Call**:**

glm**(**formula **=** obese **~** flipper\_length\_mm **\*** bill\_length\_mm **+** sex **+**

species, family **=** binomial**(**link **=** "logit"**)**, data **=** train\_data**)**

Coefficients**:**

Estimate Std. Error

**(**Intercept**)** 27.552190 78.862421

flipper\_length\_mm **-**0.207007 0.406718

bill\_length\_mm **-**1.384759 1.867541

sexmale 2.892290 1.094641

speciesChinstrap **-**4.739485 1.655085

speciesGentoo 2.640500 1.866750

flipper\_length\_mm**:**bill\_length\_mm 0.008385 0.009612

z value Pr**(>|**z**|)**

**(**Intercept**)** 0.349 0.72681

flipper\_length\_mm **-**0.509 0.61077

bill\_length\_mm **-**0.741 0.45840

sexmale 2.642 0.00824 **\*\***

speciesChinstrap **-**2.864 0.00419 **\*\***

speciesGentoo 1.414 0.15722

flipper\_length\_mm**:**bill\_length\_mm 0.872 0.38300

**---**

Signif. codes**:**

0 ‘**\*\*\***’ 0.001 ‘**\*\***’ 0.01 ‘**\***’ 0.05 ‘.’ 0.1 ‘ ’ 1

**(**Dispersion parameter **for** binomial family taken to be 1**)**

Null deviance**:** 323.002 on 232 degrees of freedom

Residual deviance**:** 98.718 on 226 degrees of freedom

AIC**:** 112.72

Number of Fisher Scoring iterations**:** 8

Analysis:

The term AIC [Akaike Information Criterion] is a measure for the predictability of the question’s specific measure, which in this case is the level of the model’s ability on being able to predict how many penguins are obese.

With the value being 112.72, which is considerably smaller, the memo here essentially is that the model is relatively accurate at prediction.

To-Do List:

Explain the significance of the ‘Estimate’ values as well as the ‘Std. Error’ for each intercept, and what it could mean for the context of the exam question.

Do the same for the ‘z-value’, and what it specifically means.

Perhaps the null and residual deviances too.

Confusion Matrix and Statistics

Reference

Prediction 0 1

0 42 2

1 13 43

Accuracy **:** 0.85

95% CI : (0.7647, 0.9135)

No Information Rate **:** 0.55

P**-**Value **[**Acc **>** NIR**]** **:** 1.716e-10

Kappa **:** 0.7036

Mcnemar's Test P-Value : 0.009823

Sensitivity : 0.9556

Specificity : 0.7636

Pos Pred Value : 0.7679

Neg Pred Value : 0.9545

Prevalence : 0.4500

Detection Rate : 0.4300

Detection Prevalence : 0.5600

Balanced Accuracy : 0.8596

'Positive' Class : 1

Analysis:

Accuracy: 0.85 [or 85%] signifies that it’s inherently efficient in predicting which penguin is actually obese and separate them from which of the penguins aren’t. Although further analysis of the accuracy can’ t quite be attained without a measure of comparison (via a separate model).

As for the ‘Mcnemar’s Test P-Value’, this definition essentially defines whether or not the null hypothesis is true (which in this case could be, “can the model efficiently determine which penguin is obese and which isn’t?”)

If you decide that the significance value is 0.05, then you have sufficient statistical evidence to reject the null hypothesis, and state that the model cannot efficiently determine whether or not X penguin is obese.

The values works vice versa.

> cat("Improved Accuracy:", round(imp\_accuracy, 3),

+ "- Proportion correct;\n")

Improved Accuracy: 0.85 - Proportion correct;

> cat("Improved Sensitivity:", round(imp\_sensitivity, 3),

+ "- Detection of obese;\n")

Improved Sensitivity: 0.956 - Detection of obese;

> cat("Improved Specificity:", round(imp\_specificity, 3),

+ "- Detection of non-obese;\n")

Improved Specificity: 0.764 - Detection of non-obese;

> cat("Improved Precision:", round(imp\_precision, 3),

+ "- Reliability of obese predictions;\n")

Improved Precision: 0.768 - Reliability of obese predictions;

Analysis:

Under each defined value includes a relatively short explanation for each component (Accuracy, Sensitivity, Specificity, Precision (according to the functions of the R library)).

The model so far shows promising signs in terms of being able to correctly predict and define the proportions of obese penguins vs non-obese penguins.

The model is also very adept in actually being able to identify obesity, in which the model also attaches ‘obesity’ as a label on a penguin whether or not it actually is.

As for specificity, the model is specific in also being able to detect and determine the levels of non-obesity in which it integrates into the whole confusion matrix.