Spline_Model_Results

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Creating Control and Experimental Holling Linear Interpolated Datasets in order to train on.

```
holling_data <- x_transform_data(read.csv('../Data/fvt_1000.csv'))
```

```
## Warning: package 'caret' was built under R version 3.6.2
```

```
## Loading required package: lattice
```

```
## Warning: package 'lattice' was built under R version 3.6.2
```

```
##
## Attaching package: 'caret'
```

```
## The following objects are masked from 'package:ModelMetrics':
##
##     confusionMatrix, precision, recall, sensitivity, specificity
```

```
## The following object is masked from 'package:survival':
##
##     cluster
```

```
## Warning: package 'pracma' was built under R version 3.6.2
```

```
holling_data1 <- x_transform_data(read.csv('../Data/natural_1000.csv'))
```

Train function to get Spline average intercept, coefficients and threshold value from Holling Control and Experimental datasets combined.

```
results <- spline_coefficient_train(holling_data, holling_data1)
results
```

```
## $int
## [1] 0.3596256
##
## $df1
## [1] 15.0525
##
## $df2
## [1] 25.51047
##
## $df3
## [1] 31.87717
##
## $df4
```

```
## [1] 33.87085
##
## $thresh
## [1] 0.2385
```

Testing Binary results using function with parameters.

```
spline_coefficient_test_params(read.csv('../Data/natural_1000.csv'), results$int, results$df1, results$
```

```
## [1] 0
```

Testing Binary results using function with no parameters.

```
spline_coefficient_test(read.csv('../Data/natural_1000.csv'))
```

```
## [1] 0
```

Testing Binary results using Accuracy test of 30 organisms with a total of 100 Holling datasets, 50 control and 50 experimental.

```
coef_test <- f_beta_eval(spline_coefficient_test, sim_hollings, 30, 50)
coef_test
```

```
## $acc
## [1] 0.83
##
## $fb
## [1] 0.8495575
##
## $preds
##   [1] 1 0 0 1 1 0 0 0 1 0 1 0 0 0 0 1 0 1 0 0 0 0 1 0 0 1 1 0 0 0 1 0 1 0 0 0 0
##  [38] 0 0 0 0 0 0 1 0 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 0 1 1 1 1 1
##  [75] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

Testing Binary results using Accuracy test of 50 organisms with a total of 100 Holling datasets, 50 control and 50 experimental.

```
coef_test <- f_beta_eval(spline_coefficient_test, sim_hollings, 50, 50)
coef_test
```

```
## $acc
## [1] 0.96
##
## $fb
## [1] 0.9615385
##
## $preds
##   [1] 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0
##  [38] 0 1 0 1 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
##  [75] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

Testing Binary results using Accuracy test of 100 organisms with a total of 100 Holling datasets, 50 control and 50 experimental.

```
coef_test <- f_beta_eval(spline_coefficient_test, sim_hollings, 100, 50)
coef_test
```

```
## $acc
## [1] 0.97
##
## $fb
## [1] 0.9708738
##
## $preds
##   [1] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
##  [38] 0 0 0 1 0 0 0 0 0 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
##  [75] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

Creating Control and Experimental Sinusodal Linear Interpolated Datasets in order to train on.

```
sin_data <- x_transform_data(read.csv('../Data/sin_linearhazard_control_1000org.csv'))
sin_data1 <- x_transform_data(read.csv('../Data/sin_linearhazard_experimental_1000org.csv'))
```

Train function to get Spline average intercept, coefficients and threshold value from Sinusodal Control and Experimental datasets combined.

```
results <- spline_coefficient_train(sin_data, sin_data1)
results
```

```
## $int
## [1] 0.2741525
##
## $df1
## [1] 0.927254
##
## $df2
## [1] 0.4675307
##
## $df3
## [1] 0.8225235
##
## $df4
## [1] 0.6952248
##
## $thresh
## [1] 0
```

Testing Binary results using Accuracy test of 30 organisms with a total of 100 Sinusodal datasets, 50 control and 50 experimental.

```
coef_test <- f_beta_eval(spline_coefficient_test, sim_sin, 30, 50)
coef_test
```

```
## $acc
## [1] 0.5
##
## $fb
## [1] 0.6666667
##
## $preds
##   [1] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
##  [38] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
##  [75] 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

Rest of results for Sinusodal return 50% accuracy with F-Beta score of 0.