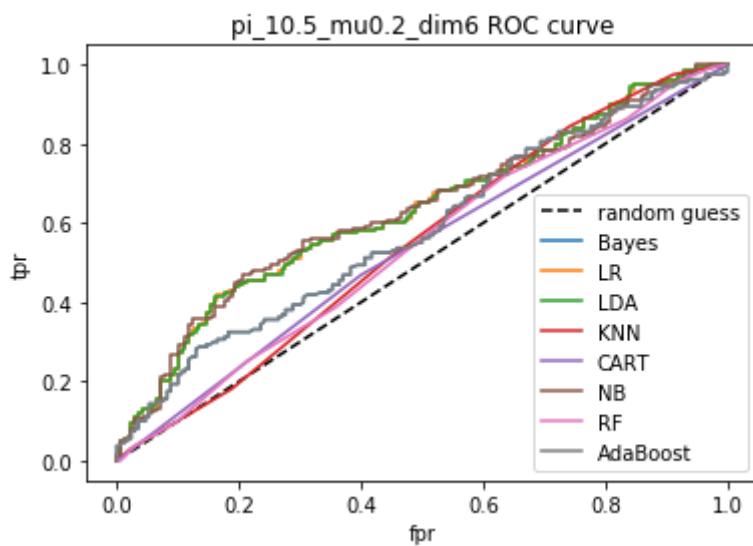
NB : AUROC = 0.632, AUPRC = 0.628, average precision = 0.547, .
Best threshold for ROC = 0.490, accuracy for the best ROC threshold is then
0.591, accuracy = 0.603.
F1 score = 0.579, log loss = 13.711, recall = 0.562.

RF : AUROC = 0.539, AUPRC = 0.499, average precision = 0.492, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.518, accuracy = 0.518.
F1 score = 0.438, log loss = 16.642, recall = 0.388.

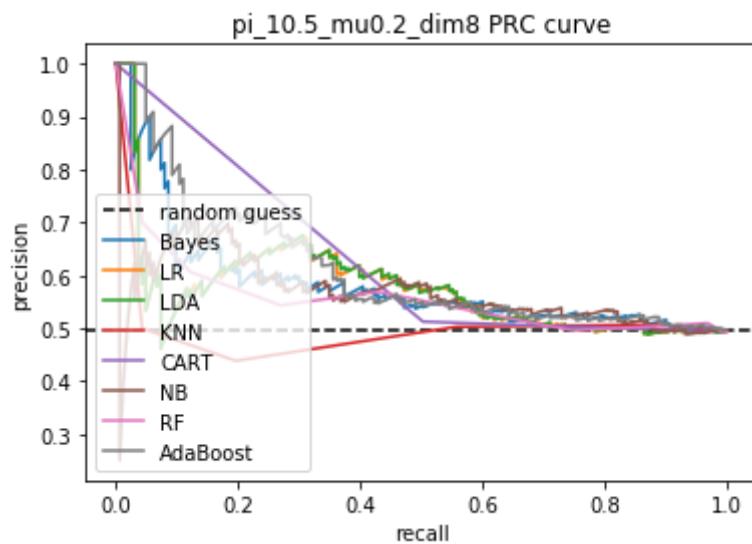
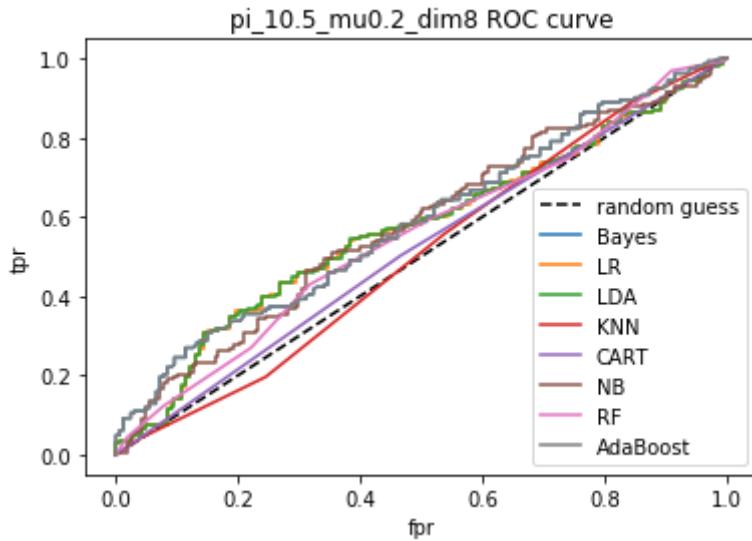
AdaBoost : AUROC = 0.580, AUPRC = 0.586, average precision = 0.501, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.536, accuracy = 0.530.
F1 score = 0.526, log loss = 16.223, recall = 0.537.

Bayes classifier has AUROC = 0.626, and AUPRC = 0.617.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is NB
The best model measured by log_loss_score is LR
The best model measured by recall is NB
Positive ratio for pi_1 = 0.5 , mu = 0.2 , dim = 8 is 0.495 .
LR : AUROC = 0.569, AUPRC = 0.573, average precision = 0.534, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.561, accuracy = 0.570.
F1 score = 0.562, log loss = 14.862, recall = 0.558.
-----
LDA : AUROC = 0.570, AUPRC = 0.574, average precision = 0.534, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.561, accuracy = 0.570.
F1 score = 0.562, log loss = 14.862, recall = 0.558.
-----
KNN : AUROC = 0.504, AUPRC = 0.497, average precision = 0.499, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.479, accuracy = 0.509.
F1 score = 0.529, log loss = 16.956, recall = 0.558.
-----
CART : AUROC = 0.518, AUPRC = 0.631, average precision = 0.503, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.506, accuracy = 0.518.
F1 score = 0.508, log loss = 16.642, recall = 0.503.
-----
NB : AUROC = 0.578, AUPRC = 0.567, average precision = 0.524, .
Best threshold for ROC = 0.505, accuracy for the best ROC threshold is then
0.558, accuracy = 0.555.
F1 score = 0.553, log loss = 15.386, recall = 0.558.
-----
RF : AUROC = 0.553, AUPRC = 0.558, average precision = 0.526, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.558, accuracy = 0.558.
F1 score = 0.490, log loss = 15.281, recall = 0.429.
-----
AdaBoost : AUROC = 0.586, AUPRC = 0.610, average precision = 0.521, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.545, accuracy = 0.548.
F1 score = 0.542, log loss = 15.595, recall = 0.540.
-----
Bayes classifier has AUROC = 0.575, and AUPRC = 0.583.
```



```

The best model measured by AUROC is AdaBoost
The best model measured by AUPRC is CART
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.2 , dim = 10  is 0.499 .
LR : AUROC = 0.554, AUPRC = 0.568, average precision = 0.506, .
Best threshold for ROC = 0.512, accuracy for the best ROC threshold is then
0.506, accuracy = 0.512.
F1 score = 0.525, log loss = 16.851, recall = 0.539.

-----
LDA : AUROC = 0.554, AUPRC = 0.568, average precision = 0.505, .
Best threshold for ROC = 0.511, accuracy for the best ROC threshold is then
0.506, accuracy = 0.509.
F1 score = 0.521, log loss = 16.956, recall = 0.533.

-----
KNN : AUROC = 0.513, AUPRC = 0.512, average precision = 0.498, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.530, accuracy = 0.497.
F1 score = 0.491, log loss = 17.374, recall = 0.485.

```

```

CART : AUROC = 0.497, AUPRC = 0.623, average precision = 0.498, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.500, accuracy = 0.497.
F1 score = 0.497, log loss = 17.374, recall = 0.497.

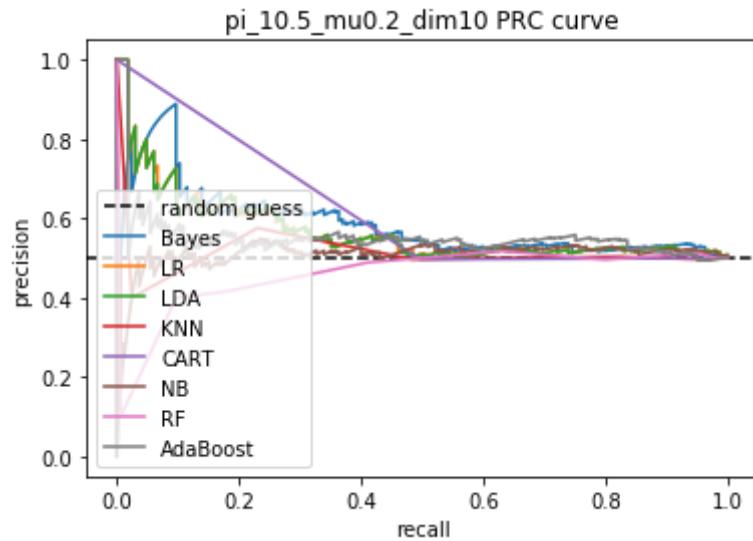
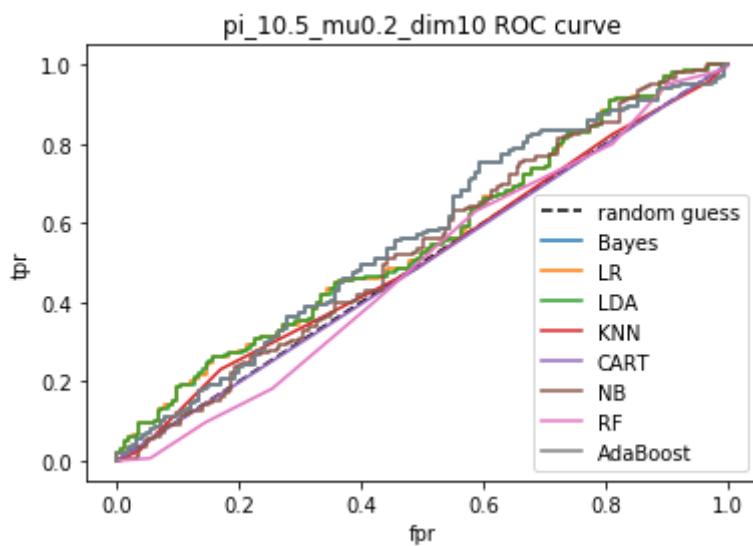
NB : AUROC = 0.537, AUPRC = 0.510, average precision = 0.518, .
Best threshold for ROC = 0.523, accuracy for the best ROC threshold is then
0.521, accuracy = 0.533.
F1 score = 0.570, log loss = 16.118, recall = 0.618.

RF : AUROC = 0.488, AUPRC = 0.462, average precision = 0.496, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.464, accuracy = 0.491.
F1 score = 0.447, log loss = 17.584, recall = 0.412.

AdaBoost : AUROC = 0.563, AUPRC = 0.550, average precision = 0.519, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.542, accuracy = 0.536.
F1 score = 0.549, log loss = 16.014, recall = 0.564.

