

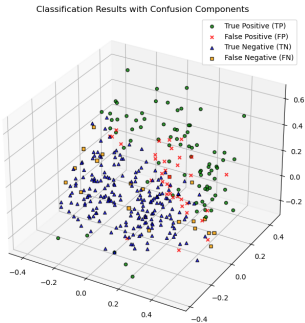
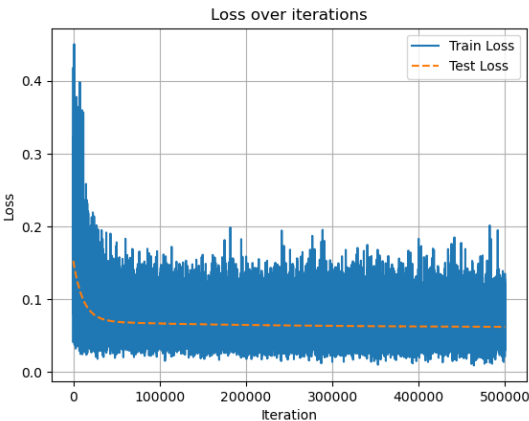
# AI4I Binary Classification Prediction

## linear regression

my model

```
linear_model = LinearRegression(n_iter=50000, lr=8e-4, batch_size=64)
```

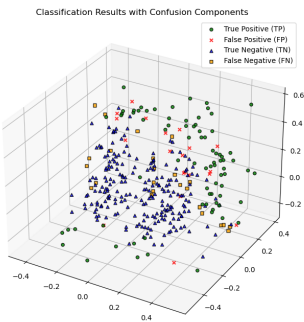
**TP: 83 TN: 206 FP: 36 FN: 21** Accuracy: 0.8352601156069365 Precision: 0.6974789915966386 Recall: 0.7980769230769231 F1 Score: 0.7443946188340808 Total time taken: 38.09750461578369 seconds



## sklearn

```
linear_sklearn = LinearRegression()
```

**TP: 78 TN: 217 FP: 20 FN: 24** Accuracy: 0.8702064896755162 Precision: 0.7959183673469388 Recall: 0.7647058823529411 F1 Score: 0.7799999999999999 Total time taken: 5.636926174163818 seconds

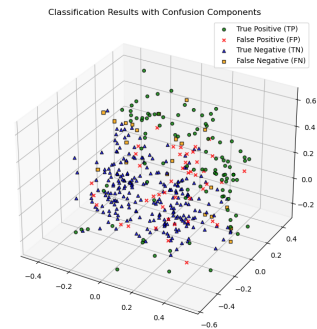
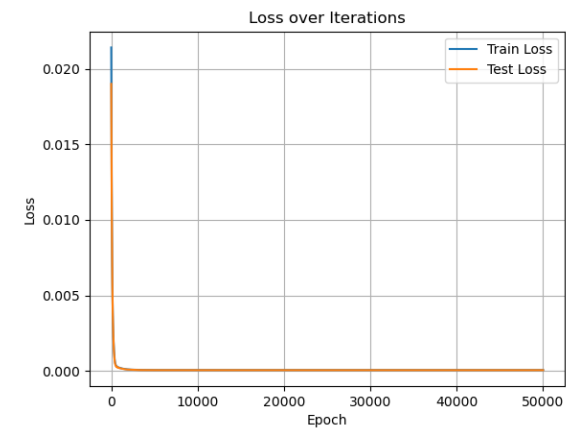


## perceptron

my model

```
perceptron_model = Perceptron(n_iter=50000, lr=2e-3, batch_size=64)
```

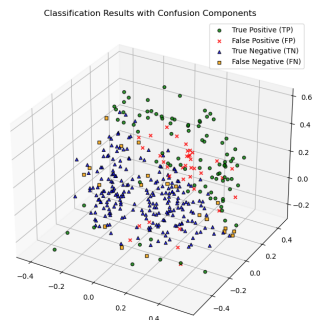
**TP: 102 TN: 242 FP: 44 FN: 21** Accuracy: 0.8410757946210269 Precision: 0.6986301369863014 Recall: 0.8292682926829268 F1 Score: 0.758364312267658 Total time taken: 19.484343767166138 seconds



sklearn

```
perceptron_sklearn = Perceptron(max_iter=100000, random_state=42)
```

