

## Peer Review

Submitted by: [Daniel Wagermaier](#)

Reviewed by: Gerald Koinig, m01235057

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### How clearly written and comprehensible is the submission in general?

Cells 1-6 of the submission were clearly written and started with a summary of the employed and the source of the used models.

Cell 7 starts with a very sparse explanation. The reason for selecting 0.95 as confidence has not been stated by the authors. The source for the used formula to calculate the upper error in 7 has not been stated.

```
confidence = 0.95

c_significance = stats.norm.ppf((1 + confidence) / 2)

catNB_upper_error = catNB_emp_error + c_significance * np.sqrt(catNB_emp_error *
(1 - catNB_emp_error) / len(y_test)) + c_significance / len(y_test)
```

Apart from this, all lines of code were clearly understandable to the reviewer and the authors intent was transparent.

### How easy is it to understand the results described in the submission?

The author has stated the results of the submission as output in the command line window in a well structured, concise and readable manner.

From this the numerical values of the results are obvious to the reviewer.

```
Correct labeled(Decision Tree): 892 from 1200 (Accuracy: 74.33%)
Correct labeled(Gauss): 682 from 1200 (Accuracy: 56.83%)
Correct labeled(Multinomial): 999 from 1200 (Accuracy: 83.25%)
Correct labeled(Complement): 865 from 1200 (Accuracy: 72.08%)
Correct labeled(Bernoulli): 995 from 1200 (Accuracy: 82.92%)
Correct labeled(Categorical): 755 from 1200 (Accuracy: 62.92%)
CategoricalNB upper error: 42.89%
BernoulliNB upper error: 18.54%
ComplementNB upper error: 33.99%
MultinomialNB upper error: 20.15%
GaussianNB upper error: 47.79%
DecisionTreeClassifier upper error: 26.52%
```

**How convincing is the experimental setup?**

All available Naive Bayes method in the sklearn library have been tested for their suitability to predict the given data.

Only one test/training/validation split has been performed to test the predictors. The predictors performance would have to be evaluated with different data splits.

**How do the authors justify their conclusion? Are you convinced?**

# According to the calculated upper error bounds, we came to the conclusion that the BernoulliNB returns the highest accuracy with an upper error of at most 18.54% (confidence 95%)

The difference in performance of Bernoulli Naïve Bayes and Multinomial Naïve Bayes seems minuscule. Further explanation as to why Bernoulli NB was chosen as the best predictor would have been welcome.

**Which questions have not been addressed by the authors?**

Only one trial has been conducted with one testing, training and validation set. No trials showing how the model would perform on different data were performed.

The model would have to be tested with different training, testing and validation set compositions. This would have been informative to gauge the estimated errors.

Further, the suitability of a decision tree has been evaluated and the resulting decision tree has been shown as a plot. Unfortunately, the plot was not readable to the reviewer. The plot settings would need to be changed.

Figure 1 displays the output from the plot function in the submission showing the distribution of data sets in training data and validation data for each digit

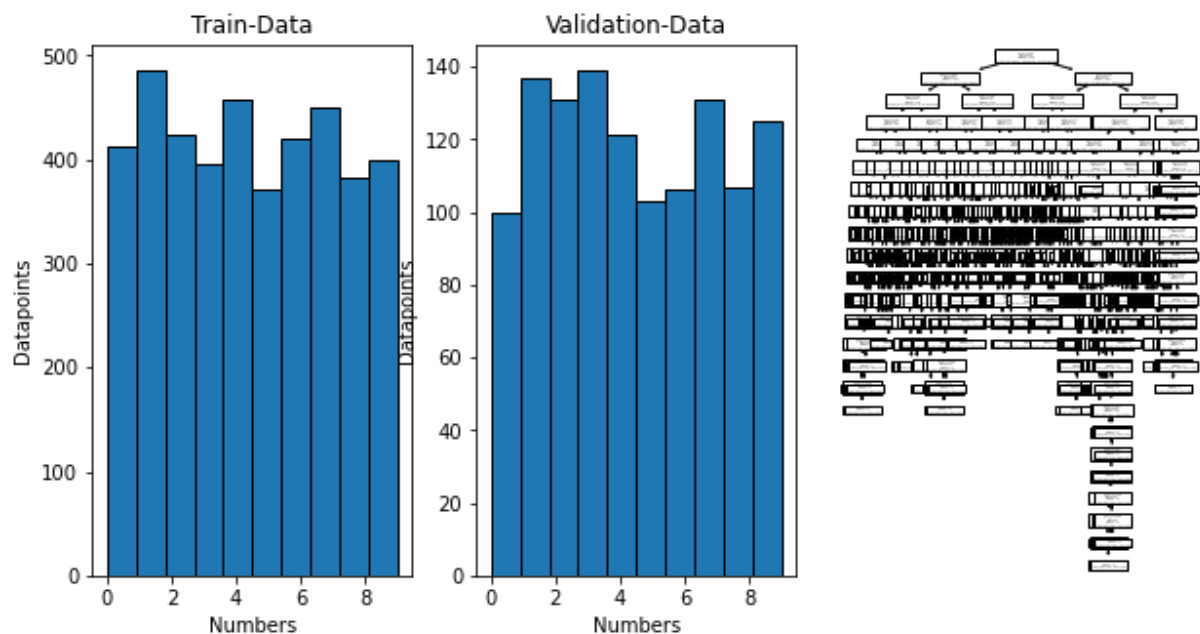


Figure 1: Output from plot function in the submission showing the distribution of data sets in training data and validation data for each digit

**Summarize the quality of the submission.**

The reviewer finds the submitted piece of code very well structured, readable and the produced predictors performed well according to the presented results.