Bayes classifier has AUROC = 0.579, and AUPRC = 0.582.

```



The best model measured by AUROC is AdaBoost  
The best model measured by AUPRC is CART  
The best model measured by accuracy\_best\_threshold is AdaBoost  
The best model measured by accuracy is AdaBoost  
The best model measured by average\_precision is AdaBoost  
The best model measured by f1 is NB  
The best model measured by log\_loss\_score is AdaBoost  
The best model measured by recall is NB  
Positive ratio for pi\_1 = 0.5 , mu = 0.4 , dim = 2 is 0.493 .  
LR : AUROC = 0.702, AUPRC = 0.696, average precision = 0.593, .  
Best threshold for ROC = 0.479, accuracy for the best ROC threshold is then  
0.648, accuracy = 0.648.  
F1 score = 0.623, log loss = 12.141, recall = 0.589.

---

LDA : AUROC = 0.703, AUPRC = 0.696, average precision = 0.590, .  
Best threshold for ROC = 0.476, accuracy for the best ROC threshold is then  
0.645, accuracy = 0.645.  
F1 score = 0.621, log loss = 12.246, recall = 0.589.

---

KNN : AUROC = 0.633, AUPRC = 0.635, average precision = 0.549, .  
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then  
0.561, accuracy = 0.591.  
F1 score = 0.557, log loss = 14.130, recall = 0.521.

---

CART : AUROC = 0.585, AUPRC = 0.681, average precision = 0.544, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.506, accuracy = 0.585.  
F1 score = 0.573, log loss = 14.339, recall = 0.564.

---

NB : AUROC = 0.699, AUPRC = 0.691, average precision = 0.576, .  
Best threshold for ROC = 0.468, accuracy for the best ROC threshold is then  
0.639, accuracy = 0.627.  
F1 score = 0.597, log loss = 12.874, recall = 0.558.

---

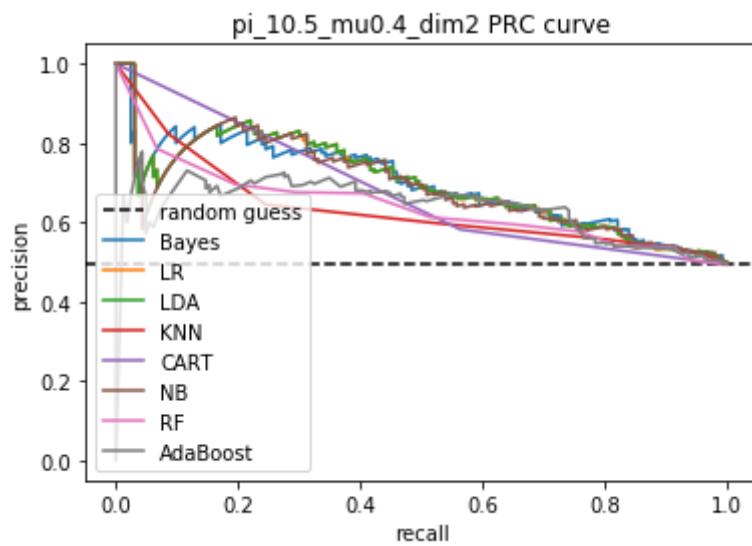
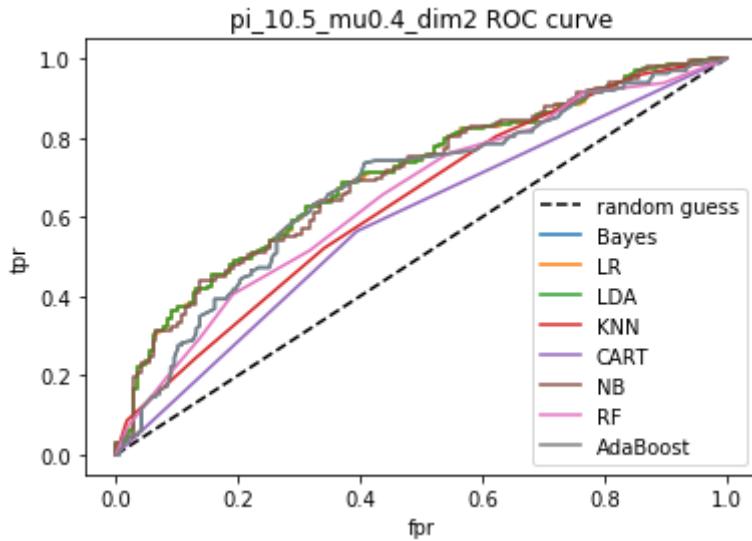
RF : AUROC = 0.648, AUPRC = 0.642, average precision = 0.555, .  
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then  
0.600, accuracy = 0.600.  
F1 score = 0.560, log loss = 13.816, recall = 0.515.

---

AdaBoost : AUROC = 0.673, AUPRC = 0.635, average precision = 0.594, .  
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then  
0.648, accuracy = 0.648.  
F1 score = 0.618, log loss = 12.141, recall = 0.577.

---

Bayes classifier has AUROC = 0.705, and AUPRC = 0.696.



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is AdaBoost
The best model measured by f1 is LR
The best model measured by log_loss_score is AdaBoost
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.4 , dim = 4  is 0.494 .
LR : AUROC = 0.759, AUPRC = 0.729, average precision = 0.618, .
Best threshold for ROC = 0.503, accuracy for the best ROC threshold is then
0.682, accuracy = 0.682.
F1 score = 0.681, log loss = 10.990, recall = 0.687.

-----
LDA : AUROC = 0.759, AUPRC = 0.729, average precision = 0.618, .
Best threshold for ROC = 0.502, accuracy for the best ROC threshold is then
0.682, accuracy = 0.682.
F1 score = 0.681, log loss = 10.990, recall = 0.687.

-----
KNN : AUROC = 0.662, AUPRC = 0.693, average precision = 0.558, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.609, accuracy = 0.606.
F1 score = 0.606, log loss = 13.606, recall = 0.613.

```

CART : AUROC = 0.597, AUPRC = 0.698, average precision = 0.552, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.506, accuracy = 0.597.  
F1 score = 0.605, log loss = 13.920, recall = 0.626.

---

NB : AUROC = 0.760, AUPRC = 0.726, average precision = 0.621, .  
Best threshold for ROC = 0.521, accuracy for the best ROC threshold is then  
0.691, accuracy = 0.688.  
F1 score = 0.700, log loss = 10.780, recall = 0.736.

---

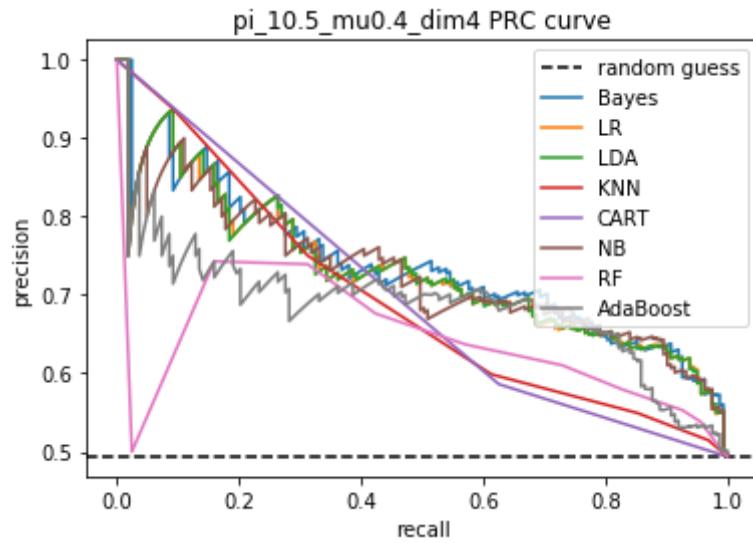
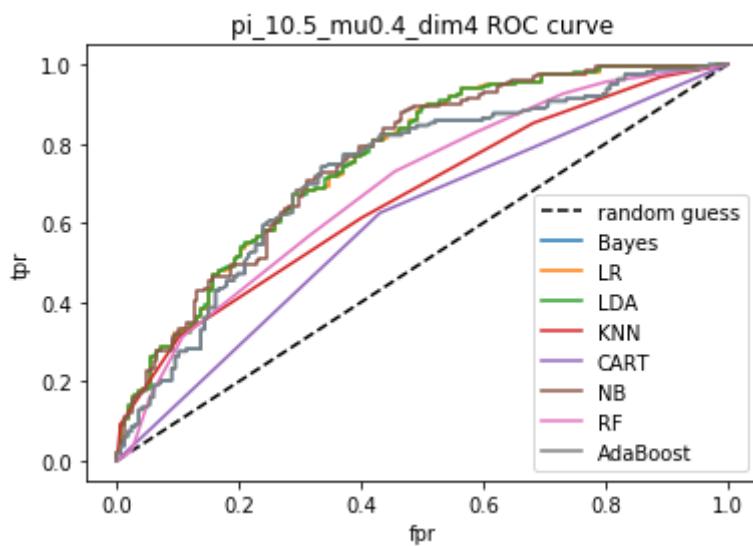
RF : AUROC = 0.688, AUPRC = 0.643, average precision = 0.576, .  
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then  
0.615, accuracy = 0.627.  
F1 score = 0.602, log loss = 12.874, recall = 0.571.

---

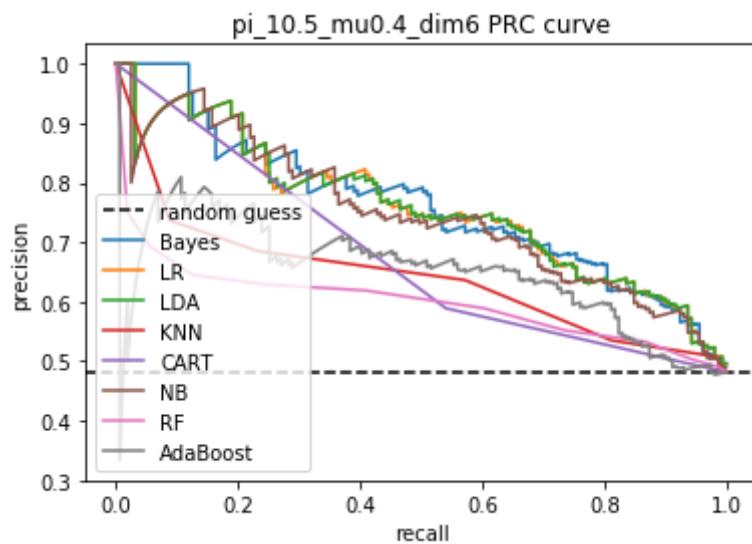
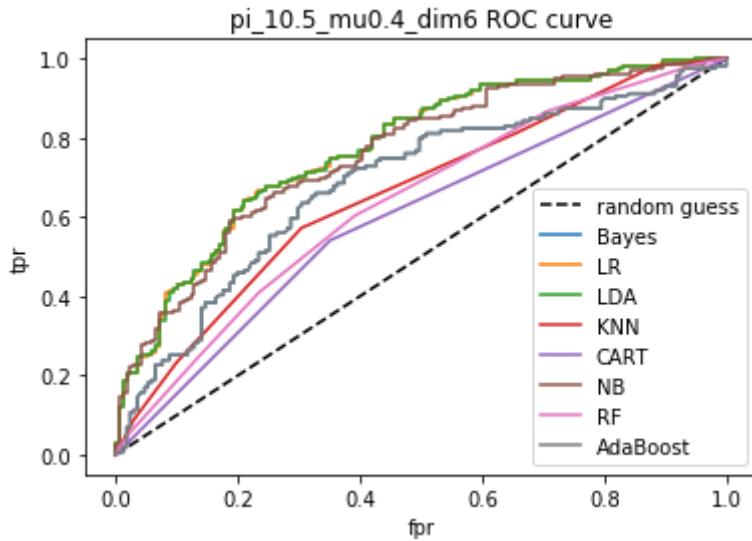
AdaBoost : AUROC = 0.726, AUPRC = 0.687, average precision = 0.626, .  
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then  
0.694, accuracy = 0.694.  
F1 score = 0.707, log loss = 10.571, recall = 0.748.

---

Bayes classifier has AUROC = 0.766, and AUPRC = 0.736.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is AdaBoost
The best model measured by accuracy is AdaBoost
The best model measured by average_precision is AdaBoost
The best model measured by f1 is AdaBoost
The best model measured by log_loss_score is AdaBoost
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.5 , mu = 0.4 , dim = 6 is 0.481 .
LR : AUROC = 0.774, AUPRC = 0.757, average precision = 0.644, .
Best threshold for ROC = 0.464, accuracy for the best ROC threshold is then
0.700, accuracy = 0.715.
F1 score = 0.682, log loss = 9.838, recall = 0.635.
-----
LDA : AUROC = 0.774, AUPRC = 0.757, average precision = 0.644, .
Best threshold for ROC = 0.461, accuracy for the best ROC threshold is then
0.700, accuracy = 0.715.
F1 score = 0.682, log loss = 9.838, recall = 0.635.
-----
KNN : AUROC = 0.658, AUPRC = 0.642, average precision = 0.570, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.579, accuracy = 0.636.
F1 score = 0.603, log loss = 12.560, recall = 0.572.
-----
CART : AUROC = 0.595, AUPRC = 0.676, average precision = 0.540, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.518, accuracy = 0.597.
F1 score = 0.564, log loss = 13.920, recall = 0.541.
-----
NB : AUROC = 0.760, AUPRC = 0.746, average precision = 0.631, .
Best threshold for ROC = 0.442, accuracy for the best ROC threshold is then
0.691, accuracy = 0.700.
F1 score = 0.657, log loss = 10.362, recall = 0.597.
-----
RF : AUROC = 0.636, AUPRC = 0.600, average precision = 0.538, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.594, accuracy = 0.594.
F1 score = 0.492, log loss = 14.025, recall = 0.409.
-----
AdaBoost : AUROC = 0.685, AUPRC = 0.649, average precision = 0.581, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.658, accuracy = 0.648.
F1 score = 0.605, log loss = 12.141, recall = 0.560.
-----
Bayes classifier has AUROC = 0.774, and AUPRC = 0.763.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.4 , dim = 8  is 0.516 .
LR : AUROC = 0.704, AUPRC = 0.720, average precision = 0.603, .
Best threshold for ROC = 0.504, accuracy for the best ROC threshold is then
0.639, accuracy = 0.639.
F1 score = 0.651, log loss = 12.455, recall = 0.653.

