Introduction – Aims and Objectives

For the purposes of this report, the first group; deaths will henceforth be referred to as Class 0 and survivors as Class 1.

**Methodology** – what did you do, and why did you do it that way? What do you hope to learn from doing it this way? Is this the best approach? Are there things you would have done if you had more time or resources?

In testing:

Total Data Points: 60 True Survivors: 39 True Deaths: 21

**Findings** – what was the accuracy found? How was it found? Were there other scoring methods used? Why did you use the one you did? Were there any parts of the results you don’t think are accurate? Summarize the two methods used, and how the results received from each other them differed.

**Discussion** – What do the results found mean? Contrast the two methods used and then compare the meaning of those results. What could come of these results? Why were the accuracy scores what they were? Would there be a better method in hindsight? Give reasons for possible errors, extended goals, and other research that could come of this report.

2x2 Matrix: Deep Learning, MATLAB  
**Fisher Exact Probability Test**

|  |  |  |  |
| --- | --- | --- | --- |
| Contingency Table | Class 0 | Class 1 | Marginal Totals |
| Class 0 | **5** | **6** | **11** |
| Class 1 | **3** | **16** | **19** |
| Marginal Totals | **8** | **22** | **True Total 30** |

Chart

Description automatically generated

Figure : MATLAB Deep Learning Bilayered Neural Network 2x2 Contingency Matrix

**Conclusions and Recommendations** – Concluding the meaning of results found. Why this research is important and why the results were processed in the way they were. Things that would have improved the results, and that may have impacted the study. Stretch goals that you believe would have made the results better.

**References** – machine learning paper? The referenced paper, MATLAB documentation, python documentation, the website for 2x2 tables.

\*\*\*Make sure to update the algorithm with the feature selection – maybe the results will be more accurate??

First, the data was separated into class 0 and class 1, class 1 being a good patient outcome and class 2 being a bad patient outcome. The data was then placed into two separate matrices, training, and test sets. The training set had 11 class 0 data points and 19 class 1 data points, and the test set had 10 class 0 data points and 20 class 1 data points. Because there was not an even number of class 0 or class 1 data points, they had to be separated between the training and the test set with bias. The test set was decided to contain more class 1 and the training set with bias to class 0. This was because if overfitting was to occur to class 0 during training, it was better to occur with caution then with callousness. Additionally, from Golub’s paper (THE ONE HE GAVE US), the markers for bad outcomes resulted in less failures (when the algorithm is wrong) then the markers for good outcomes, resulting in the suggestion that markers signifying class 0 are more skewed from the mean then those signifying class 1. Thus, biasing the training towards class 0 increases the likelihood for a high success rate on classifying the given datapoints.

For separating the data, Microsoft Excel was used, using an online random number generator corresponding to each datapoint, and then copying the relevant columns into different sheets. The training and the test set were each stored in a single Excel file. Then, both datasets were formatted to be three dimensional arrays: axis 0 (rows) was set to be the features given for each datapoint, axis 1 (columns) was set to be datapoints given (a full set of features all pertaining to a single patient), and axis 2 (sheets) was set to be classes (whether the outcome was good or bad). This allowed the algorithm to train on one set, knowing the outcomes, and then test on the second set, marking its performance with the given classes after classifying.

The datasets were then read into Matlab,

Things from assignment:  
- evaluate the performance of the classifier

-compare with the value of matlab

1. How did you convert the raw data into a form your program could understand? Did you do a matrix? Take individual data? Etc.

2. When splitting your data into training and testing sets how did u ensure there was as minimal bias as possible, and the groups were good representations of the data set as a whole?

3. What form of training did you conduct? Why did you select this process and what is the mathematical reasoning behind it?

4. How did you determine your ideal parameters? Is there a possibility to improve the accuracy even more so?

5. How did your testing data respond to your training model? Is this an accurate way to predict patient outcome?

6. Something about fishers

7. Something about Matthew coef.

8.conclusion on what the entire process shows for results

Appendix A:

Using k =9

|  |  |  |
| --- | --- | --- |
| Data Point Index | Predicted Class | True Class |
| 1 | 1 | 0 |
| 2 | 1 | 0 |
| 3 | 0 | 0 |
| 4 | 1 | 0 |
| 5 | 1 | 0 |
| 6 | 1 | 0 |
| 7 | 0 | 0 |
| 8 | 1 | 0 |
| 9 | 1 | 0 |
| 10 | 0 | 0 |
| 11 | 1 | 0 |
| 12 | 1 | 1 |
| 13 | 1 | 1 |
| 14 | 1 | 1 |
| 15 | 1 | 1 |
| 16 | 1 | 1 |
| 17 | 1 | 1 |
| 18 | 1 | 1 |
| 19 | 1 | 1 |
| 20 | 1 | 1 |
| 21 | 1 | 1 |
| 22 | 1 | 1 |
| 23 | 1 | 1 |
| 24 | 1 | 1 |
| 25 | 1 | 1 |
| 26 | 1 | 1 |
| 27 | 1 | 1 |
| 28 | 1 | 1 |
| 29 | 1 | 1 |
| 30 | 1 | 1 |
| **Accuracy over All Data Points: 73.3%** | | |

Python script written for KNN model and validation.