Sleep.R

user

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library(tidyverse)

## ── Attaching core tidyverse packages ──────────────────────── tidyverse 2.0.0 ──  
## ✔ dplyr 1.1.4 ✔ readr 2.1.4  
## ✔ forcats 1.0.0 ✔ stringr 1.5.1  
## ✔ ggplot2 3.4.4 ✔ tibble 3.2.1  
## ✔ lubridate 1.9.3 ✔ tidyr 1.3.0  
## ✔ purrr 1.0.2   
## ── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
## ✖ dplyr::filter() masks stats::filter()  
## ✖ dplyr::lag() masks stats::lag()  
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors

library(psych)

##   
## Attaching package: 'psych'  
##   
## The following objects are masked from 'package:ggplot2':  
##   
## %+%, alpha

library(gridExtra)

##   
## Attaching package: 'gridExtra'  
##   
## The following object is masked from 'package:dplyr':  
##   
## combine

library(dplyr)  
library(knitr)  
library(ggplot2)  
library(caret)

## Loading required package: lattice  
##   
## Attaching package: 'caret'  
##   
## The following object is masked from 'package:purrr':  
##   
## lift

data<-read.csv("Sleep\_health\_and\_lifestyle\_dataset.csv")  
  
summary(data)

## Person.ID Gender Age Occupation   
## Min. : 1.00 Length:374 Min. :27.00 Length:374   
## 1st Qu.: 94.25 Class :character 1st Qu.:35.25 Class :character   
## Median :187.50 Mode :character Median :43.00 Mode :character   
## Mean :187.50 Mean :42.18   
## 3rd Qu.:280.75 3rd Qu.:50.00   
## Max. :374.00 Max. :59.00   
## Sleep.Duration Quality.of.Sleep Physical.Activity.Level Stress.Level   
## Min. :5.800 Min. :4.000 Min. :30.00 Min. :3.000   
## 1st Qu.:6.400 1st Qu.:6.000 1st Qu.:45.00 1st Qu.:4.000   
## Median :7.200 Median :7.000 Median :60.00 Median :5.000   
## Mean :7.132 Mean :7.313 Mean :59.17 Mean :5.385   
## 3rd Qu.:7.800 3rd Qu.:8.000 3rd Qu.:75.00 3rd Qu.:7.000   
## Max. :8.500 Max. :9.000 Max. :90.00 Max. :8.000   
## BMI.Category Blood.Pressure Heart.Rate Daily.Steps   
## Length:374 Length:374 Min. :65.00 Min. : 3000   
## Class :character Class :character 1st Qu.:68.00 1st Qu.: 5600   
## Mode :character Mode :character Median :70.00 Median : 7000   
## Mean :70.17 Mean : 6817   
## 3rd Qu.:72.00 3rd Qu.: 8000   
## Max. :86.00 Max. :10000   
## Sleep.Disorder   
## Length:374   
## Class :character   
## Mode :character   
##   
##   
##

View(data)  
head(data)

## Person.ID Gender Age Occupation Sleep.Duration Quality.of.Sleep  
## 1 1 Male 27 Software Engineer 6.1 6  
## 2 2 Male 28 Doctor 6.2 6  
## 3 3 Male 28 Doctor 6.2 6  
## 4 4 Male 28 Sales Representative 5.9 4  
## 5 5 Male 28 Sales Representative 5.9 4  
## 6 6 Male 28 Software Engineer 5.9 4  
## Physical.Activity.Level Stress.Level BMI.Category Blood.Pressure Heart.Rate  
## 1 42 6 Overweight 126/83 77  
## 2 60 8 Normal 125/80 75  
## 3 60 8 Normal 125/80 75  
## 4 30 8 Obese 140/90 85  
## 5 30 8 Obese 140/90 85  
## 6 30 8 Obese 140/90 85  
## Daily.Steps Sleep.Disorder  
## 1 4200 None  
## 2 10000 None  
## 3 10000 None  
## 4 3000 Sleep Apnea  
## 5 3000 Sleep Apnea  
## 6 3000 Insomnia

tail(data)

## Person.ID Gender Age Occupation Sleep.Duration Quality.of.Sleep  
## 369 369 Female 59 Nurse 8.1 9  
## 370 370 Female 59 Nurse 8.1 9  
## 371 371 Female 59 Nurse 8.0 9  
## 372 372 Female 59 Nurse 8.1 9  
## 373 373 Female 59 Nurse 8.1 9  
## 374 374 Female 59 Nurse 8.1 9  
## Physical.Activity.Level Stress.Level BMI.Category Blood.Pressure Heart.Rate  
## 369 75 3 Overweight 140/95 68  
## 370 75 3 Overweight 140/95 68  
## 371 75 3 Overweight 140/95 68  
## 372 75 3 Overweight 140/95 68  
## 373 75 3 Overweight 140/95 68  
## 374 75 3 Overweight 140/95 68  
## Daily.Steps Sleep.Disorder  
## 369 7000 Sleep Apnea  
## 370 7000 Sleep Apnea  
## 371 7000 Sleep Apnea  
## 372 7000 Sleep Apnea  
## 373 7000 Sleep Apnea  
## 374 7000 Sleep Apnea

glimpse(data)

## Rows: 374  
## Columns: 13  
## $ Person.ID <int> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,…  
## $ Gender <chr> "Male", "Male", "Male", "Male", "Male", "Male"…  
## $ Age <int> 27, 28, 28, 28, 28, 28, 29, 29, 29, 29, 29, 29…  
## $ Occupation <chr> "Software Engineer", "Doctor", "Doctor", "Sale…  
## $ Sleep.Duration <dbl> 6.1, 6.2, 6.2, 5.9, 5.9, 5.9, 6.3, 7.8, 7.8, 7…  
## $ Quality.of.Sleep <int> 6, 6, 6, 4, 4, 4, 6, 7, 7, 7, 6, 7, 6, 6, 6, 6…  
## $ Physical.Activity.Level <int> 42, 60, 60, 30, 30, 30, 40, 75, 75, 75, 30, 75…  
## $ Stress.Level <int> 6, 8, 8, 8, 8, 8, 7, 6, 6, 6, 8, 6, 8, 8, 8, 8…  
## $ BMI.Category <chr> "Overweight", "Normal", "Normal", "Obese", "Ob…  
## $ Blood.Pressure <chr> "126/83", "125/80", "125/80", "140/90", "140/9…  
## $ Heart.Rate <int> 77, 75, 75, 85, 85, 85, 82, 70, 70, 70, 70, 70…  
## $ Daily.Steps <int> 4200, 10000, 10000, 3000, 3000, 3000, 3500, 80…  
## $ Sleep.Disorder <chr> "None", "None", "None", "Sleep Apnea", "Sleep …

data$sleep\_category <- cut(data$Sleep.Duration, breaks = c(0, 6.5, 9),  
 labels = c("Poor Sleep", "Good Sleep"))  
data