-----
LDA : AUROC = 0.704, AUPRC = 0.720, average precision = 0.607, .
Best threshold for ROC = 0.503, accuracy for the best ROC threshold is then
0.645, accuracy = 0.645.
F1 score = 0.657, log loss = 12.246, recall = 0.659.

-----
KNN : AUROC = 0.622, AUPRC = 0.641, average precision = 0.570, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.548, accuracy = 0.594.
F1 score = 0.608, log loss = 14.025, recall = 0.612.

```

```

CART : AUROC = 0.616, AUPRC = 0.718, average precision = 0.587, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.485, accuracy = 0.615.
F1 score = 0.607, log loss = 13.292, recall = 0.576.

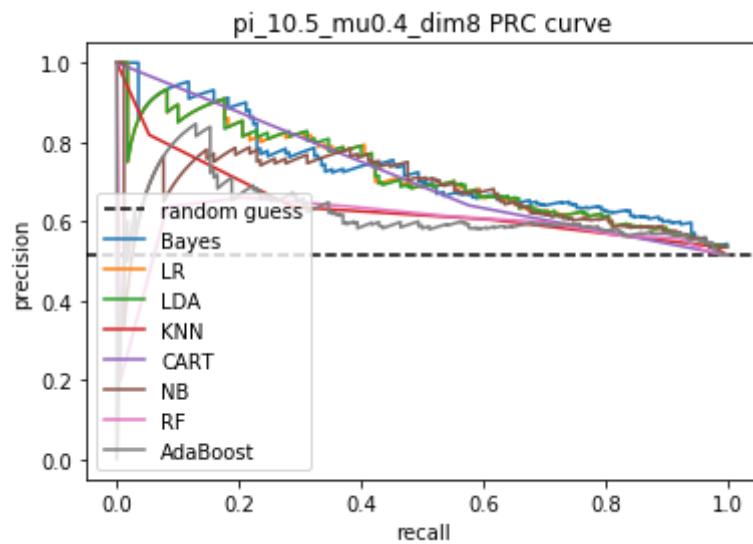
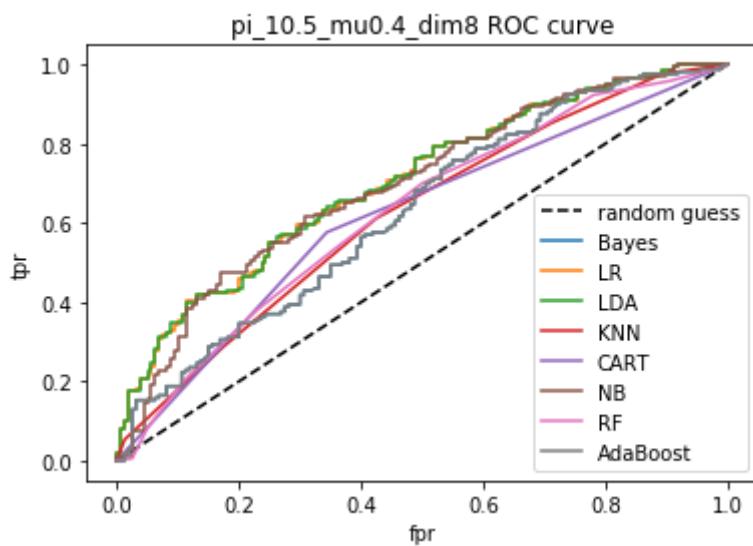
NB : AUROC = 0.695, AUPRC = 0.679, average precision = 0.589, .
Best threshold for ROC = 0.527, accuracy for the best ROC threshold is then
0.633, accuracy = 0.624.
F1 score = 0.650, log loss = 12.978, recall = 0.676.

RF : AUROC = 0.626, AUPRC = 0.594, average precision = 0.568, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.570, accuracy = 0.588.
F1 score = 0.575, log loss = 14.234, recall = 0.541.

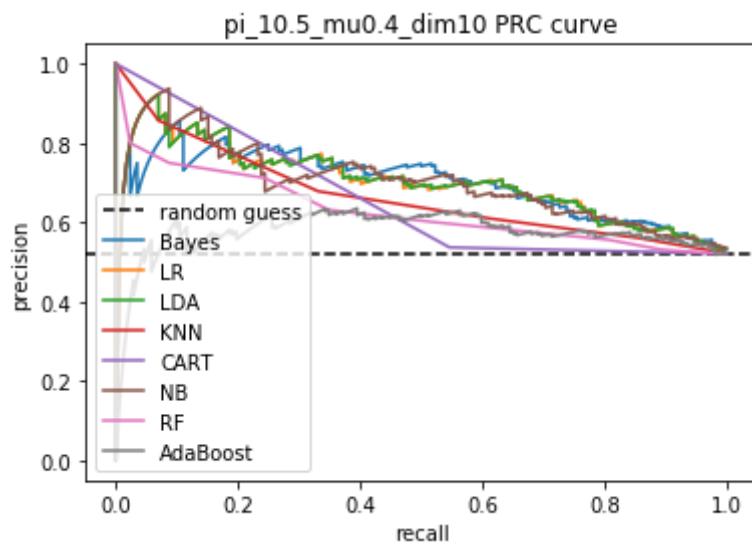
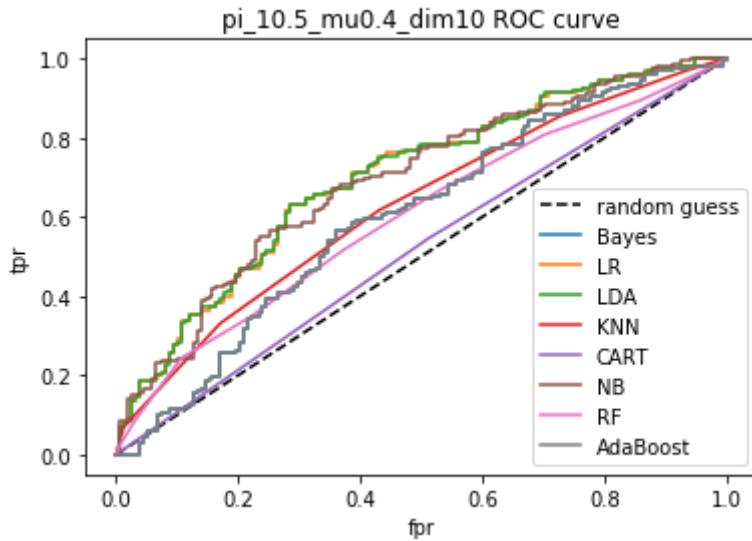
AdaBoost : AUROC = 0.627, AUPRC = 0.617, average precision = 0.554, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.576, accuracy = 0.570.
F1 score = 0.580, log loss = 14.862, recall = 0.576.

Bayes classifier has AUROC = 0.718, and AUPRC = 0.730.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LDA
The best model measured by accuracy is LDA
The best model measured by average_precision is LDA
The best model measured by f1 is LDA
The best model measured by log_loss_score is LDA
The best model measured by recall is NB
Positive ratio for pi_1 = 0.5 , mu = 0.4 , dim = 10 is 0.52 .
LR : AUROC = 0.699, AUPRC = 0.698, average precision = 0.623, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.658, accuracy = 0.658.
F1 score = 0.667, log loss = 11.827, recall = 0.657.
-----
LDA : AUROC = 0.700, AUPRC = 0.698, average precision = 0.623, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.661, accuracy = 0.658.
F1 score = 0.667, log loss = 11.827, recall = 0.657.
-----
KNN : AUROC = 0.627, AUPRC = 0.667, average precision = 0.575, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.570, accuracy = 0.594.
F1 score = 0.613, log loss = 14.025, recall = 0.616.
-----
CART : AUROC = 0.517, AUPRC = 0.660, average precision = 0.530, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.479, accuracy = 0.518.
F1 score = 0.542, log loss = 16.642, recall = 0.547.
-----
NB : AUROC = 0.693, AUPRC = 0.696, average precision = 0.618, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.648, accuracy = 0.652.
F1 score = 0.663, log loss = 12.036, recall = 0.657.
-----
RF : AUROC = 0.600, AUPRC = 0.630, average precision = 0.563, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.555, accuracy = 0.570.
F1 score = 0.556, log loss = 14.862, recall = 0.517.
-----
AdaBoost : AUROC = 0.602, AUPRC = 0.573, average precision = 0.560, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.597, accuracy = 0.573.
F1 score = 0.612, log loss = 14.758, recall = 0.645.
-----
Bayes classifier has AUROC = 0.705, and AUPRC = 0.695.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LDA
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.6 , dim = 2  is 0.496 .
LR : AUROC = 0.797, AUPRC = 0.778, average precision = 0.658, .
Best threshold for ROC = 0.515, accuracy for the best ROC threshold is then
0.715, accuracy = 0.724.
F1 score = 0.728, log loss = 9.524, recall = 0.744.

-----
LDA : AUROC = 0.797, AUPRC = 0.777, average precision = 0.658, .
Best threshold for ROC = 0.513, accuracy for the best ROC threshold is then
0.715, accuracy = 0.724.
F1 score = 0.728, log loss = 9.524, recall = 0.744.

-----
KNN : AUROC = 0.710, AUPRC = 0.731, average precision = 0.604, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.624, accuracy = 0.664.
F1 score = 0.673, log loss = 11.618, recall = 0.695.

```

```

CART : AUROC = 0.639, AUPRC = 0.724, average precision = 0.587, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.503, accuracy = 0.639.
F1 score = 0.627, log loss = 12.455, recall = 0.610.

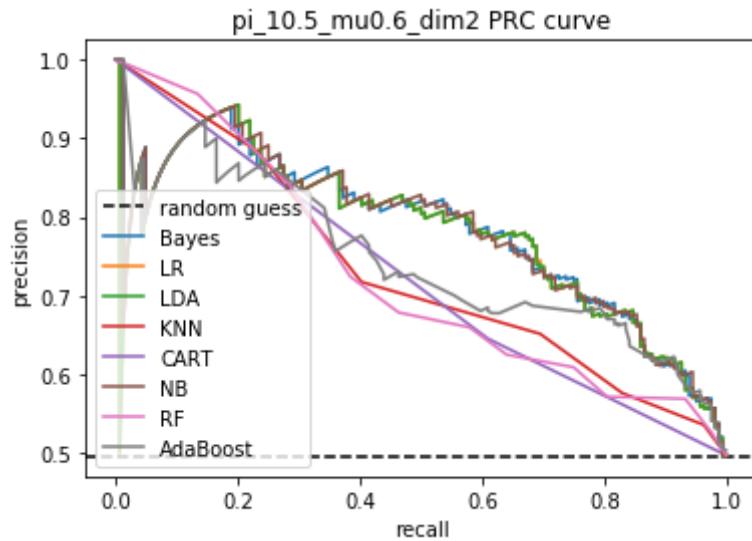
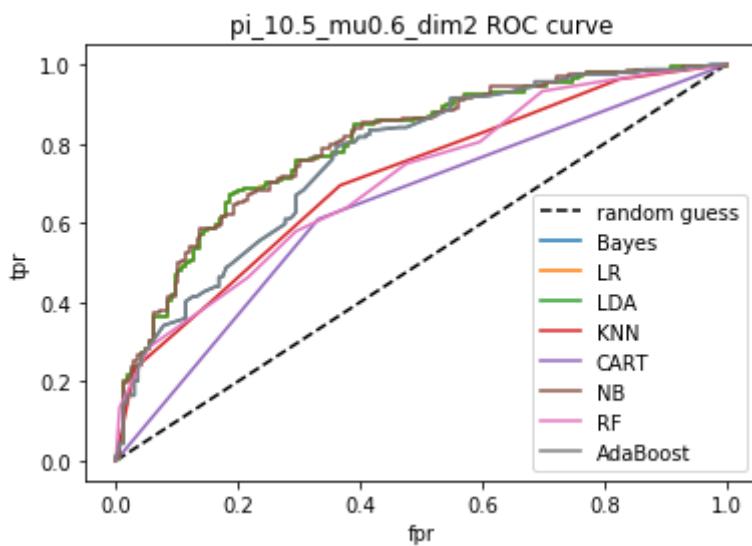
NB : AUROC = 0.798, AUPRC = 0.782, average precision = 0.651, .
Best threshold for ROC = 0.512, accuracy for the best ROC threshold is then
0.721, accuracy = 0.715.
F1 score = 0.715, log loss = 9.838, recall = 0.720.

RF : AUROC = 0.705, AUPRC = 0.726, average precision = 0.591, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.642, accuracy = 0.642.
F1 score = 0.617, log loss = 12.350, recall = 0.579.

