

*Article*

# **Investigation of the Relationships between Coat Colour, Sex, and Morphological Characteristics in Donkeys Using Data Mining Algorithms**

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## The Prediction Equation Results for the Bagging MARS Algorithm

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> bagMARS$oob
RMSE  Rsquared    MAE
[1,] 3.391163 0.7971010 2.712162
[2,] 4.582449 0.6737574 3.617525
[3,] 5.434235 0.5649297 3.374495

> cat(format(mu5))
BL=(108.6688
+ 0.7055595 * h(WH-105)
- 2.17283 * h(99-HR)
+ 0.1699517 * h(CC-107)
- 1.899378 * h(41-HW)
- 0.7495128 * h(HW-41)
- 0.2444284 * h(50-TL)
- 0.3697409 * Province Kars*h(105-WH)
- 0.1295822 * h(105-WH)*h(EL-22)
+ 0.1273157 * h(HR-99)*h(29-CW)
+ 0.08126315 * h(104-HR)*h(41-HW)
+ 0.2053291 * h(HR-99)*h(39-TL)
- 0.2801208 * h(HR-99)*h(52-HL)
+ 0.3064254 * h(41-HW)*h(HL-58)
+ 0.09016256 * h(41-HW)*h(58-HL)
+ 0.4655969 * h(41-HW)*h(CAC-13.5)
+ 0.04869532 * h(41-HW)*h(LL-45)
+ 0.2760453 * h(41-HW)*h(EL-22.5)
+ 0.1530143 * h(50-TL)*h(21-EL)
- 0.1723079 * h(TL-50)*h(EL-22)
+ 109.2485
- 0.9382122 * h(107-HR)
+ 2.483933 * h(HR-107)
- 1.116736 * h(HW-41)
+ 1.615983 * h(38-TL)
+ 0.1763708 * h(TL-38)
+ 0.03688395 * h(101-WH)*h(107-HR)
+ 0.3488042 * h(WH-101)*h(107-HR)
- 0.05538678 * h(107-HR)*h(107-CC)
+ 0.1822892 * h(107-HR)*h(CW-26)
+ 0.4428114 * h(107-HR)*h(26-CW)
- 0.1194691 * h(HR-100)*h(41-HW)
- 0.1066795 * h(107-HR)*h(51-TL)
- 0.06071318 * h(109-HR)*h(TL-38)
- 0.1032581 * h(HR-109)*h(TL-38)
+ 0.878669 * h(107-HR)*h(CAC-13.5)
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+ 0.3322155 \* h(107-HR)\*h(13.5-CAC)  
 + 0.06099415 \* h(107-HR)\*h(24-EL)  
 - 0.4135477 \* h(26-CW)\*h(41-HW)  
 - 0.09861111 \* h(CW-26)\*h(41-HW)  
 + 0.2334746 \* h(41-HW)\*h(HL-59)  
 + 0.03160098 \* h(41-HW)\*h(59-HL)  
 + 105.1639  
 - 0.4696366 \* h(104-WH)  
 + 0.7602837 \* h(WH-104)  
 - 3.231432 \* h(CC-116)  
 + 0.4090607 \* h(118-CC)  
 + 8.844629 \* h(CC-118)  
 - 4.048582 \* h(CC-119)  
 + 0.2687515 \* h(46-CD)  
 - 2.748363 \* h(40-HW)  
 - 1.208723 \* h(HW-40)  
 + 1.640274 \* h(TL-41)  
 - 1.713009 \* h(TL-47)  
 - 1.948429 \* h(47-LL)  
 - 0.5398618 \* h(LL-47)  
 - 0.5592429 \* Province Kars\*h(104-WH)  
 + 2.01843 \* Province Mardin\*h(40-HW)  
 - 1.217631 \* ProvincVan\*h(46-CD)  
 - 0.2142578 \* h(2-Age)\*h(118-CC)  
 - 0.04165114 \* h(Age-2)\*h(118-CC)  
 - 0.1174302 \* h(6-Age)\*h(CC-116)  
 + 0.06116534 \* h(Age-2)\*h(40-HW)  
 - 1.017233 \* h(2-Age)\*h(41-TL)  
 + 0.2189627 \* h(Age-2)\*h(41-TL)  
 + 0.8046758 \* h(104-WH)\*h(CAC-13.5)  
 + 0.2175535 \* h(104-WH)\*h(13.5-CAC)  
 - 0.03825487 \* h(105-HR)\*h(118-CC)  
 - 0.07320834 \* h(HR-105)\*h(118-CC)  
 + 0.1669249 \* h(112-CC)\*h(CD-46)  
 - 0.06852234 \* h(CC-118)\*h(TL-43)  
 - 0.1997813 \* h(CC-118)\*h(43-TL)  
 + 0.4741123 \* h(118-CC)\*h(EL-24)  
 - 0.05721887 \* h(118-CC)\*h(24-EL)  
 - 0.1610904 \* h(118-CC)\*h(EL-22)  
 + 0.0742018 \* h(40-HW)\*h(59-TL)  
 + 0.06577163 \* h(40-HW)\*h(57-HL)  
 + 0.198802 \* h(40-HW)\*h(LL-48)  
 + 0.2341542 \* h(40-HW)\*h(48-LL)  
 - 1.166718 \* h(39-TL)\*h(LL-47)

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) / 3
> mu5$fit
$Resample1
Selected 20 of 36 terms, and 11 of 29 predictors
Termination condition: Reached nk 36
Importance: HR, WH, HW, CAC, HL, TL, EL, ProvinceKars, LL, CW, CC, ColorBlack-unused,
ColorBrown-unused, ColorGray-unused, ...
Number of terms at each degree of interaction: 1 6 13
GCV 11.58879    RSS 3248.805    GRSq 0.777539    RSq 0.8309909
$Resample2
Selected 22 of 27 terms, and 9 of 29 predictors
Termination condition: RSq changed by less than 0.001 at 27 terms
Importance: HR, HW, CW, HL, CAC, TL, WH, CC, EL, ColorBlack-unused, ColorBrown-unused,
ColorGray-unused, ColorWhite-unused, ...
Number of terms at each degree of interaction: 1 5 16
GCV 11.74647    RSS 3191.692    GRSq 0.7745919    RSq 0.8340208
$Resample3
Selected 38 of 51 terms, and 14 of 29 predictors
Termination condition: Reached nk 59
Importance: HW, WH, CAC, ProvincKars, TL, ProvincMardin, Age, CC, EL, ProvincVan,
CD, LL, HR, HL, ColorBlack-unused, ColorBrown-unused, ...
Number of terms at each degree of interaction: 1 13 24
GCV 6.660898    RSS 1382.563    GRSq 0.8669723    RSq 0.9251719

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