## Person.ID Gender Age Occupation Sleep.Duration Quality.of.Sleep  
## 1 1 Male 27 Software Engineer 6.1 6  
## 2 2 Male 28 Doctor 6.2 6  
## 3 3 Male 28 Doctor 6.2 6  
## 4 4 Male 28 Sales Representative 5.9 4  
## 5 5 Male 28 Sales Representative 5.9 4  
## 6 6 Male 28 Software Engineer 5.9 4  
## 7 7 Male 29 Teacher 6.3 6  
## 8 8 Male 29 Doctor 7.8 7  
## 9 9 Male 29 Doctor 7.8 7  
## 10 10 Male 29 Doctor 7.8 7  
## 11 11 Male 29 Doctor 6.1 6  
## 12 12 Male 29 Doctor 7.8 7  
## 13 13 Male 29 Doctor 6.1 6  
## 14 14 Male 29 Doctor 6.0 6  
## 15 15 Male 29 Doctor 6.0 6  
## 16 16 Male 29 Doctor 6.0 6  
## 17 17 Female 29 Nurse 6.5 5  
## 18 18 Male 29 Doctor 6.0 6  
## 19 19 Female 29 Nurse 6.5 5  
## 20 20 Male 30 Doctor 7.6 7  
## 21 21 Male 30 Doctor 7.7 7  
## 22 22 Male 30 Doctor 7.7 7  
## 23 23 Male 30 Doctor 7.7 7  
## 24 24 Male 30 Doctor 7.7 7  
## 25 25 Male 30 Doctor 7.8 7  
## 26 26 Male 30 Doctor 7.9 7  
## 27 27 Male 30 Doctor 7.8 7  
## 28 28 Male 30 Doctor 7.9 7  
## 29 29 Male 30 Doctor 7.9 7  
## 30 30 Male 30 Doctor 7.9 7  
## 31 31 Female 30 Nurse 6.4 5  
## 32 32 Female 30 Nurse 6.4 5  
## 33 33 Female 31 Nurse 7.9 8  
## 34 34 Male 31 Doctor 6.1 6  
## 35 35 Male 31 Doctor 7.7 7  
## 36 36 Male 31 Doctor 6.1 6  
## 37 37 Male 31 Doctor 6.1 6  
## 38 38 Male 31 Doctor 7.6 7  
## 39 39 Male 31 Doctor 7.6 7  
## 40 40 Male 31 Doctor 7.6 7  
## 41 41 Male 31 Doctor 7.7 7  
## 42 42 Male 31 Doctor 7.7 7  
## 43 43 Male 31 Doctor 7.7 7  
## 44 44 Male 31 Doctor 7.8 7  
## 45 45 Male 31 Doctor 7.7 7  
## 46 46 Male 31 Doctor 7.8 7  
## 47 47 Male 31 Doctor 7.7 7  
## 48 48 Male 31 Doctor 7.8 7  
## 49 49 Male 31 Doctor 7.7 7  
## 50 50 Male 31 Doctor 7.7 7  
## 51 51 Male 32 Engineer 7.5 8  
## 52 52 Male 32 Engineer 7.5 8  
## 53 53 Male 32 Doctor 6.0 6  
## 54 54 Male 32 Doctor 7.6 7  
## 55 55 Male 32 Doctor 6.0 6  
## 56 56 Male 32 Doctor 6.0 6  
## 57 57 Male 32 Doctor 7.7 7  
## 58 58 Male 32 Doctor 6.0 6  
## 59 59 Male 32 Doctor 6.0 6  
## 60 60 Male 32 Doctor 7.7 7  
## 61 61 Male 32 Doctor 6.0 6  
## 62 62 Male 32 Doctor 6.0 6  
## 63 63 Male 32 Doctor 6.2 6  
## 64 64 Male 32 Doctor 6.2 6  
## 65 65 Male 32 Doctor 6.2 6  
## 66 66 Male 32 Doctor 6.2 6  
## 67 67 Male 32 Accountant 7.2 8  
## 68 68 Male 33 Doctor 6.0 6  
## 69 69 Female 33 Scientist 6.2 6  
## 70 70 Female 33 Scientist 6.2 6  
## 71 71 Male 33 Doctor 6.1 6  
## 72 72 Male 33 Doctor 6.1 6  
## 73 73 Male 33 Doctor 6.1 6  
## 74 74 Male 33 Doctor 6.1 6  
## 75 75 Male 33 Doctor 6.0 6  
## 76 76 Male 33 Doctor 6.0 6  
## 77 77 Male 33 Doctor 6.0 6  
## 78 78 Male 33 Doctor 6.0 6  
## 79 79 Male 33 Doctor 6.0 6  
## 80 80 Male 33 Doctor 6.0 6  
## 81 81 Female 34 Scientist 5.8 4  
## 82 82 Female 34 Scientist 5.8 4  
## 83 83 Male 35 Teacher 6.7 7  
## 84 84 Male 35 Teacher 6.7 7  
## 85 85 Male 35 Software Engineer 7.5 8  
## 86 86 Female 35 Accountant 7.2 8  
## 87 87 Male 35 Engineer 7.2 8  
## 88 88 Male 35 Engineer 7.2 8  
## 89 89 Male 35 Engineer 7.3 8  
## 90 90 Male 35 Engineer 7.3 8  
## 91 91 Male 35 Engineer 7.3 8  
## 92 92 Male 35 Engineer 7.3 8  
## 93 93 Male 35 Software Engineer 7.5 8  
## 94 94 Male 35 Lawyer 7.4 7  
## 95 95 Female 36 Accountant 7.2 8  
## 96 96 Female 36 Accountant 7.1 8  
## 97 97 Female 36 Accountant 7.2 8  
## 98 98 Female 36 Accountant 7.1 8  
## 99 99 Female 36 Teacher 7.1 8  
## 100 100 Female 36 Teacher 7.1 8  
## 101 101 Female 36 Teacher 7.2 8  
## 102 102 Female 36 Teacher 7.2 8  
## 103 103 Female 36 Teacher 7.2 8  
## 104 104 Male 36 Teacher 6.6 5  
## 105 105 Female 36 Teacher 7.2 8  
## 106 106 Male 36 Teacher 6.6 5  
## 107 107 Female 37 Nurse 6.1 6  
## 108 108 Male 37 Engineer 7.8 8  
## 109 109 Male 37 Engineer 7.8 8  
## 110 110 Male 37 Lawyer 7.4 8  
## 111 111 Female 37 Accountant 7.2 8  
## 112 112 Male 37 Lawyer 7.4 8  
## 113 113 Female 37 Accountant 7.2 8  
## 114 114 Male 37 Lawyer 7.4 8  
## 115 115 Female 37 Accountant 7.2 8  
## 116 116 Female 37 Accountant 7.2 8  
## 117 117 Female 37 Accountant 7.2 8  
## 118 118 Female 37 Accountant 7.2 8  
## 119 119 Female 37 Accountant 7.2 8  
## 