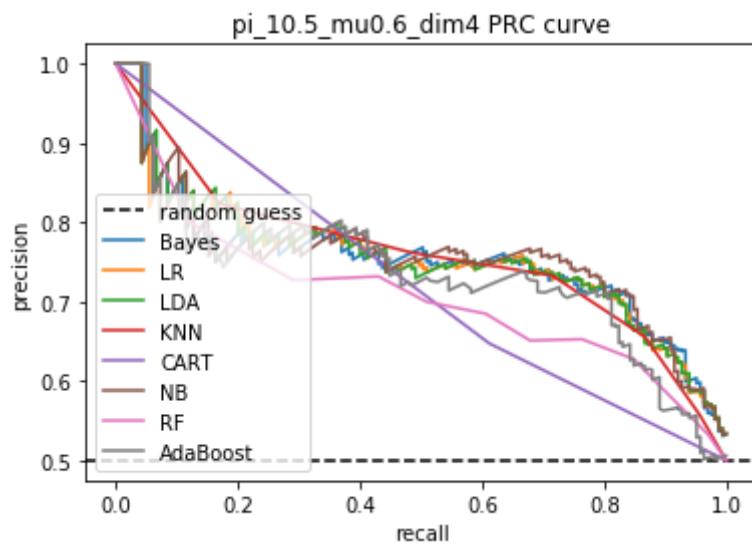
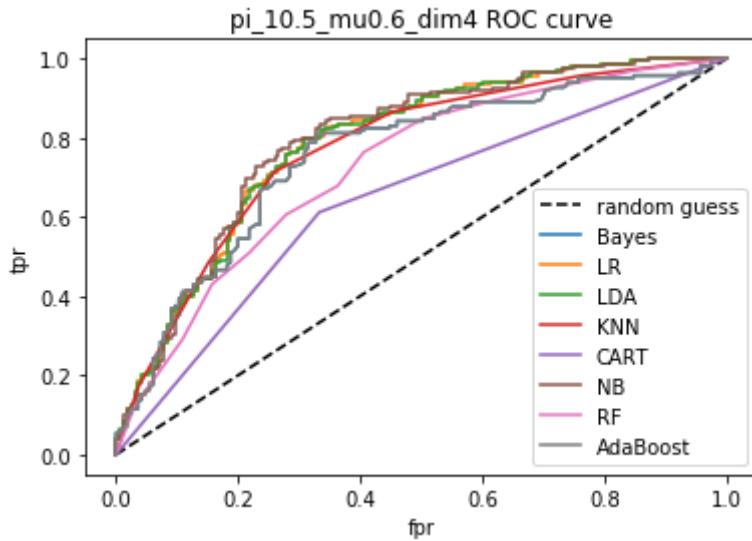
AdaBoost : AUROC = 0.762, AUPRC = 0.743, average precision = 0.636, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.688, accuracy = 0.703.
F1 score = 0.718, log loss = 10.257, recall = 0.762.

Bayes classifier has AUROC = 0.799, and AUPRC = 0.782.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.5 , mu = 0.6 , dim = 4 is 0.5 .
LR : AUROC = 0.787, AUPRC = 0.754, average precision = 0.671, .
Best threshold for ROC = 0.457, accuracy for the best ROC threshold is then
0.730, accuracy = 0.727.
F1 score = 0.713, log loss = 9.420, recall = 0.679.
-----
LDA : AUROC = 0.787, AUPRC = 0.756, average precision = 0.671, .
Best threshold for ROC = 0.462, accuracy for the best ROC threshold is then
0.730, accuracy = 0.727.
F1 score = 0.713, log loss = 9.420, recall = 0.679.
-----
KNN : AUROC = 0.773, AUPRC = 0.759, average precision = 0.667, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.667, accuracy = 0.727.
F1 score = 0.724, log loss = 9.420, recall = 0.715.
-----
CART : AUROC = 0.639, AUPRC = 0.727, average precision = 0.590, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.500, accuracy = 0.639.
F1 score = 0.629, log loss = 12.455, recall = 0.612.
-----
NB : AUROC = 0.793, AUPRC = 0.756, average precision = 0.684, .
Best threshold for ROC = 0.464, accuracy for the best ROC threshold is then
0.745, accuracy = 0.742.
F1 score = 0.734, log loss = 8.896, recall = 0.709.
-----
RF : AUROC = 0.725, AUPRC = 0.708, average precision = 0.612, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.664, accuracy = 0.664.
F1 score = 0.643, log loss = 11.618, recall = 0.606.
-----
AdaBoost : AUROC = 0.754, AUPRC = 0.736, average precision = 0.656, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.706, accuracy = 0.718.
F1 score = 0.719, log loss = 9.734, recall = 0.721.
-----
Bayes classifier has AUROC = 0.789, and AUPRC = 0.753.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is KNN
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.5 , mu = 0.6 , dim = 6 is 0.532 .
LR : AUROC = 0.806, AUPRC = 0.803, average precision = 0.704, .
Best threshold for ROC = 0.545, accuracy for the best ROC threshold is then
0.733, accuracy = 0.748.
F1 score = 0.773, log loss = 8.687, recall = 0.801.

-----
LDA : AUROC = 0.805, AUPRC = 0.804, average precision = 0.702, .
Best threshold for ROC = 0.540, accuracy for the best ROC threshold is then
0.733, accuracy = 0.745.
F1 score = 0.768, log loss = 8.792, recall = 0.790.

-----
KNN : AUROC = 0.702, AUPRC = 0.727, average precision = 0.638, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.633, accuracy = 0.667.
F1 score = 0.691, log loss = 11.513, recall = 0.699.

```

```

CART : AUROC = 0.628, AUPRC = 0.746, average precision = 0.611, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.467, accuracy = 0.630.
F1 score = 0.655, log loss = 12.769, recall = 0.659.

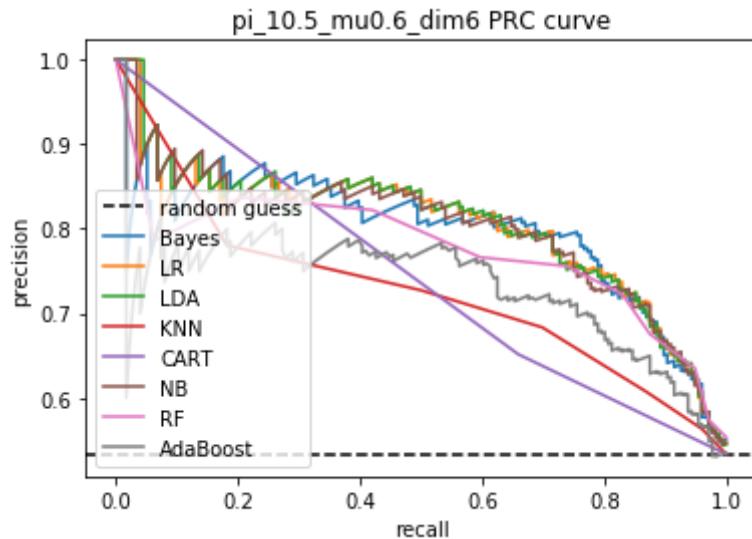
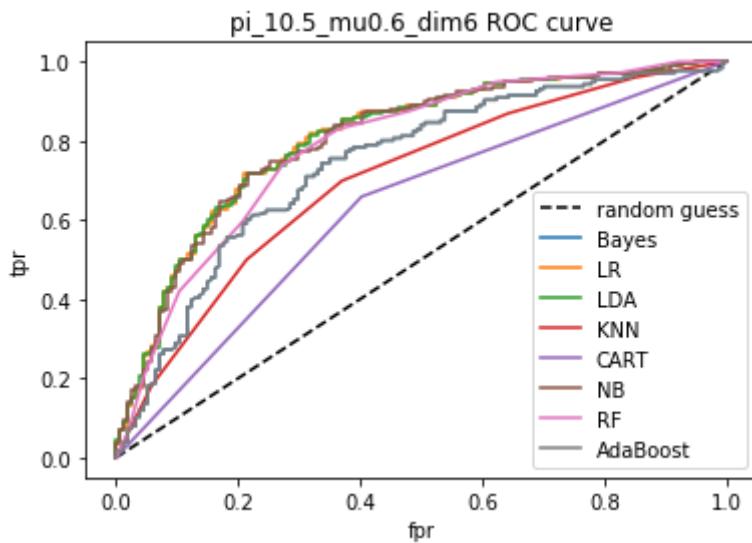
NB : AUROC = 0.803, AUPRC = 0.801, average precision = 0.685, .
Best threshold for ROC = 0.536, accuracy for the best ROC threshold is then
0.745, accuracy = 0.727.
F1 score = 0.754, log loss = 9.420, recall = 0.784.

RF : AUROC = 0.787, AUPRC = 0.775, average precision = 0.698, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.688, accuracy = 0.733.
F1 score = 0.747, log loss = 9.210, recall = 0.739.

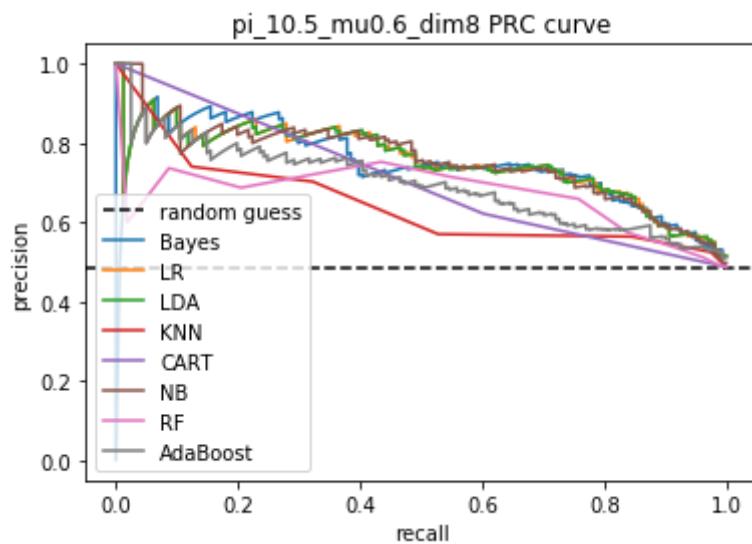
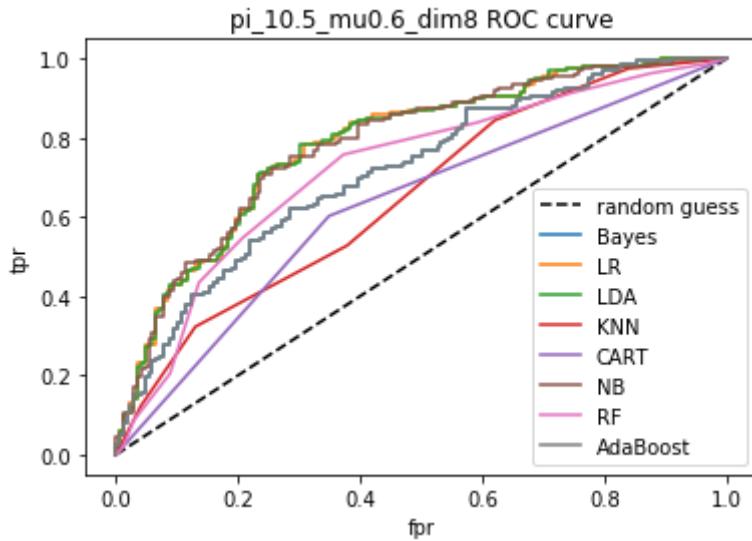
AdaBoost : AUROC = 0.742, AUPRC = 0.732, average precision = 0.666, .
Best threshold for ROC = 0.502, accuracy for the best ROC threshold is then
0.688, accuracy = 0.703.
F1 score = 0.728, log loss = 10.257, recall = 0.744.

Bayes classifier has AUROC = 0.804, and AUPRC = 0.796.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.6 , dim = 8 is 0.487 .
LR : AUROC = 0.786, AUPRC = 0.753, average precision = 0.667, .
Best threshold for ROC = 0.469, accuracy for the best ROC threshold is then
0.733, accuracy = 0.736.
F1 score = 0.722, log loss = 9.106, recall = 0.702.
-----
LDA : AUROC = 0.786, AUPRC = 0.753, average precision = 0.667, .
Best threshold for ROC = 0.469, accuracy for the best ROC threshold is then
0.730, accuracy = 0.736.
F1 score = 0.722, log loss = 9.106, recall = 0.702.
-----
KNN : AUROC = 0.652, AUPRC = 0.645, average precision = 0.531, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.603, accuracy = 0.576.
F1 score = 0.548, log loss = 14.653, recall = 0.528.
-----
CART : AUROC = 0.627, AUPRC = 0.709, average precision = 0.569, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.512, accuracy = 0.627.
F1 score = 0.612, log loss = 12.874, recall = 0.602.
-----
NB : AUROC = 0.784, AUPRC = 0.757, average precision = 0.658, .
Best threshold for ROC = 0.476, accuracy for the best ROC threshold is then
0.724, accuracy = 0.727.
F1 score = 0.713, log loss = 9.420, recall = 0.696.
-----
RF : AUROC = 0.721, AUPRC = 0.673, average precision = 0.612, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.673, accuracy = 0.673.
F1 score = 0.620, log loss = 11.304, recall = 0.547.
-----
AdaBoost : AUROC = 0.716, AUPRC = 0.696, average precision = 0.597, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.655, accuracy = 0.661.
F1 score = 0.634, log loss = 11.722, recall = 0.602.
-----
Bayes classifier has AUROC = 0.782, and AUPRC = 0.744.
```



```

The best model measured by AUROC is LR
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is LR
The best model measured by log_loss_score is LR
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.6 , dim = 10  is 0.514 .
LR : AUROC = 0.794, AUPRC = 0.785, average precision = 0.660, .
Best threshold for ROC = 0.490, accuracy for the best ROC threshold is then
0.715, accuracy = 0.706.
F1 score = 0.709, log loss = 10.152, recall = 0.694.