**TP: 94 TN: 232 FP: 36 FN: 21** Accuracy: 0.8511749347258486 Precision: 0.7230769230769231 Recall: 0.8173913043478261 F1 Score: 0.7673469387755102 Total time taken: 2.7166144847869873 seconds

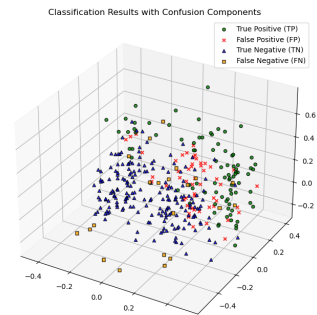
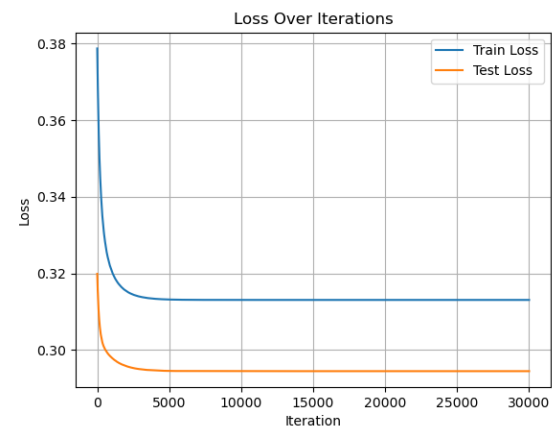


logistic regression

my model

```
logistic_model = LogisticRegression(n_iter=30000, lr=3e-3, batch_size=64)
```

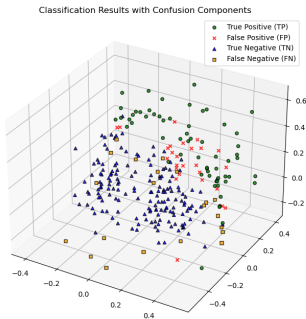
**TP: 85 TN: 195 FP: 52 FN: 21** Accuracy: 0.7932011331444759 Precision: 0.6204379562043796 Recall: 0.8018867924528302 F1 Score: 0.6995884773662552 Total time taken: 19.374540090560913 seconds



sklearn

```
logistic_sklearn = LogisticRegression(max_iter=100000, random_state=42)
```

**TP: 61 TN: 165 FP: 26 FN: 21** Accuracy: 0.8278388278388278 Precision: 0.7011494252873564 Recall: 0.7439024390243902 F1 Score: 0.7218934911242605 Total time taken: 2.442545175552368 seconds

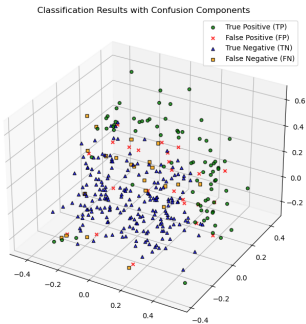
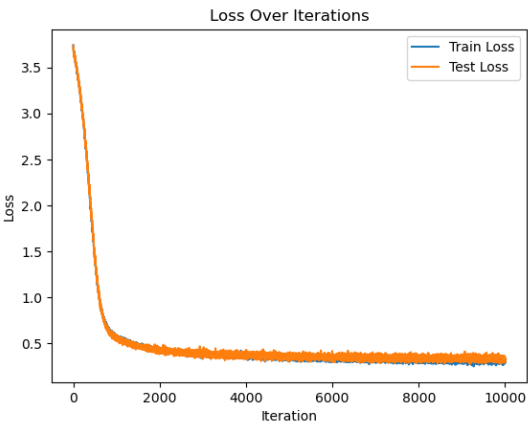


MLP

my model

```
mlp_model = MultiLayerPerceptron(layer_sizes=[X_train.shape[1],47,101,32], n_iter=10000, lr=1e-5, batch_size=32)
```

**TP: 87 TN: 213 FP: 20 FN: 13** Accuracy: 0.9009009009009009 Precision: 0.8130841121495327 Recall: 0.87 F1 Score: 0.8405797101449274 Total time taken: 421.797244310379 seconds



sklearn

```
mlp_sklearn = MLPClassifier(hidden_layer_sizes=(12,47,101,11), activation='relu', solver='adam', max_iter=10000, random_state=42)
```

**TP: 90 TN: 213 FP: 15 FN: 8** Accuracy: 0.9294478527607362 Precision: 0.8571428571428571 Recall: 0.9183673469387755 F1 Score: 0.8866995073891625 Total time taken: 8.705824136734009 seconds