120 120 Female 37 Accountant 7.2 8  
## 121 121 Female 37 Accountant 7.2 8  
## 122 122 Female 37 Accountant 7.2 8  
## 123 123 Female 37 Accountant 7.2 8  
## 124 124 Female 37 Accountant 7.2 8  
## 125 125 Female 37 Accountant 7.2 8  
## 126 126 Female 37 Nurse 7.5 8  
## 127 127 Male 38 Lawyer 7.3 8  
## 128 128 Female 38 Accountant 7.1 8  
## 129 129 Male 38 Lawyer 7.3 8  
## 130 130 Male 38 Lawyer 7.3 8  
## 131 131 Female 38 Accountant 7.1 8  
## 132 132 Male 38 Lawyer 7.3 8  
## 133 133 Male 38 Lawyer 7.3 8  
## 134 134 Female 38 Accountant 7.1 8  
## 135 135 Male 38 Lawyer 7.3 8  
## 136 136 Male 38 Lawyer 7.3 8  
## 137 137 Female 38 Accountant 7.1 8  
## 138 138 Male 38 Lawyer 7.1 8  
## 139 139 Female 38 Accountant 7.1 8  
## 140 140 Male 38 Lawyer 7.1 8  
## 141 141 Female 38 Accountant 7.1 8  
## 142 142 Male 38 Lawyer 7.1 8  
## 143 143 Female 38 Accountant 7.1 8  
## 144 144 Female 38 Accountant 7.1 8  
## 145 145 Male 38 Lawyer 7.1 8  
## 146 146 Female 38 Lawyer 7.4 7  
## 147 147 Male 39 Lawyer 7.2 8  
## 148 148 Male 39 Engineer 6.5 5  
## 149 149 Female 39 Lawyer 6.9 7  
## 150 150 Female 39 Accountant 8.0 9  
## 151 151 Female 39 Accountant 8.0 9  
## 152 152 Male 39 Lawyer 7.2 8  
## 153 153 Male 39 Lawyer 7.2 8  
## 154 154 Male 39 Lawyer 7.2 8  
## 155 155 Male 39 Lawyer 7.2 8  
## 156 156 Male 39 Lawyer 7.2 8  
## 157 157 Male 39 Lawyer 7.2 8  
## 158 158 Male 39 Lawyer 7.2 8  
## 159 159 Male 39 Lawyer 7.2 8  
## 160 160 Male 39 Lawyer 7.2 8  
## 161 161 Male 39 Lawyer 7.2 8  
## 162 162 Female 40 Accountant 7.2 8  
## 163 163 Female 40 Accountant 7.2 8  
## 164 164 Male 40 Lawyer 7.9 8  
## 165 165 Male 40 Lawyer 7.9 8  
## 166 166 Male 41 Lawyer 7.6 8  
## 167 167 Male 41 Engineer 7.3 8  
## 168 168 Male 41 Lawyer 7.1 7  
## 169 169 Male 41 Lawyer 7.1 7  
## 170 170 Male 41 Lawyer 7.7 8  
## 171 171 Male 41 Lawyer 7.7 8  
## 172 172 Male 41 Lawyer 7.7 8  
## 173 173 Male 41 Lawyer 7.7 8  
## 174 174 Male 41 Lawyer 7.7 8  
## 175 175 Male 41 Lawyer 7.6 8  
## 176 176 Male 41 Lawyer 7.6 8  
## 177 177 Male 41 Lawyer 7.6 8  
## 178 178 Male 42 Salesperson 6.5 6  
## 179 179 Male 42 Lawyer 7.8 8  
## 180 180 Male 42 Lawyer 7.8 8  
## 181 181 Male 42 Lawyer 7.8 8  
## 182 182 Male 42 Lawyer 7.8 8  
## 183 183 Male 42 Lawyer 7.8 8  
## 184 184 Male 42 Lawyer 7.8 8  
## 185 185 Female 42 Teacher 6.8 6  
## 186 186 Female 42 Teacher 6.8 6  
## 187 187 Female 43 Teacher 6.7 7  
## 188 188 Male 43 Salesperson 6.3 6  
## 189 189 Female 43 Teacher 6.7 7  
## 190 190 Male 43 Salesperson 6.5 6  
## 191 191 Female 43 Teacher 6.7 7  
## 192 192 Male 43 Salesperson 6.4 6  
## 193 193 Male 43 Salesperson 6.5 6  
## 194 194 Male 43 Salesperson 6.5 6  
## 195 195 Male 43 Salesperson 6.5 6  
## 196 196 Male 43 Salesperson 6.5 6  
## 197 197 Male 43 Salesperson 6.5 6  
## 198 198 Male 43 Salesperson 6.5 6  
## 199 199 Male 43 Salesperson 6.5 6  
## 200 200 Male 43 Salesperson 6.5 6  
## 201 201 Male 43 Salesperson 6.5 6  
## 202 202 Male 43 Engineer 7.8 8  
## 203 203 Male 43 Engineer 7.8 8  
## 204 204 Male 43 Engineer 6.9 6  
## 205 205 Male 43 Engineer 7.6 8  
## 206 206 Male 43 Engineer 7.7 8  
## 207 207 Male 43 Engineer 7.7 8  
## 208 208 Male 43 Engineer 7.7 8  
## 209 209 Male 43 Engineer 7.7 8  
## 210 210 Male 43 Engineer 7.8 8  
## 211 211 Male 43 Engineer 7.7 8  
## 212 212 Male 43 Engineer 7.8 8  
## 213 213 Male 43 Engineer 7.8 8  
## 214 214 Male 43 Engineer 7.8 8  
## 215 215 Male 43 Engineer 7.8 8  
## 216 216 Male 43 Engineer 7.8 8  
## 217 217 Male 43 Engineer 7.8 8  
## 218 218 Male 43 Engineer 7.8 8  
## 219 219 Male 43 Engineer 7.8 8  
## 220 220 Male 43 Salesperson 6.5 6  
## 221 221 Female 44 Teacher 6.6 7  
## 222 222 Male 44 Salesperson 6.4 6  
## 223 223 Male 44 Salesperson 6.3 6  
## 224 224 Male 44 Salesperson 6.4 6  
## 225 225 Female 44 Teacher 6.6 7  
## 226 226 Male 44 Salesperson 6.3 6  
## 227 227 Female 44 Teacher 6.6 7  
## 228 228 Male 44 Salesperson 6.3 6  
## 229 229 Female 44 Teacher 6.6 7  
## 230 230 Male 44 Salesperson 6.3 6  
## 231 231 Female 44 Teacher 6.6 7  
## 232 232 Male 44 Salesperson 