-----
LDA : AUROC = 0.794, AUPRC = 0.785, average precision = 0.659, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.706, accuracy = 0.706.
F1 score = 0.710, log loss = 10.152, recall = 0.700.

-----
KNN : AUROC = 0.673, AUPRC = 0.694, average precision = 0.602, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.606, accuracy = 0.636.
F1 score = 0.641, log loss = 12.560, recall = 0.629.

```

```

CART : AUROC = 0.601, AUPRC = 0.719, average precision = 0.575, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.485, accuracy = 0.603.
F1 score = 0.629, log loss = 13.711, recall = 0.653.

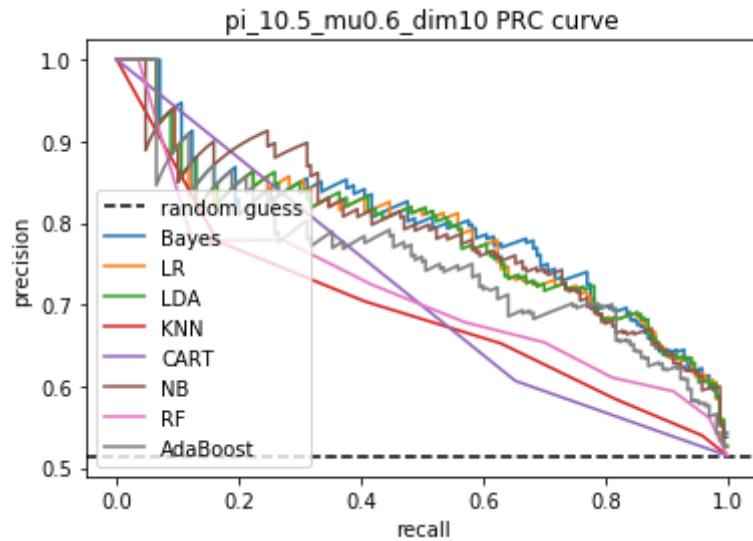
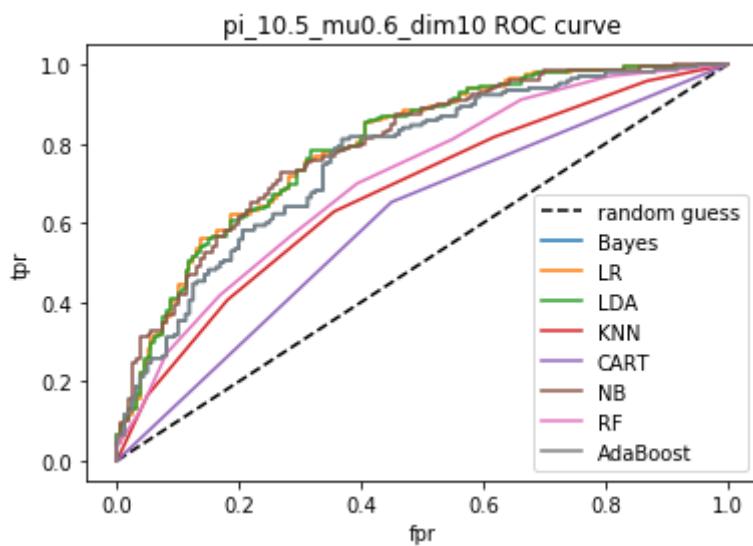
NB : AUROC = 0.793, AUPRC = 0.789, average precision = 0.668, .
Best threshold for ROC = 0.513, accuracy for the best ROC threshold is then
0.727, accuracy = 0.718.
F1 score = 0.729, log loss = 9.734, recall = 0.735.

RF : AUROC = 0.709, AUPRC = 0.713, average precision = 0.608, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.639, accuracy = 0.639.
F1 score = 0.620, log loss = 12.455, recall = 0.571.

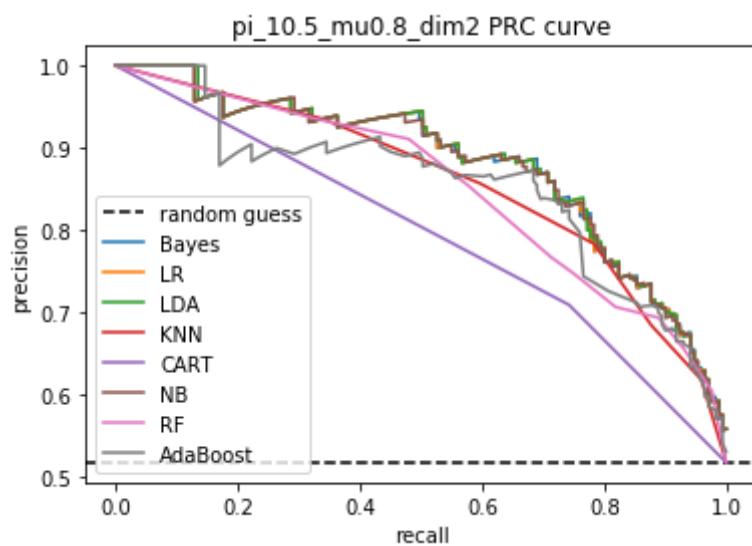
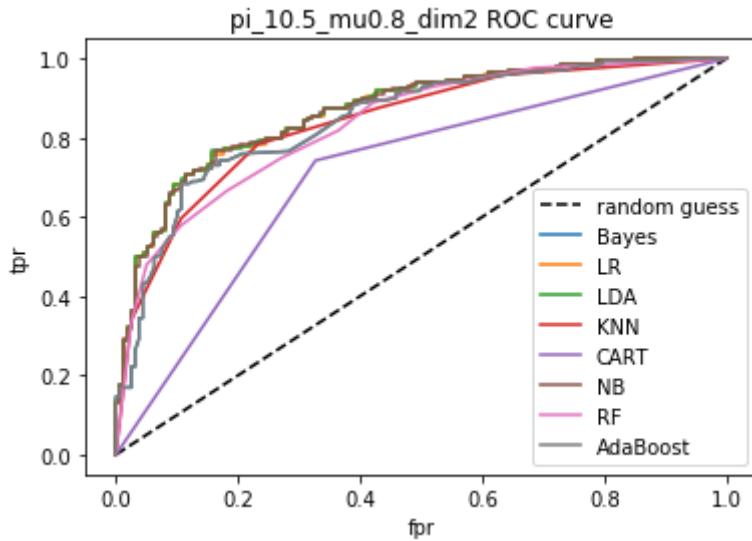
AdaBoost : AUROC = 0.760, AUPRC = 0.757, average precision = 0.654, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.679, accuracy = 0.706.
F1 score = 0.725, log loss = 10.152, recall = 0.753.

Bayes classifier has AUROC = 0.802, and AUPRC = 0.793.

```



```
The best model measured by AUROC is LR
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.5 , mu = 0.8 , dim = 2 is 0.519 .
LR : AUROC = 0.868, AUPRC = 0.879, average precision = 0.730, .
Best threshold for ROC = 0.503, accuracy for the best ROC threshold is then
0.779, accuracy = 0.779.
F1 score = 0.786, log loss = 7.640, recall = 0.784.
-----
LDA : AUROC = 0.869, AUPRC = 0.879, average precision = 0.730, .
Best threshold for ROC = 0.509, accuracy for the best ROC threshold is then
0.782, accuracy = 0.779.
F1 score = 0.786, log loss = 7.640, recall = 0.784.
-----
KNN : AUROC = 0.839, AUPRC = 0.858, average precision = 0.726, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.739, accuracy = 0.776.
F1 score = 0.784, log loss = 7.745, recall = 0.784.
-----
CART : AUROC = 0.708, AUPRC = 0.793, average precision = 0.660, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.482, accuracy = 0.709.
F1 score = 0.726, log loss = 10.048, recall = 0.743.
-----
NB : AUROC = 0.868, AUPRC = 0.878, average precision = 0.736, .
Best threshold for ROC = 0.505, accuracy for the best ROC threshold is then
0.785, accuracy = 0.785.
F1 score = 0.792, log loss = 7.431, recall = 0.789.
-----
RF : AUROC = 0.834, AUPRC = 0.851, average precision = 0.696, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.739, accuracy = 0.739.
F1 score = 0.739, log loss = 9.001, recall = 0.713.
-----
AdaBoost : AUROC = 0.846, AUPRC = 0.852, average precision = 0.742, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.779, accuracy = 0.782.
F1 score = 0.779, log loss = 7.536, recall = 0.743.
-----
Bayes classifier has AUROC = 0.868, and AUPRC = 0.878.
```



```

The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is NB
The best model measured by average_precision is AdaBoost
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.5 , mu = 0.8 , dim = 4  is 0.532 .
LR : AUROC = 0.883, AUPRC = 0.875, average precision = 0.780, .
Best threshold for ROC = 0.532, accuracy for the best ROC threshold is then
0.818, accuracy = 0.821.
F1 score = 0.834, log loss = 6.175, recall = 0.841.

-----
LDA : AUROC = 0.884, AUPRC = 0.875, average precision = 0.780, .
Best threshold for ROC = 0.541, accuracy for the best ROC threshold is then
0.818, accuracy = 0.821.
F1 score = 0.834, log loss = 6.175, recall = 0.841.

-----
KNN : AUROC = 0.829, AUPRC = 0.845, average precision = 0.729, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.758, accuracy = 0.767.
F1 score = 0.779, log loss = 8.059, recall = 0.773.

```

```

CART : AUROC = 0.733, AUPRC = 0.819, average precision = 0.695, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.467, accuracy = 0.736.
F1 score = 0.759, log loss = 9.106, recall = 0.778.

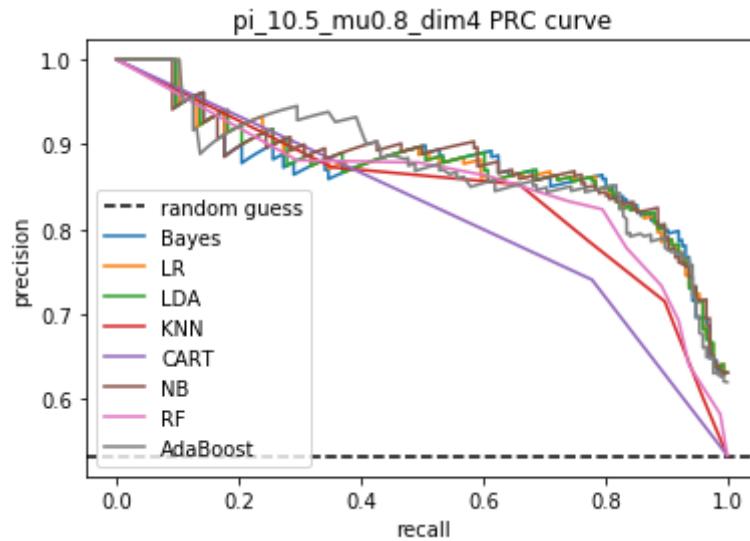
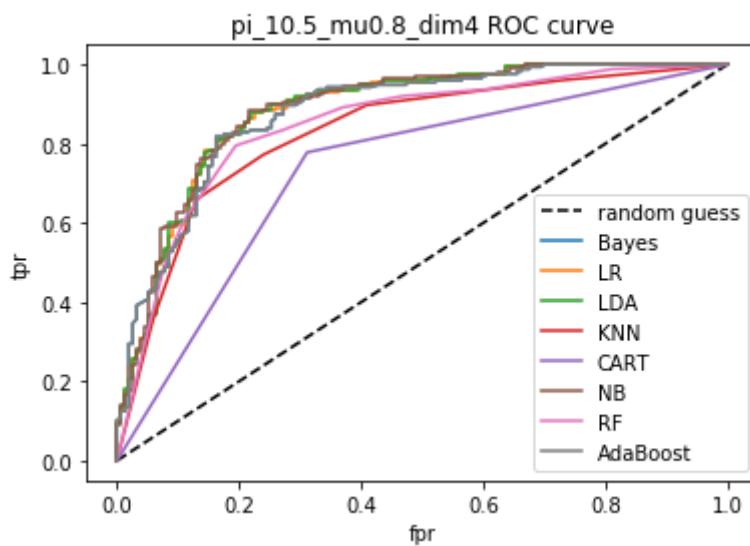
NB : AUROC = 0.886, AUPRC = 0.878, average precision = 0.777, .
Best threshold for ROC = 0.543, accuracy for the best ROC threshold is then
0.815, accuracy = 0.821.
F1 score = 0.836, log loss = 6.175, recall = 0.852.

