

Task 1 – Dataset (Penguins)

Neural Network



November 6, 2022

CS - H28

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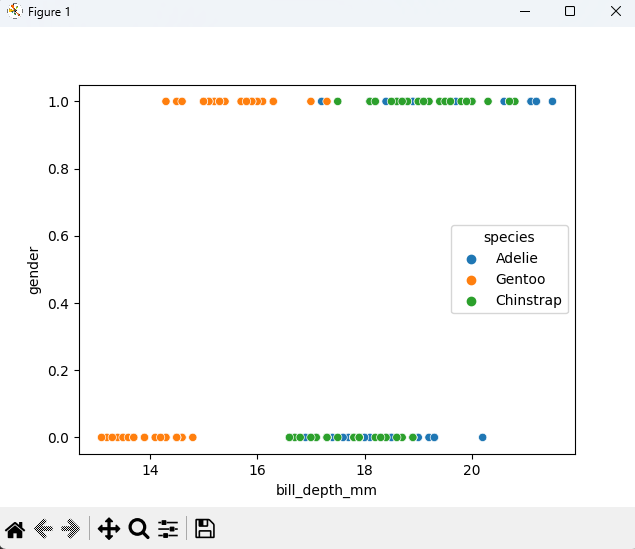


Figure 1 The data above using features "Gender " and “Bill Depth" shows that:

1. between class "Gentoo" & "Chinstrap": there is a line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is no line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly.

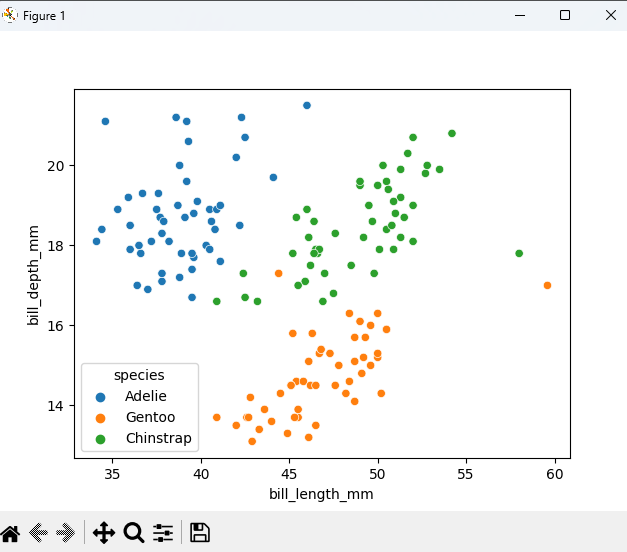


Figure 2 The data above using features "Bill length " and “Bill Depth" shows that:

between class "Gentoo" & "Chinstrap": there is a line to separate them linearly.

between class "Gentoo" & "Adelie": there is a line to separate them linearly.

between class "Adelie" & "Chinstrap": there is no line to separate them linearly.

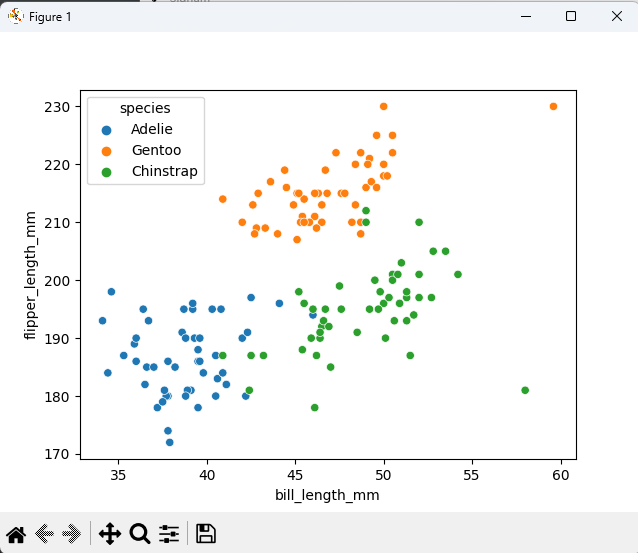


Figure 3 The data above using features " Bill Length" and "Flipper Length " shows that:

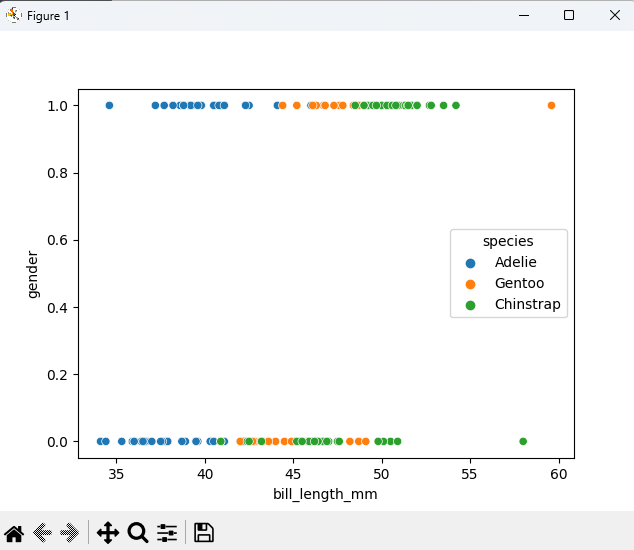
1. between class "Gentoo" & "Chinstrap": there is no line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is no line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly.

Figure 4 The data above using features "Bill length " and “Gender" shows that:

1. between class "Gentoo" & "Chinstrap": there is no line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is no line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly.

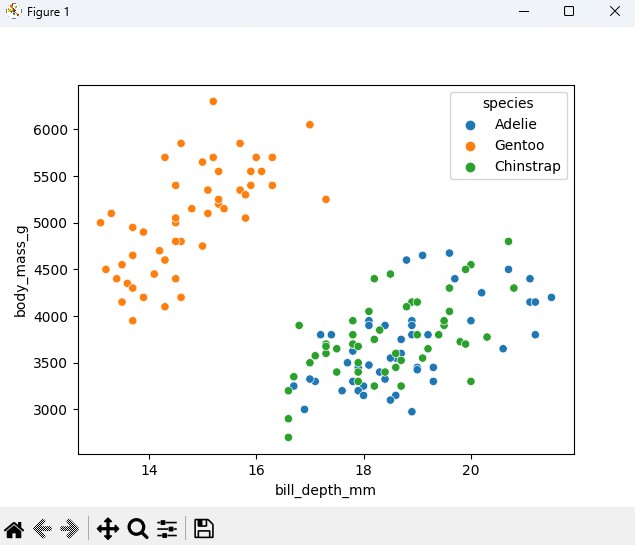


Figure 5 The data above using features " Bill Depth" and "Body Mass " shows that:

1. between class "Gentoo" & "Chinstrap": there is a line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is a line to separate them linearly.
3. Chart, scatter chart

   Description automatically generatedbetween class "Adelie" & "Chinstrap": there is no line to separate them linearly

Figure 6 The data above using features " Bill Length" and "Body Mass " shows that:

1. between class "Gentoo" & "Chinstrap": there is no line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is no line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly

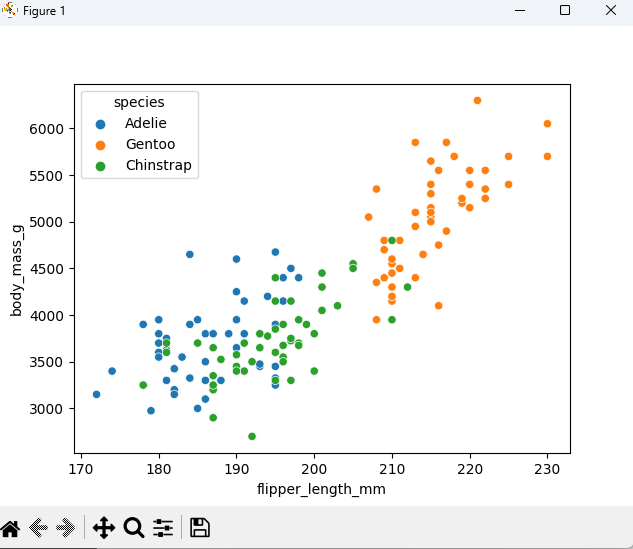


Figure 7 The data above using features " Flipper Length" and "Body Mass " shows that:

1. between class "Gentoo" & "Chinstrap": there is no line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is no line to separate them linearly.
3. Graphical user interface

   Description automatically generatedbetween class "Adelie" & "Chinstrap": there is no line to separate them linearly

Figure 8 The data above using features " Gender" and "Body Mass " shows that:

1. between class "Gentoo" & "Chinstrap": there is no line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is no line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly

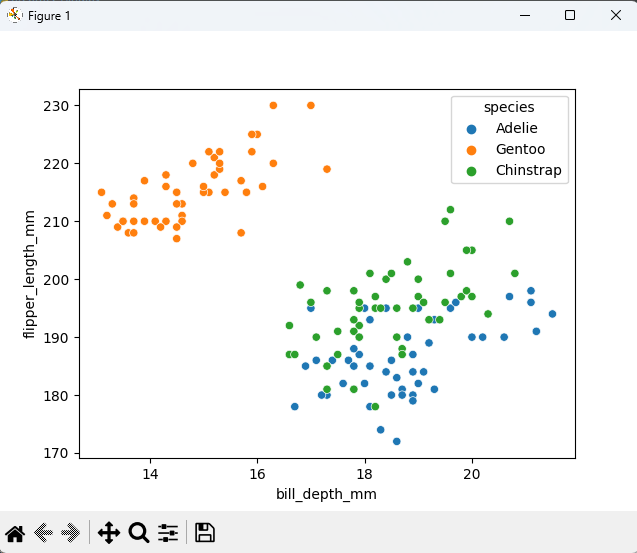


Figure 9 The data above using features " Flipper Length" and "Bill Depth " shows that:

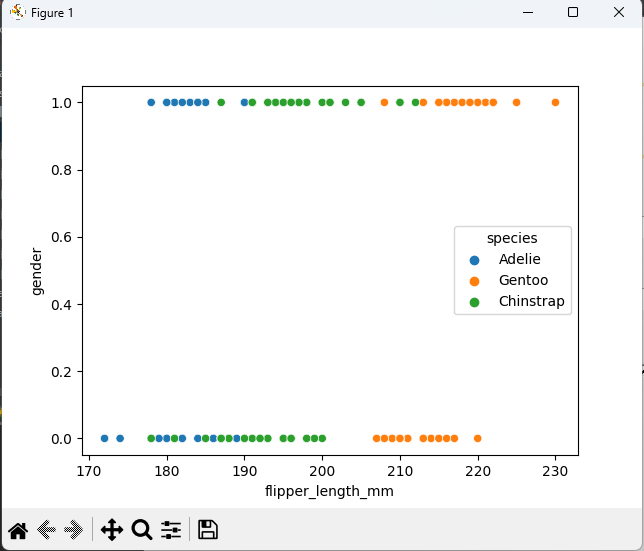
1. between class "Gentoo" & "Chinstrap": there is a line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is a line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly

Figure 10 The data above using features " Flipper Length" and "Bill Depth " shows that:

1. between class "Gentoo" & "Chinstrap": there is no line to separate them linearly.
2. between class "Gentoo" & "Adelie": there is a line to separate them linearly.
3. between class "Adelie" & "Chinstrap": there is no line to separate them linearly

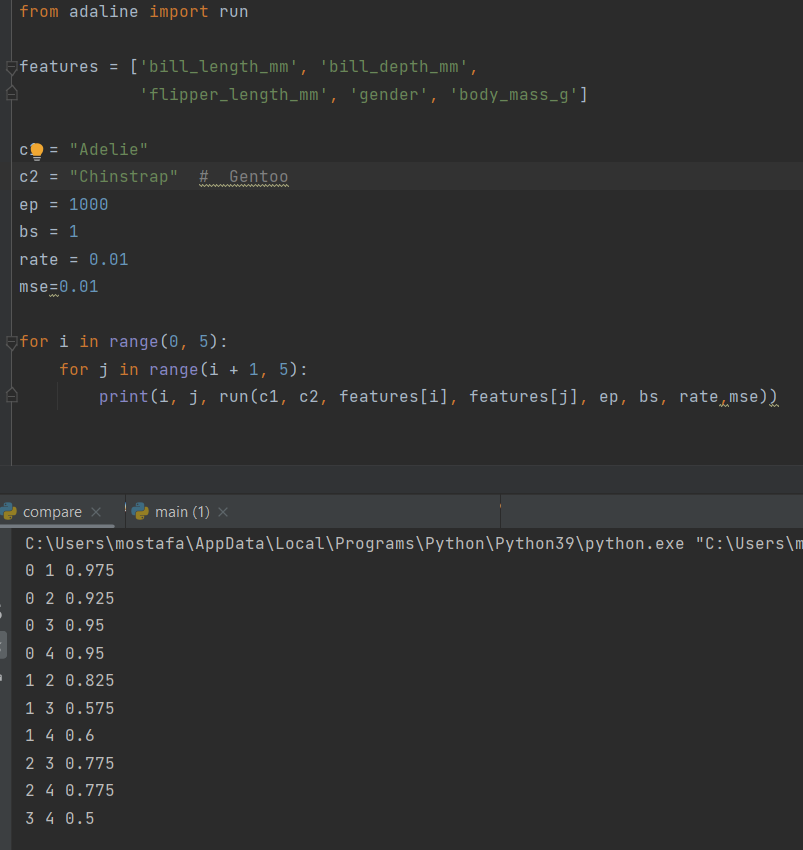
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Analysis:

The features that achieved the highest accuracy after running our algorithm:

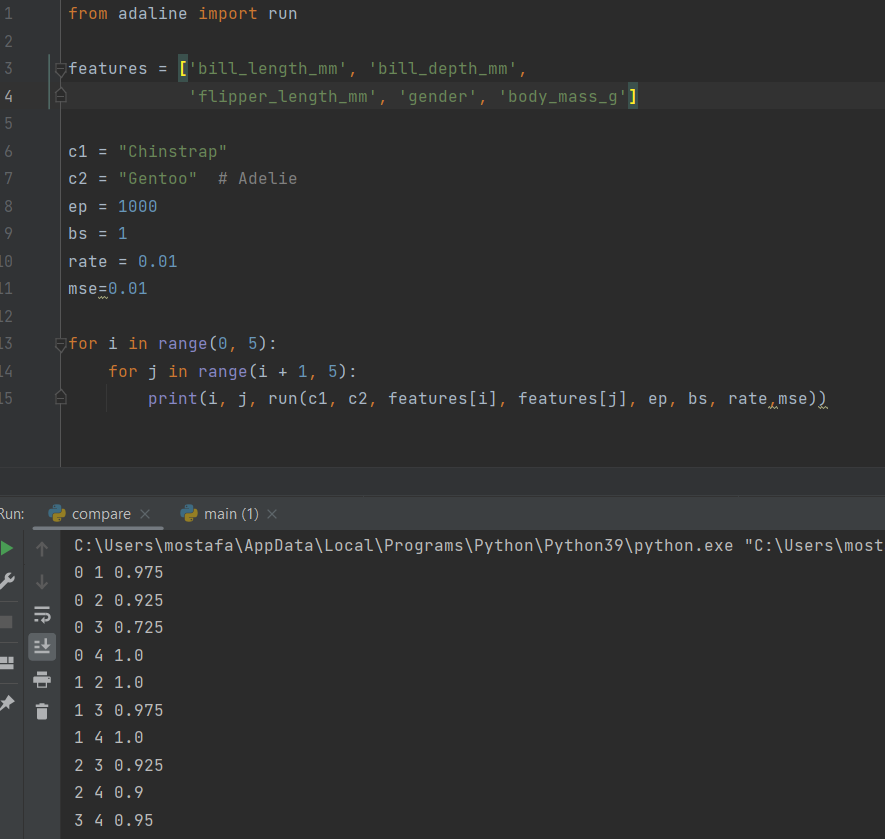
**Adelie and Chinstrap:**

* from this screenshot we could see that the best features to discriminate between "Adelie" and “Chinstrap” classes are “bill\_length\_mm” and “bill\_depth\_mm” which get 97.5% accuracy. We can conclude that with these features we can linearly separate the two classes.



**“Gentoo" and “Chinstrap”:**

* from this screenshot we could see that the best features to discriminate between " **Gentoo**" and “Chinstrap” classes are “bill\_length\_mm” and “body\_mass\_g” which get 100% accuracy. Also features “bill\_depth\_mm” and “flipper\_length\_mm” get 100% accuracy, and features “bill\_depth\_mm” and “body\_mass\_g” get 100% accuracy.



Graphical user interface, text, application, email

Description automatically generated

**“Gentoo" and “Adelie”:**

* from this screenshot we could see that the best features to discriminate between "Gentoo" and “Chinstrap” classes are “bill\_length\_mm” and “flipper\_length\_mm” which get 100% accuracy. Also, other features combinations get 100% accuracy as shown below.