6.3 6  
## 233 233 Female 44 Teacher 6.6 7  
## 234 234 Male 44 Salesperson 6.3 6  
## 235 235 Female 44 Teacher 6.6 7  
## 236 236 Male 44 Salesperson 6.3 6  
## 237 237 Male 44 Salesperson 6.4 6  
## 238 238 Female 44 Teacher 6.5 7  
## 239 239 Male 44 Salesperson 6.3 6  
## 240 240 Male 44 Salesperson 6.4 6  
## 241 241 Female 44 Teacher 6.5 7  
## 242 242 Male 44 Salesperson 6.3 6  
## 243 243 Male 44 Salesperson 6.4 6  
## 244 244 Female 44 Teacher 6.5 7  
## 245 245 Male 44 Salesperson 6.3 6  
## 246 246 Female 44 Teacher 6.5 7  
## 247 247 Male 44 Salesperson 6.3 6  
## 248 248 Male 44 Engineer 6.8 7  
## 249 249 Male 44 Salesperson 6.4 6  
## 250 250 Male 44 Salesperson 6.5 6  
## 251 251 Female 45 Teacher 6.8 7  
## 252 252 Female 45 Teacher 6.8 7  
## 253 253 Female 45 Teacher 6.5 7  
## 254 254 Female 45 Teacher 6.5 7  
## 255 255 Female 45 Teacher 6.5 7  
## 256 256 Female 45 Teacher 6.5 7  
## 257 257 Female 45 Teacher 6.6 7  
## 258 258 Female 45 Teacher 6.6 7  
## 259 259 Female 45 Teacher 6.6 7  
## 260 260 Female 45 Teacher 6.6 7  
## 261 261 Female 45 Teacher 6.6 7  
## 262 262 Female 45 Teacher 6.6 7  
## 263 263 Female 45 Teacher 6.6 7  
## 264 264 Female 45 Manager 6.9 7  
## 265 265 Male 48 Doctor 7.3 7  
## 266 266 Female 48 Nurse 5.9 6  
## 267 267 Male 48 Doctor 7.3 7  
## 268 268 Female 49 Nurse 6.2 6  
## 269 269 Female 49 Nurse 6.0 6  
## 270 270 Female 49 Nurse 6.1 6  
## 271 271 Female 49 Nurse 6.1 6  
## 272 272 Female 49 Nurse 6.1 6  
## 273 273 Female 49 Nurse 6.1 6  
## 274 274 Female 49 Nurse 6.2 6  
## 275 275 Female 49 Nurse 6.2 6  
## 276 276 Female 49 Nurse 6.2 6  
## 277 277 Male 49 Doctor 8.1 9  
## 278 278 Male 49 Doctor 8.1 9  
## 279 279 Female 50 Nurse 6.1 6  
## 280 280 Female 50 Engineer 8.3 9  
## 281 281 Female 50 Nurse 6.0 6  
## 282 282 Female 50 Nurse 6.1 6  
## 283 283 Female 50 Nurse 6.0 6  
## 284 284 Female 50 Nurse 6.0 6  
## 285 285 Female 50 Nurse 6.0 6  
## 286 286 Female 50 Nurse 6.0 6  
## 287 287 Female 50 Nurse 6.0 6  
## 288 288 Female 50 Nurse 6.0 6  
## 289 289 Female 50 Nurse 6.0 6  
## 290 290 Female 50 Nurse 6.1 6  
## 291 291 Female 50 Nurse 6.0 6  
## 292 292 Female 50 Nurse 6.1 6  
## 293 293 Female 50 Nurse 6.1 6  
## 294 294 Female 50 Nurse 6.0 6  
## 295 295 Female 50 Nurse 6.1 6  
## 296 296 Female 50 Nurse 6.0 6  
## 297 297 Female 50 Nurse 6.1 6  
## 298 298 Female 50 Nurse 6.1 6  
## 299 299 Female 51 Engineer 8.5 9  
## 300 300 Female 51 Engineer 8.5 9  
## 301 301 Female 51 Engineer 8.5 9  
## 302 302 Female 51 Engineer 8.5 9  
## 303 303 Female 51 Nurse 7.1 7  
## 304 304 Female 51 Nurse 6.0 6  
## 305 305 Female 51 Nurse 6.1 6  
## 306 306 Female 51 Nurse 6.1 6  
## 307 307 Female 52 Accountant 6.5 7  
## 308 308 Female 52 Accountant 6.5 7  
## 309 309 Female 52 Accountant 6.6 7  
## 310 310 Female 52 Accountant 6.6 7  
## 311 311 Female 52 Accountant 6.6 7  
## 312 312 Female 52 Accountant 6.6 7  
## 313 313 Female 52 Engineer 8.4 9  
## 314 314 Female 52 Engineer 8.4 9  
## 315 315 Female 52 Engineer 8.4 9  
## 316 316 Female 53 Engineer 8.3 9  
## 317 317 Female 53 Engineer 8.5 9  
## 318 318 Female 53 Engineer 8.5 9  
## 319 319 Female 53 Engineer 8.4 9  
## 320 320 Female 53 Engineer 8.4 9  
## 321 321 Female 53 Engineer 8.5 9  
## 322 322 Female 53 Engineer 8.4 9  
## 323 323 Female 53 Engineer 8.4 9  
## 324 324 Female 53 Engineer 8.5 9  
## 325 325 Female 53 Engineer 8.3 9  
## 326 326 Female 53 Engineer 8.5 9  
## 327 327 Female 53 Engineer 8.3 9  
## 328 328 Female 53 Engineer 8.5 9  
## 329 329 Female 53 Engineer 8.3 9  
## 330 330 Female 53 Engineer 8.5 9  
## 331 331 Female 53 Engineer 8.5 9  
## 332 332 Female 53 Engineer 8.4 9  
## 333 333 Female 54 Engineer 8.4 9  
## 334 334 Female 54 Engineer 8.4 9  
## 335 335 Female 54 Engineer 8.4 9  
## 336 336 Female 54 Engineer 8.4 9  
## 337 337 Female 54 Engineer 8.4 9  
## 338 338 Female 54 Engineer 8.4 9  
## 339 339 Female 54 Engineer 8.5 9  
## 340 340 Female 55 Nurse 8.1 9  
## 341 341 Female 55 Nurse 8.1 9  
## 342 342 Female 56 Doctor 8.2 9  
## 343 343 Female 56 Doctor 8.2 9  
## 344 344 Female 