RF : AUROC = 0.847, AUPRC = 0.854, average precision = 0.764, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.782, accuracy = 0.800.
F1 score = 0.809, log loss = 6.908, recall = 0.795.

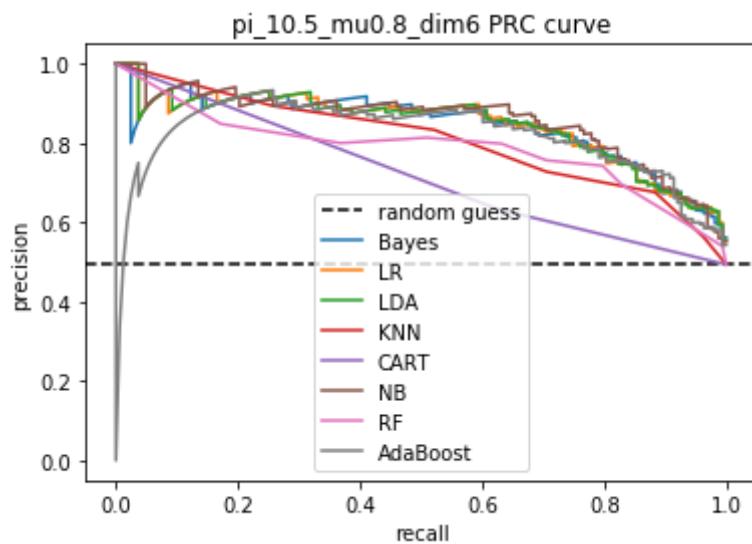
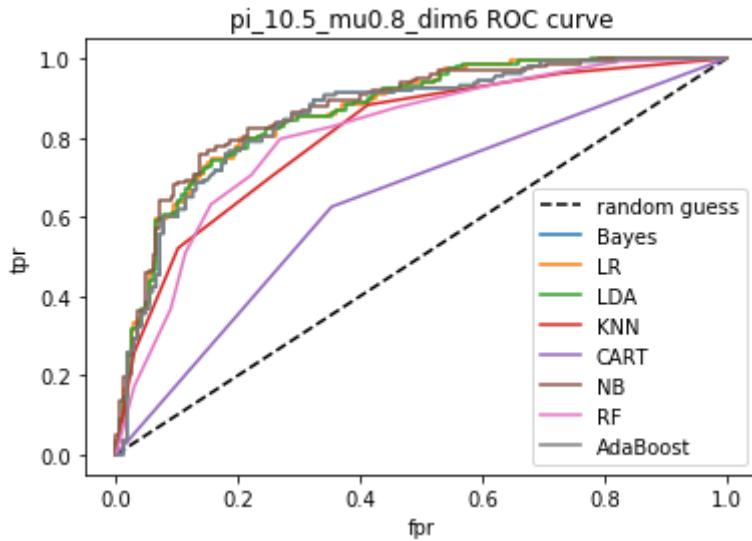
AdaBoost : AUROC = 0.878, AUPRC = 0.875, average precision = 0.759, .
Best threshold for ROC = 0.502, accuracy for the best ROC threshold is then
0.821, accuracy = 0.803.
F1 score = 0.819, log loss = 6.803, recall = 0.835.

Bayes classifier has AUROC = 0.884, and AUPRC = 0.873.

```



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is AdaBoost
The best model measured by accuracy is LR
The best model measured by average_precision is LR
The best model measured by f1 is NB
The best model measured by log_loss_score is LR
The best model measured by recall is NB
Positive ratio for pi_1 = 0.5 , mu = 0.8 , dim = 6 is 0.494 .
LR : AUROC = 0.866, AUPRC = 0.847, average precision = 0.724, .
Best threshold for ROC = 0.496, accuracy for the best ROC threshold is then
0.794, accuracy = 0.788.
F1 score = 0.784, log loss = 7.326, recall = 0.779.
-----
LDA : AUROC = 0.866, AUPRC = 0.846, average precision = 0.717, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.782, accuracy = 0.782.
F1 score = 0.778, log loss = 7.536, recall = 0.773.
-----
KNN : AUROC = 0.809, AUPRC = 0.809, average precision = 0.659, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.712, accuracy = 0.724.
F1 score = 0.717, log loss = 9.524, recall = 0.706.
-----
CART : AUROC = 0.636, AUPRC = 0.722, average precision = 0.581, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.506, accuracy = 0.636.
F1 score = 0.630, log loss = 12.560, recall = 0.626.
-----
NB : AUROC = 0.873, AUPRC = 0.856, average precision = 0.729, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.794, accuracy = 0.794.
F1 score = 0.791, log loss = 7.117, recall = 0.791.
-----
RF : AUROC = 0.810, AUPRC = 0.787, average precision = 0.679, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.742, accuracy = 0.742.
F1 score = 0.730, log loss = 8.896, recall = 0.706.
-----
AdaBoost : AUROC = 0.857, AUPRC = 0.812, average precision = 0.702, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.788, accuracy = 0.773.
F1 score = 0.777, log loss = 7.850, recall = 0.804.
-----
Bayes classifier has AUROC = 0.868, and AUPRC = 0.846.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is AdaBoost
Positive ratio for pi_1 = 0.5 , mu = 0.8 , dim = 8 is 0.493 .
LR : AUROC = 0.865, AUPRC = 0.849, average precision = 0.722, .
Best threshold for ROC = 0.472, accuracy for the best ROC threshold is then
0.788, accuracy = 0.785.
F1 score = 0.779, log loss = 7.431, recall = 0.767.

-----
LDA : AUROC = 0.865, AUPRC = 0.850, average precision = 0.719, .
Best threshold for ROC = 0.466, accuracy for the best ROC threshold is then
0.791, accuracy = 0.782.
F1 score = 0.775, log loss = 7.536, recall = 0.761.

-----
KNN : AUROC = 0.796, AUPRC = 0.764, average precision = 0.662, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.670, accuracy = 0.730.
F1 score = 0.729, log loss = 9.315, recall = 0.736.

```

```

CART : AUROC = 0.709, AUPRC = 0.778, average precision = 0.645, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.506, accuracy = 0.709.
F1 score = 0.700, log loss = 10.048, recall = 0.687.

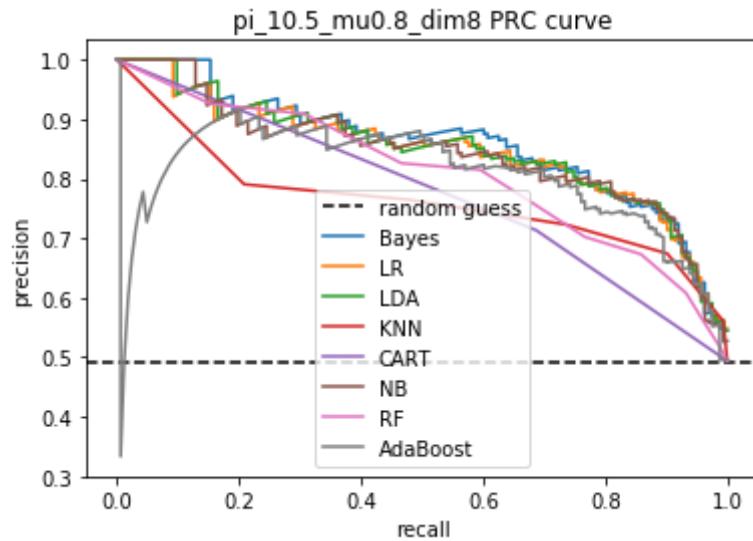
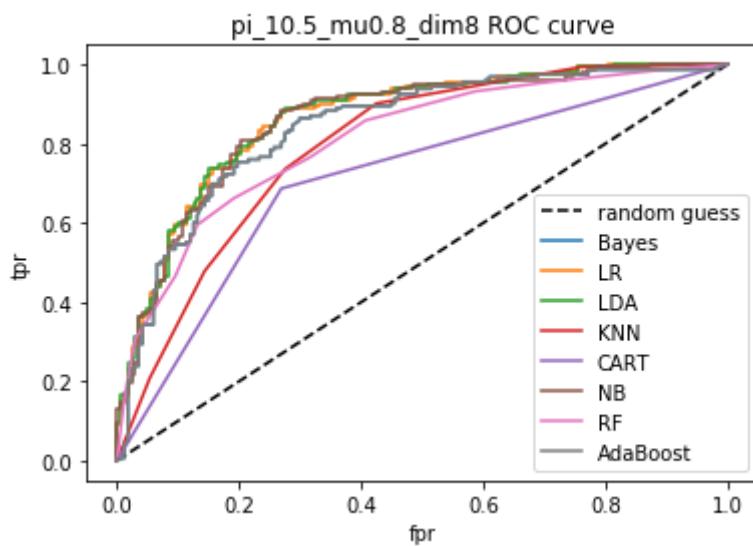
NB : AUROC = 0.861, AUPRC = 0.845, average precision = 0.730, .
Best threshold for ROC = 0.476, accuracy for the best ROC threshold is then
0.797, accuracy = 0.791.
F1 score = 0.784, log loss = 7.222, recall = 0.767.

RF : AUROC = 0.812, AUPRC = 0.811, average precision = 0.678, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.736, accuracy = 0.736.
F1 score = 0.713, log loss = 9.106, recall = 0.663.

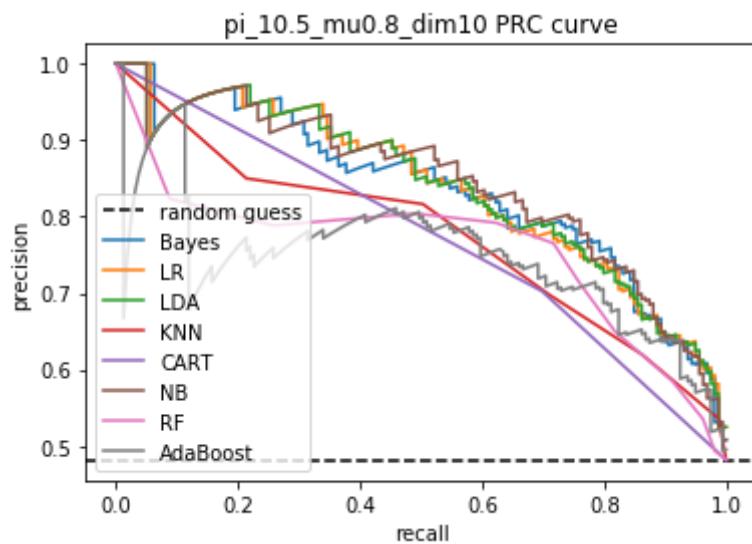
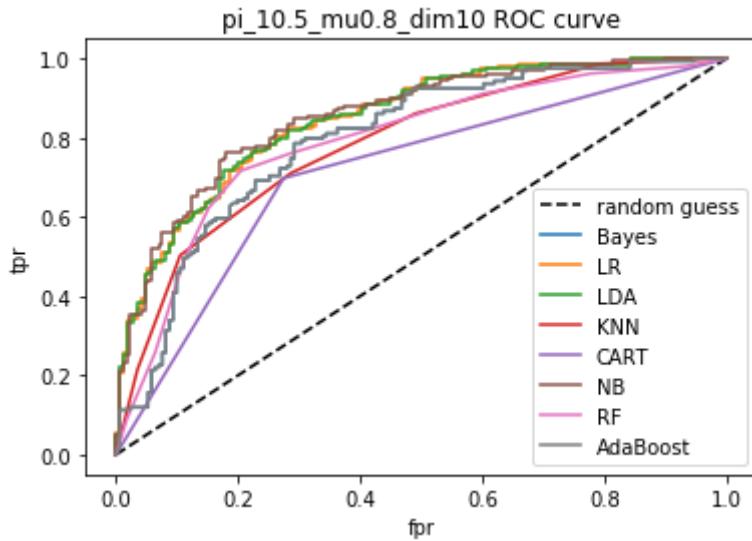
AdaBoost : AUROC = 0.843, AUPRC = 0.803, average precision = 0.709, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.764, accuracy = 0.770.
F1 score = 0.758, log loss = 7.954, recall = 0.730.

Bayes classifier has AUROC = 0.869, and AUPRC = 0.859.