57 Nurse 8.1 9  
## 345 345 Female 57 Nurse 8.2 9  
## 346 346 Female 57 Nurse 8.2 9  
## 347 347 Female 57 Nurse 8.2 9  
## 348 348 Female 57 Nurse 8.2 9  
## 349 349 Female 57 Nurse 8.2 9  
## 350 350 Female 57 Nurse 8.1 9  
## 351 351 Female 57 Nurse 8.1 9  
## 352 352 Female 57 Nurse 8.1 9  
## 353 353 Female 58 Nurse 8.0 9  
## 354 354 Female 58 Nurse 8.0 9  
## 355 355 Female 58 Nurse 8.0 9  
## 356 356 Female 58 Nurse 8.0 9  
## 357 357 Female 58 Nurse 8.0 9  
## 358 358 Female 58 Nurse 8.0 9  
## 359 359 Female 59 Nurse 8.0 9  
## 360 360 Female 59 Nurse 8.1 9  
## 361 361 Female 59 Nurse 8.2 9  
## 362 362 Female 59 Nurse 8.2 9  
## 363 363 Female 59 Nurse 8.2 9  
## 364 364 Female 59 Nurse 8.2 9  
## 365 365 Female 59 Nurse 8.0 9  
## 366 366 Female 59 Nurse 8.0 9  
## 367 367 Female 59 Nurse 8.1 9  
## 368 368 Female 59 Nurse 8.0 9  
## 369 369 Female 59 Nurse 8.1 9  
## 370 370 Female 59 Nurse 8.1 9  
## 371 371 Female 59 Nurse 8.0 9  
## 372 372 Female 59 Nurse 8.1 9  
## 373 373 Female 59 Nurse 8.1 9  
## 374 374 Female 59 Nurse 8.1 9  
## Physical.Activity.Level Stress.Level BMI.Category Blood.Pressure  
## 1 42 6 Overweight 126/83  
## 2 60 8 Normal 125/80  
## 3 60 8 Normal 125/80  
## 4 30 8 Obese 140/90  
## 5 30 8 Obese 140/90  
## 6 30 8 Obese 140/90  
## 7 40 7 Obese 140/90  
## 8 75 6 Normal 120/80  
## 9 75 6 Normal 120/80  
## 10 75 6 Normal 120/80  
## 11 30 8 Normal 120/80  
## 12 75 6 Normal 120/80  
## 13 30 8 Normal 120/80  
## 14 30 8 Normal 120/80  
## 15 30 8 Normal 120/80  
## 16 30 8 Normal 120/80  
## 17 40 7 Normal Weight 132/87  
## 18 30 8 Normal 120/80  
## 19 40 7 Normal Weight 132/87  
## 20 75 6 Normal 120/80  
## 21 75 6 Normal 120/80  
## 22 75 6 Normal 120/80  
## 23 75 6 Normal 120/80  
## 24 75 6 Normal 120/80  
## 25 75 6 Normal 120/80  
## 26 75 6 Normal 120/80  
## 27 75 6 Normal 120/80  
## 28 75 6 Normal 120/80  
## 29 75 6 Normal 120/80  
## 30 75 6 Normal 120/80  
## 31 35 7 Normal Weight 130/86  
## 32 35 7 Normal Weight 130/86  
## 33 75 4 Normal Weight 117/76  
## 34 30 8 Normal 125/80  
## 35 75 6 Normal 120/80  
## 36 30 8 Normal 125/80  
## 37 30 8 Normal 125/80  
## 38 75 6 Normal 120/80  
## 39 75 6 Normal 120/80  
## 40 75 6 Normal 120/80  
## 41 75 6 Normal 120/80  
## 42 75 6 Normal 120/80  
## 43 75 6 Normal 120/80  
## 44 75 6 Normal 120/80  
## 45 75 6 Normal 120/80  
## 46 75 6 Normal 120/80  
## 47 75 6 Normal 120/80  
## 48 75 6 Normal 120/80  
## 49 75 6 Normal 120/80  
## 50 75 6 Normal 120/80  
## 51 45 3 Normal 120/80  
## 52 45 3 Normal 120/80  
## 53 30 8 Normal 125/80  
## 54 75 6 Normal 120/80  
## 55 30 8 Normal 125/80  
## 56 30 8 Normal 125/80  
## 57 75 6 Normal 120/80  
## 58 30 8 Normal 125/80  
## 59 30 8 Normal 125/80  
## 60 75 6 Normal 120/80  
## 61 30 8 Normal 125/80  
## 62 30 8 Normal 125/80  
## 63 30 8 Normal 125/80  
## 64 30 8 Normal 125/80  
## 65 30 8 Normal 125/80  
## 66 30 8 Normal 125/80  
## 67 50 6 Normal Weight 118/76  
## 68 30 8 Normal 125/80  
## 69 50 6 Overweight 128/85  
## 70 50 6 Overweight 128/85  
## 71 30 8 Normal 125/80  
## 72 30 8 Normal 125/80  
## 73 30 8 Normal 125/80  
## 74 30 8 Normal 125/80  
## 75 30 8 Normal 125/80  
## 76 30 8 Normal 125/80  
## 77 30 8 Normal 125/80  
## 78 30 8 Normal 125/80  
## 79 30 8 Normal 125/80  
## 80 30 8 Normal 125/80  
## 81 32 8 Overweight 131/86  
## 82 32 8 Overweight 131/86  
## 83 40 5 Overweight 128/84  
## 84 40 5 Overweight 128/84  
## 85 60 5 Normal Weight 120/80  
## 86 60 4 Normal 115/75  
## 87 60 4 Normal 125/80  
## 88 60 4 Normal 125/80  
## 89 60 4 Normal 125/80  
## 90 60 4 Normal 125/80  
## 91 60 4 Normal 125/80  
## 92 60 4 Normal 125/80  
## 93 60 5 Normal Weight 120/80  
## 94 60 5 Obese 135/88  
## 95 60 4 Normal 115/75  
## 96 60 4 Normal 115/75  
## 97 60 4 Normal 115/75  
## 98 60 4 Normal 115/75  
## 99 60 4 Normal 115/75  
## 100 60 4 Normal 115/75  
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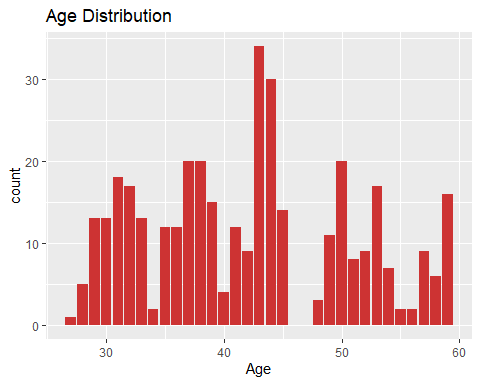
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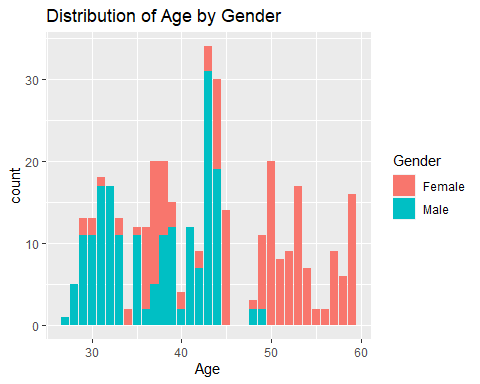
colSums(is.na(data))

## Person.ID Gender Age   
## 0 0 0   
## Occupation Sleep.Duration Quality.of.Sleep   
## 0 0 0   
## Physical.Activity.Level Stress.Level BMI.Category   
## 0 0 0   
## Blood.Pressure Heart.Rate Daily.Steps   
## 0 0 0   
## Sleep.Disorder sleep\_category   
## 0 0

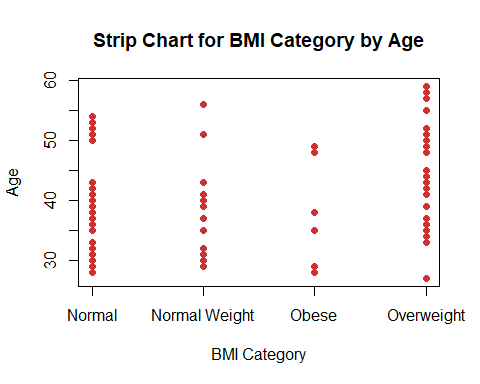
attach(data)  
  
ggplot(data, aes(x = Age,fill =Age )) +  
 geom\_bar(fill='brown3')+  
 ggtitle("Age Distribution")



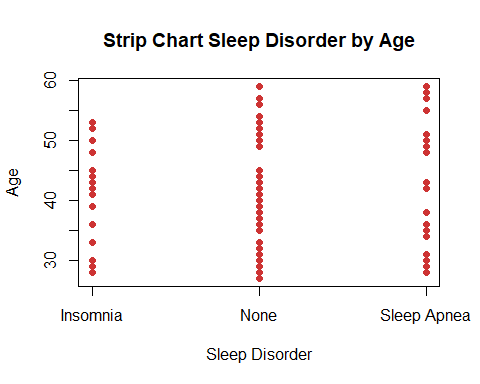
ggplot(data, aes(x = Age, fill = Gender)) +  
 geom\_bar() +  
 ggtitle("Distribution of Age by Gender")



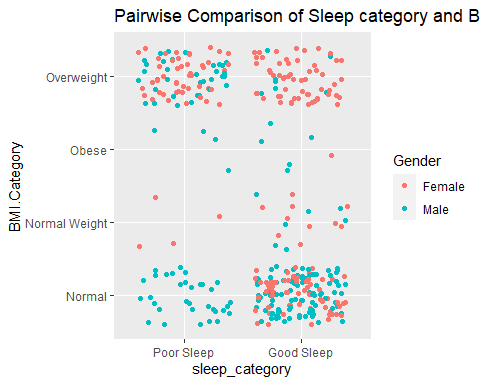
#ggplot(data, aes(x= 'Strip Chart', y = Age))+  
 # geom\_jitter(width = 0.2,height = 10, color="brown3")  
   
 #grid Chart for BMI category and Age  
stripchart(Age~BMI.Category,  
 data = data,  
 main='Strip Chart for BMI Category by Age',  
 xlab='BMI Category',  
 ylab= 'Age',  
 col='brown3',  
 vertical=TRUE,  
 pch=16)



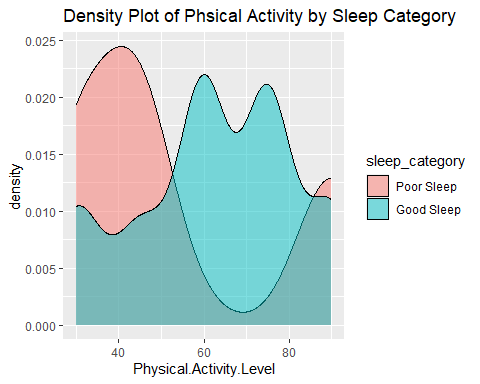
stripchart(Age~Sleep.Disorder,  
 data = data,  
 main='Strip Chart Sleep Disorder by Age',  
 xlab='Sleep Disorder',  
 ylab= 'Age',  
 col='brown3',  
 vertical=TRUE,  
 pch=16)