```



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 0.8 , dim = 10  is 0.481 .
LR : AUROC = 0.848, AUPRC = 0.837, average precision = 0.691, .
Best threshold for ROC = 0.481, accuracy for the best ROC threshold is then
0.764, accuracy = 0.767.
F1 score = 0.757, log loss = 8.059, recall = 0.755.
-----
LDA : AUROC = 0.849, AUPRC = 0.837, average precision = 0.691, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.767, accuracy = 0.767.
F1 score = 0.759, log loss = 8.059, recall = 0.761.
-----
KNN : AUROC = 0.784, AUPRC = 0.774, average precision = 0.635, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.706, accuracy = 0.712.
F1 score = 0.704, log loss = 9.943, recall = 0.711.
-----
CART : AUROC = 0.712, AUPRC = 0.773, average precision = 0.636, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.518, accuracy = 0.712.
F1 score = 0.700, log loss = 9.943, recall = 0.698.
-----
NB : AUROC = 0.854, AUPRC = 0.841, average precision = 0.696, .
Best threshold for ROC = 0.502, accuracy for the best ROC threshold is then
0.776, accuracy = 0.773.
F1 score = 0.768, log loss = 7.850, recall = 0.780.
-----
RF : AUROC = 0.790, AUPRC = 0.758, average precision = 0.685, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.758, accuracy = 0.758.
F1 score = 0.740, log loss = 8.373, recall = 0.717.
-----
AdaBoost : AUROC = 0.796, AUPRC = 0.745, average precision = 0.646, .
Best threshold for ROC = 0.501, accuracy for the best ROC threshold is then
0.724, accuracy = 0.724.
F1 score = 0.720, log loss = 9.524, recall = 0.736.
-----
Bayes classifier has AUROC = 0.848, and AUPRC = 0.835.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.5 , mu = 1 , dim = 2  is 0.509 .
LR : AUROC = 0.915, AUPRC = 0.922, average precision = 0.781, .
Best threshold for ROC = 0.527, accuracy for the best ROC threshold is then
0.833, accuracy = 0.833.
F1 score = 0.838, log loss = 5.757, recall = 0.845.

-----
LDA : AUROC = 0.916, AUPRC = 0.922, average precision = 0.781, .
Best threshold for ROC = 0.521, accuracy for the best ROC threshold is then
0.830, accuracy = 0.833.
F1 score = 0.838, log loss = 5.757, recall = 0.845.

-----
KNN : AUROC = 0.861, AUPRC = 0.867, average precision = 0.760, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.800, accuracy = 0.812.
F1 score = 0.814, log loss = 6.489, recall = 0.810.

```

CART : AUROC = 0.748, AUPRC = 0.816, average precision = 0.692, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.491, accuracy = 0.748.  
F1 score = 0.755, log loss = 8.687, recall = 0.762.

---

NB : AUROC = 0.915, AUPRC = 0.921, average precision = 0.786, .  
Best threshold for ROC = 0.509, accuracy for the best ROC threshold is then  
0.833, accuracy = 0.836.  
F1 score = 0.839, log loss = 5.652, recall = 0.839.

---

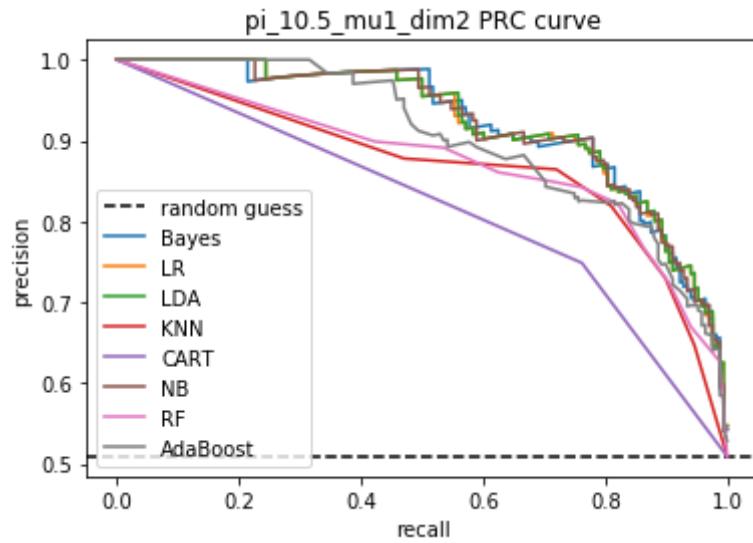
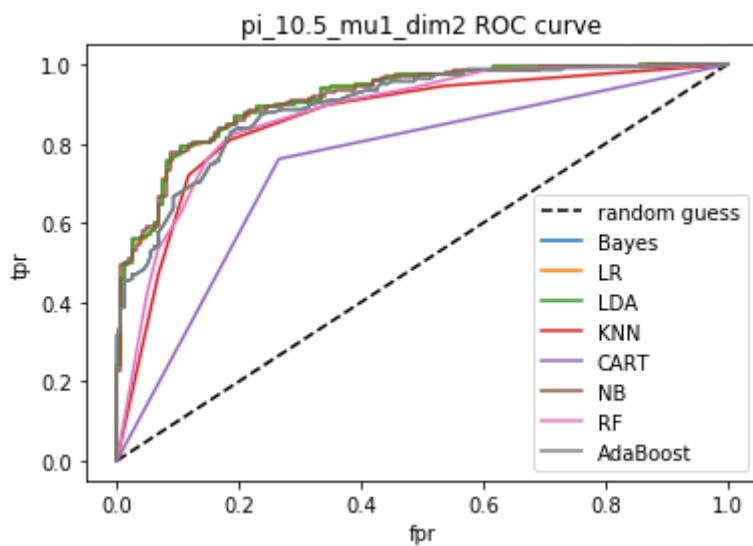
RF : AUROC = 0.875, AUPRC = 0.873, average precision = 0.763, .  
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then  
0.806, accuracy = 0.806.  
F1 score = 0.800, log loss = 6.698, recall = 0.762.

---

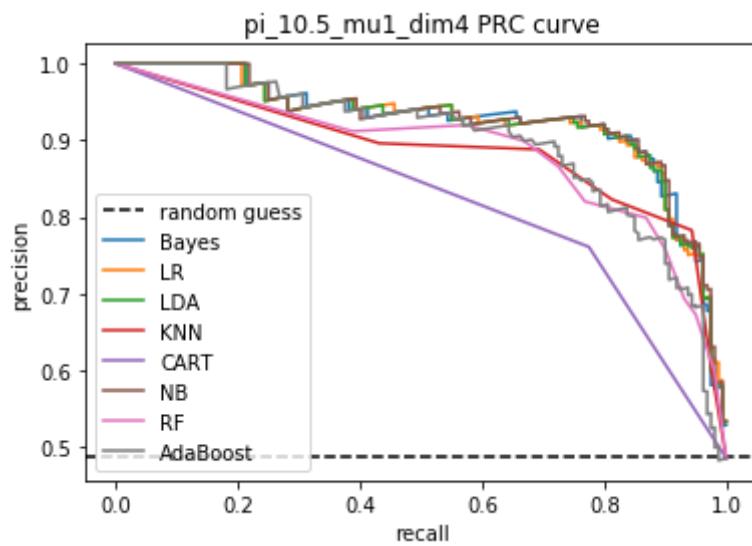
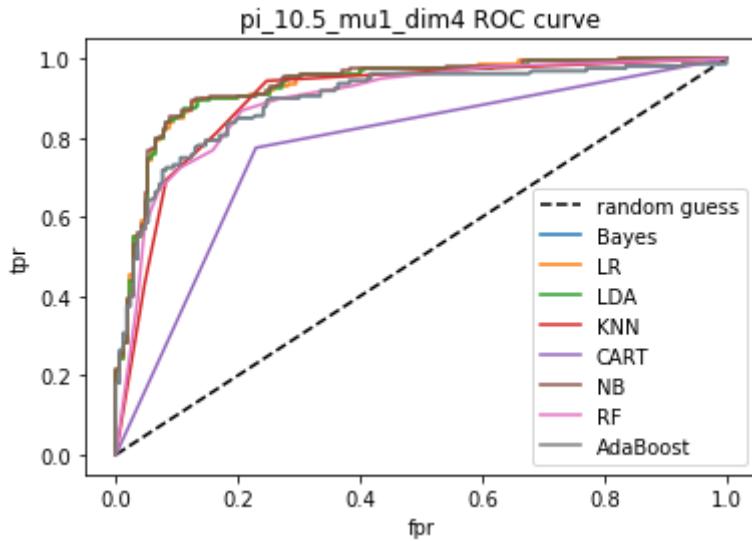
AdaBoost : AUROC = 0.894, AUPRC = 0.902, average precision = 0.768, .  
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then  
0.818, accuracy = 0.821.  
F1 score = 0.825, log loss = 6.175, recall = 0.827.

---

Bayes classifier has AUROC = 0.914, and AUPRC = 0.921.



```
The best model measured by AUROC is LDA
The best model measured by AUPRC is LDA
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 1 , dim = 4 is 0.486 .
LR : AUROC = 0.932, AUPRC = 0.923, average precision = 0.822, .
Best threshold for ROC = 0.468, accuracy for the best ROC threshold is then
0.876, accuracy = 0.873.
F1 score = 0.867, log loss = 4.396, recall = 0.856.
-----
LDA : AUROC = 0.931, AUPRC = 0.923, average precision = 0.827, .
Best threshold for ROC = 0.448, accuracy for the best ROC threshold is then
0.876, accuracy = 0.876.
F1 score = 0.870, log loss = 4.291, recall = 0.856.
-----
KNN : AUROC = 0.898, AUPRC = 0.885, average precision = 0.759, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.809, accuracy = 0.824.
F1 score = 0.818, log loss = 6.071, recall = 0.812.
-----
CART : AUROC = 0.773, AUPRC = 0.822, average precision = 0.699, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.515, accuracy = 0.773.
F1 score = 0.768, log loss = 7.850, recall = 0.775.
-----
NB : AUROC = 0.933, AUPRC = 0.925, average precision = 0.831, .
Best threshold for ROC = 0.479, accuracy for the best ROC threshold is then
0.876, accuracy = 0.879.
F1 score = 0.873, log loss = 4.187, recall = 0.856.
-----
RF : AUROC = 0.894, AUPRC = 0.885, average precision = 0.742, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.812, accuracy = 0.806.
F1 score = 0.794, log loss = 6.698, recall = 0.769.
-----
AdaBoost : AUROC = 0.896, AUPRC = 0.897, average precision = 0.752, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.812, accuracy = 0.818.
F1 score = 0.811, log loss = 6.280, recall = 0.806.
-----
Bayes classifier has AUROC = 0.931, and AUPRC = 0.924.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is LR
Positive ratio for pi_1 = 0.5 , mu = 1 , dim = 6  is 0.547 .
LR : AUROC = 0.911, AUPRC = 0.931, average precision = 0.786, .
Best threshold for ROC = 0.531, accuracy for the best ROC threshold is then
0.800, accuracy = 0.815.
F1 score = 0.830, log loss = 6.385, recall = 0.823.

-----
LDA : AUROC = 0.911, AUPRC = 0.930, average precision = 0.789, .
Best threshold for ROC = 0.547, accuracy for the best ROC threshold is then
0.809, accuracy = 0.821.
F1 score = 0.837, log loss = 6.175, recall = 0.840.