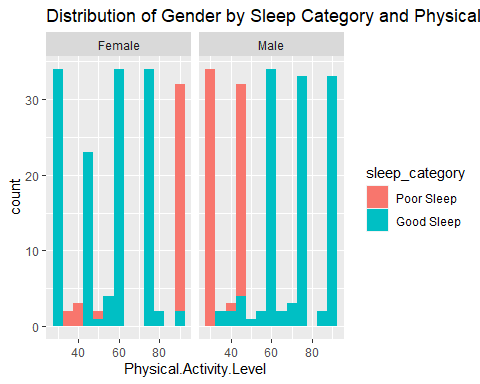
ggplot(data, aes(x = sleep\_category, y = BMI.Category, color = Gender)) +  
 geom\_jitter() +  
 ggtitle("Pairwise Comparison of Sleep category and BMI by Gender")



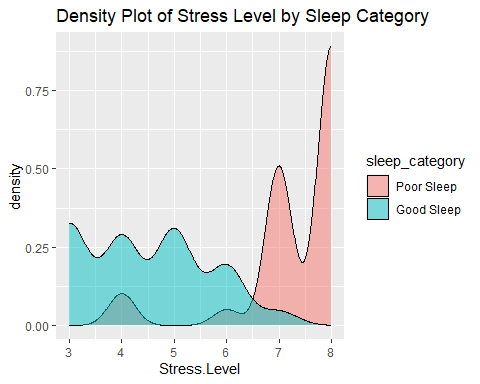
ggplot(data, aes(x = Physical.Activity.Level, fill = sleep\_category)) +  
 geom\_density(alpha = 0.5) +  
 ggtitle("Density Plot of Phsical Activity by Sleep Category")



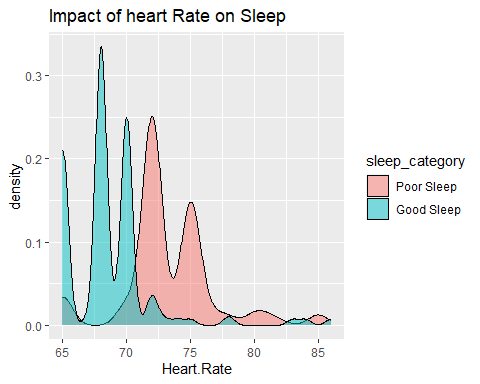
ggplot(data, aes(x = Physical.Activity.Level, fill = sleep\_category)) +  
 geom\_histogram(binwidth = 5, position = "identity") +  
 facet\_grid(.~Gender) +  
 ggtitle("Distribution of Gender by Sleep Category and Physical Avtivity Level")



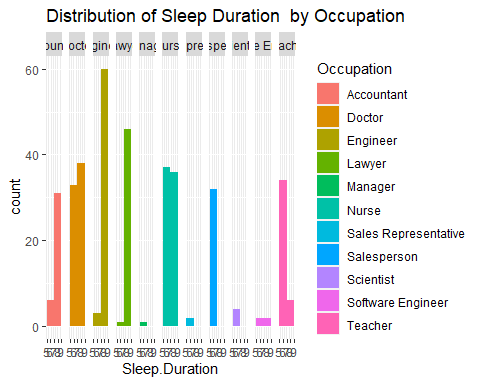
ggplot(data, aes(x = Stress.Level, fill = sleep\_category)) +  
 geom\_density(alpha = 0.5) +  
 ggtitle("Density Plot of Stress Level by Sleep Category")



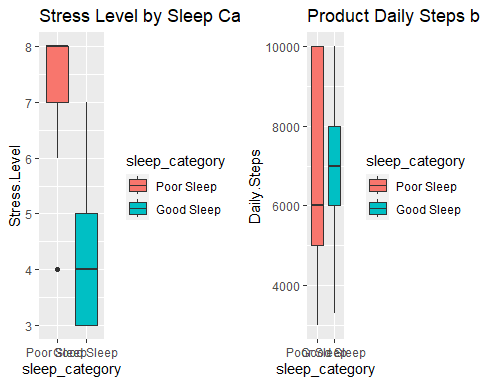
ggplot(data, aes(x = Heart.Rate,fill =sleep\_category )) +  
 geom\_density(alpha=0.5)+  
 ggtitle("Impact of heart Rate on Sleep")



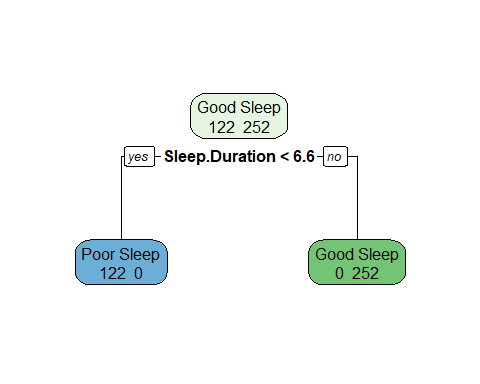
ggplot(data, aes(x = Sleep.Duration, fill = Occupation)) +  
 geom\_histogram(binwidth = 2, position = "identity") +  
 facet\_grid(.~Occupation) +  
 ggtitle("Distribution of Sleep Duration by Occupation")



grid.arrange(  
 ggplot(data, aes(x = sleep\_category, y = Stress.Level, fill = sleep\_category)) +  
 geom\_boxplot() +  
 ggtitle("Stress Level by Sleep Category"),  
   
 ggplot(data, aes(x = sleep\_category, y = Daily.Steps, fill = sleep\_category)) +  
 geom\_boxplot() +  
 ggtitle("Product Daily Steps by Sleep Category"),  
   
   
 ncol = 2  
)



library(rpart)  
library(rpart.plot)  
  
# Fit the decision tree model  
tree\_model <- rpart(sleep\_category ~ Age + Physical.Activity.Level + Sleep.Duration +Quality.of.Sleep + Stress.Level +Heart.Rate + Daily.Steps,  
 data = data, method = "class")  
  
# Visualize the decision tree  
rpart.plot(tree\_model, extra = 1)



# Predictions using the decision tree model  
predictions\_tree <- predict(tree\_model, data, type = "class")  
  
# Confusion Matrix for Decision Tree  
conf\_matrix\_tree <- table(predictions\_tree, data$sleep\_category)  
  
# Calculate metrics for the decision tree model  
calculate\_metrics <- function(conf\_matrix) {  
 precision <- conf\_matrix[2, 2] / sum(conf\_matrix[, 2])  
 recall <- conf\_matrix[2, 2] / sum(conf\_matrix[2, ])  
 f1\_score <- 2 \* (precision \* recall) / (precision + recall)  
 accuracy <- sum(diag(conf\_matrix)) / sum(conf\_matrix)  
   
 return(c(Precision = precision, Recall = recall, F1\_Score = f1\_score, Accuracy = accuracy))  
}  
  
metrics\_tree <- calculate\_metrics(conf\_matrix\_tree)  
  
cat("Decision Tree Model Precision:", metrics\_tree["Precision"], "\n")

## Decision Tree Model Precision: 1

cat("Decision Tree Model Recall:", metrics\_tree["Recall"], "\n")

## Decision Tree Model Recall: 1

cat("Decision Tree Model F1 Score:", metrics\_tree["F1\_Score"], "\n")

## Decision Tree Model F1 Score: 1

cat("Decision Tree Model Accuracy:", metrics\_tree["Accuracy"], "\n")

## Decision Tree Model Accuracy: 1

# Create a SVM model  
  
library(caTools)  
set.seed(123)   
sample = sample.split(data$sleep\_category, SplitRatio = .80)  
  
  
train = subset(data, sample == TRUE)  
test = subset(data, sample == FALSE)  
  
testc<-test$sleep\_category  
test <- test[ c(1:14)]  
  
test$Occupation <-factor(test$Occupation,levels = levels(train$Occupation))  
test$sleep\_category<-factor(test$sleep\_category, levels = levels(train$sleep\_category))  
  
colnames(data)

## [1] "Person.ID" "Gender"   
## [3] "Age" "Occupation"   
## [5] "Sleep.Duration" "Quality.of.Sleep"   
## [7] "Physical.Activity.Level" "Stress.Level"   
## [9] "BMI.Category" "Blood.Pressure"   
## [11] "Heart.Rate" "Daily.Steps"   
## [13] "Sleep.Disorder" "sleep\_category"

colnames(test)

## [1] "Person.ID" "Gender"   
## [3] "Age" "Occupation"   
## [5] "Sleep.Duration" "Quality.of.Sleep"   
## [7] "Physical.Activity.Level" "Stress.Level"   
## [9] "BMI.Category" "Blood.Pressure"   
## [11] "Heart.Rate" "Daily.Steps"   
## [13] "Sleep.Disorder" "sleep\_category"

colnames(testc)

## NULL

library(e1071)  
  
SVMFIT <- svm(as.factor(sleep\_category)~., data = train, kernel = "polynomial", cost = 5, tolerance = 0.001, epsilon = 0.1,  
 shrinking = TRUE, cross = 0)  
# Plot Results  
summary(SVMFIT)

##   
## Call:  
## svm(formula = as.factor(sleep\_category) ~ ., data = train, kernel = "polynomial",   
## cost = 5, tolerance = 0.001, epsilon = 0.1, shrinking = TRUE,   
## cross = 0)  
##   
##   
## Parameters:  
## SVM-Type: C-classification   
## SVM-Kernel: polynomial   
## cost: 5   
## degree: 3   
## coef.0: 0   
##   
## Number of Support Vectors: 129  
##   
## ( 63 66 )  
##   
##   
## Number of Classes: 2   
##   
## Levels:   
## Poor Sleep Good Sleep

#Predictions = predict(SVMFIT, test)  
#SVMCLASSIFIER= table(Predictions, testc)  
#confusionMatrix(SVMCLASSIFIER)  
  
library(C50)  
  
CTree<-C5.0(as.factor(sleep\_category) ~ ., data = train , trials = 10, rules = FALSE)  
summary(CTree)

##   
## Call:  
## C5.0.formula(formula = as.factor(sleep\_category) ~ ., data = train, trials  
## = 10, rules = FALSE)  
##   
##   
## C5.0 [Release 2.07 GPL Edition] Mon Sep 9 18:54:29 2024  
## -------------------------------  
##   
## Class specified by attribute `outcome'  
##   
## Read 300 cases (14 attributes) from undefined.data  
##   
## ----- Trial 0: -----  
##   
## Decision tree:  
##   
## Sleep.Duration <= 6.5: Poor Sleep (98)  
## Sleep.Duration > 6.5: Good Sleep (202)  
##   
## \*\*\* boosting reduced to 1 trial since last classifier is very accurate  
##   
## \*\*\* boosting abandoned (too few classifiers)  
##   
##   
## Evaluation on training data (300 cases):  
##   
## Decision Tree   
## ----------------   
## Size Errors   
##   
## 2 0( 0.0%) <<  
##   
##   
## (a) (b) <-classified as  
## ---- ----  
## 98 (a): class Poor Sleep  
## 202 (b): class Good Sleep  
##   
##   
## Attribute usage:  
##   
## 100.00% Sleep.Duration  
##   
##   
## Time: 0.0 secs

#plot(CTree, metric = "Accuracy")  
  
  
  
oneTreeProbs <- predict(CTree, test)  
c50<- table(oneTreeProbs, testc)  
confusionMatrix(c50)

## Confusion Matrix and Statistics  
##   
## testc  
## oneTreeProbs Poor Sleep Good Sleep  
## Poor Sleep 24 0  
## Good Sleep 0 50  
##   
## Accuracy : 1   
## 95% CI : (0.9514, 1)  
## No Information Rate : 0.6757   
## P-Value [Acc > NIR] : 2.516e-13   
##   
## Kappa : 1   
##   
## Mcnemar's Test P-Value : NA   
##   
## Sensitivity : 1.0000   
## Specificity : 1.0000   
## Pos Pred Value : 1.0000   
## Neg Pred Value : 1.0000   
## Prevalence : 0.3243   
## Detection Rate : 0.3243   
## Detection Prevalence : 0.3243   
## Balanced Accuracy : 1.0000   
##   
## 'Positive' Class : Poor Sleep   
##