-----
KNN : AUROC = 0.874, AUPRC = 0.894, average precision = 0.794, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.803, accuracy = 0.827.
F1 score = 0.844, log loss = 5.966, recall = 0.851.

```

CART : AUROC = 0.768, AUPRC = 0.848, average precision = 0.739, .  
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then  
0.452, accuracy = 0.770.  
F1 score = 0.790, log loss = 7.954, recall = 0.790.

---

NB : AUROC = 0.915, AUPRC = 0.933, average precision = 0.783, .  
Best threshold for ROC = 0.565, accuracy for the best ROC threshold is then  
0.815, accuracy = 0.815.  
F1 score = 0.832, log loss = 6.385, recall = 0.834.

---

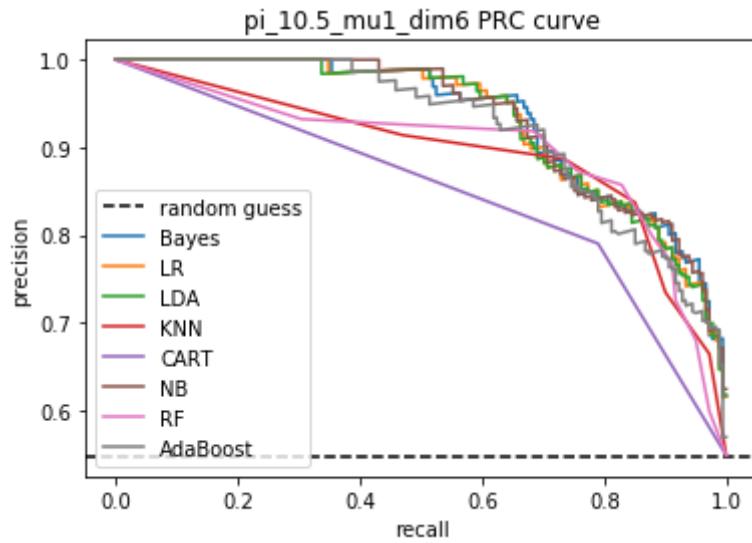
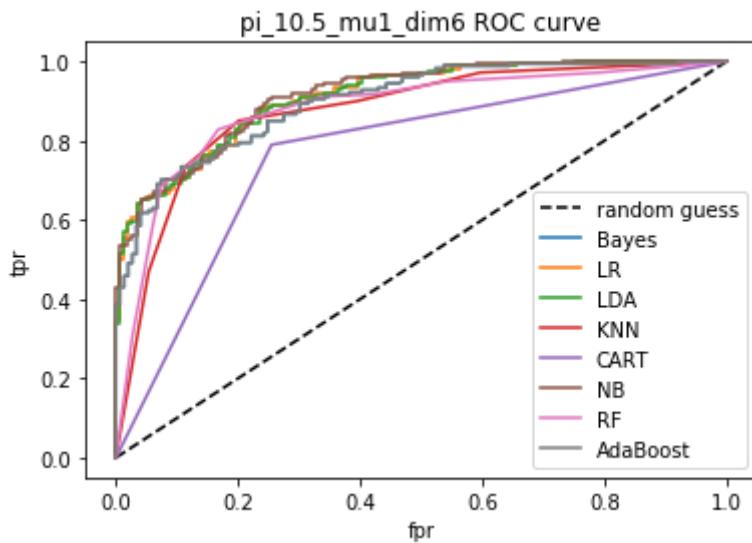
RF : AUROC = 0.880, AUPRC = 0.897, average precision = 0.804, .  
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then  
0.806, accuracy = 0.830.  
F1 score = 0.843, log loss = 5.861, recall = 0.829.

---

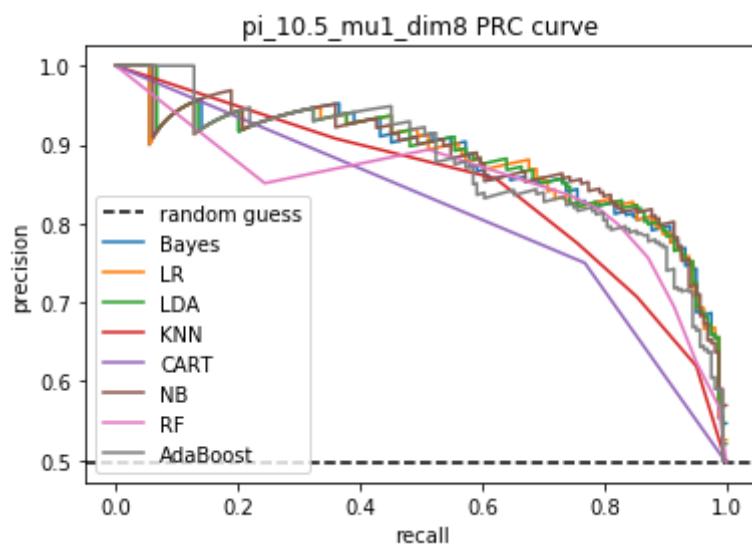
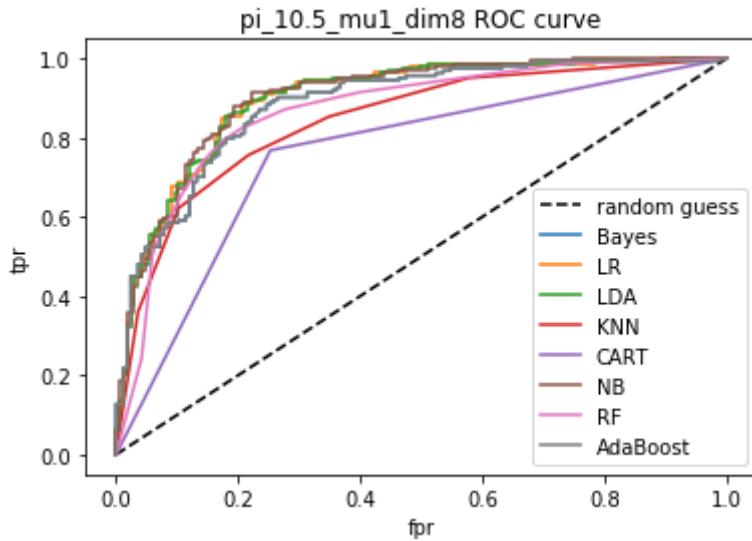
AdaBoost : AUROC = 0.900, AUPRC = 0.922, average precision = 0.776, .  
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then  
0.794, accuracy = 0.800.  
F1 score = 0.812, log loss = 6.908, recall = 0.790.

---

Bayes classifier has AUROC = 0.915, and AUPRC = 0.933.



```
The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is NB
The best model measured by accuracy is RF
The best model measured by average_precision is RF
The best model measured by f1 is KNN
The best model measured by log_loss_score is RF
The best model measured by recall is KNN
Positive ratio for pi_1 = 0.5 , mu = 1 , dim = 8 is 0.497 .
LR : AUROC = 0.899, AUPRC = 0.881, average precision = 0.770, .
Best threshold for ROC = 0.499, accuracy for the best ROC threshold is then
0.827, accuracy = 0.827.
F1 score = 0.826, log loss = 5.966, recall = 0.823.
-----
LDA : AUROC = 0.900, AUPRC = 0.883, average precision = 0.768, .
Best threshold for ROC = 0.506, accuracy for the best ROC threshold is then
0.827, accuracy = 0.827.
F1 score = 0.827, log loss = 5.966, recall = 0.829.
-----
KNN : AUROC = 0.843, AUPRC = 0.848, average precision = 0.707, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.761, accuracy = 0.770.
F1 score = 0.765, log loss = 7.954, recall = 0.756.
-----
CART : AUROC = 0.758, AUPRC = 0.817, average precision = 0.691, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.503, accuracy = 0.758.
F1 score = 0.759, log loss = 8.373, recall = 0.768.
-----
NB : AUROC = 0.902, AUPRC = 0.885, average precision = 0.772, .
Best threshold for ROC = 0.538, accuracy for the best ROC threshold is then
0.821, accuracy = 0.833.
F1 score = 0.836, log loss = 5.757, recall = 0.854.
-----
RF : AUROC = 0.866, AUPRC = 0.846, average precision = 0.751, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.809, accuracy = 0.809.
F1 score = 0.805, log loss = 6.594, recall = 0.793.
-----
AdaBoost : AUROC = 0.884, AUPRC = 0.875, average precision = 0.737, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.803, accuracy = 0.800.
F1 score = 0.800, log loss = 6.908, recall = 0.805.
-----
Bayes classifier has AUROC = 0.899, and AUPRC = 0.881.
```



```

The best model measured by AUROC is NB
The best model measured by AUPRC is NB
The best model measured by accuracy_best_threshold is LR
The best model measured by accuracy is NB
The best model measured by average_precision is NB
The best model measured by f1 is NB
The best model measured by log_loss_score is NB
The best model measured by recall is NB
Positive ratio for pi_1 = 0.5 , mu = 1 , dim = 10  is 0.498 .
LR : AUROC = 0.933, AUPRC = 0.934, average precision = 0.809, .
Best threshold for ROC = 0.470, accuracy for the best ROC threshold is then
0.858, accuracy = 0.858.
F1 score = 0.854, log loss = 4.919, recall = 0.841.

-----
LDA : AUROC = 0.932, AUPRC = 0.934, average precision = 0.811, .
Best threshold for ROC = 0.461, accuracy for the best ROC threshold is then
0.852, accuracy = 0.858.
F1 score = 0.854, log loss = 4.919, recall = 0.835.

-----
KNN : AUROC = 0.888, AUPRC = 0.902, average precision = 0.773, .
Best threshold for ROC = 0.600, accuracy for the best ROC threshold is then
0.773, accuracy = 0.830.
F1 score = 0.829, log loss = 5.861, recall = 0.829.

```

```

CART : AUROC = 0.703, AUPRC = 0.777, average precision = 0.638, .
Best threshold for ROC = 1.000, accuracy for the best ROC threshold is then
0.503, accuracy = 0.703.
F1 score = 0.708, log loss = 10.257, recall = 0.726.

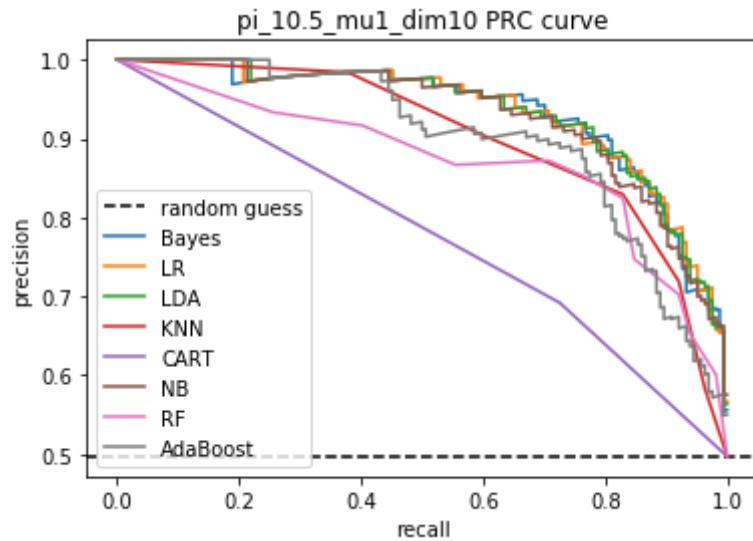
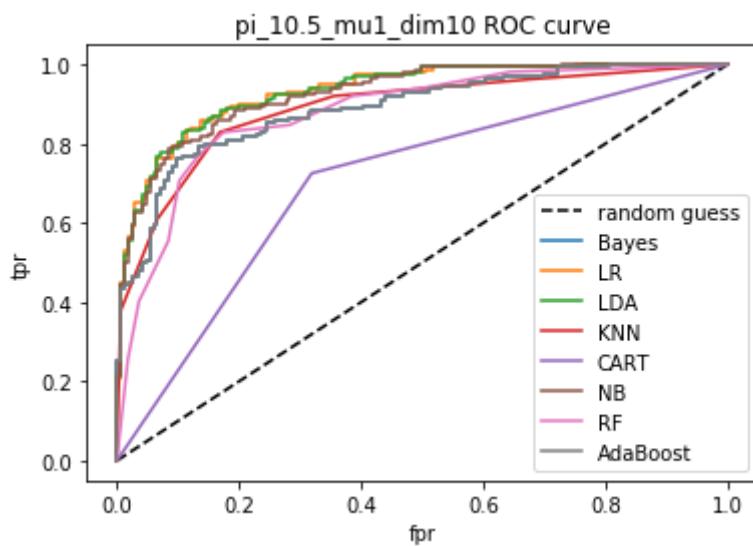
NB : AUROC = 0.927, AUPRC = 0.929, average precision = 0.799, .
Best threshold for ROC = 0.440, accuracy for the best ROC threshold is then
0.842, accuracy = 0.845.
F1 score = 0.839, log loss = 5.338, recall = 0.811.

RF : AUROC = 0.878, AUPRC = 0.872, average precision = 0.769, .
Best threshold for ROC = 0.500, accuracy for the best ROC threshold is then
0.818, accuracy = 0.818.
F1 score = 0.808, log loss = 6.280, recall = 0.768.

AdaBoost : AUROC = 0.889, AUPRC = 0.899, average precision = 0.777, .
Best threshold for ROC = 0.497, accuracy for the best ROC threshold is then
0.812, accuracy = 0.824.
F1 score = 0.814, log loss = 6.071, recall = 0.774.

Bayes classifier has AUROC = 0.932, and AUPRC = 0.933.

```



The best model measured by AUROC is LR  
The best model measured by AUPRC is LR  
The best model measured by accuracy\_best\_threshold is LR  
The best model measured by accuracy is LR  
The best model measured by average\_precision is LDA  
The best model measured by f1 is LR  
The best model measured by log\_loss\_score is LDA  
The best model measured by recall is LR