SHAP Dataset 1

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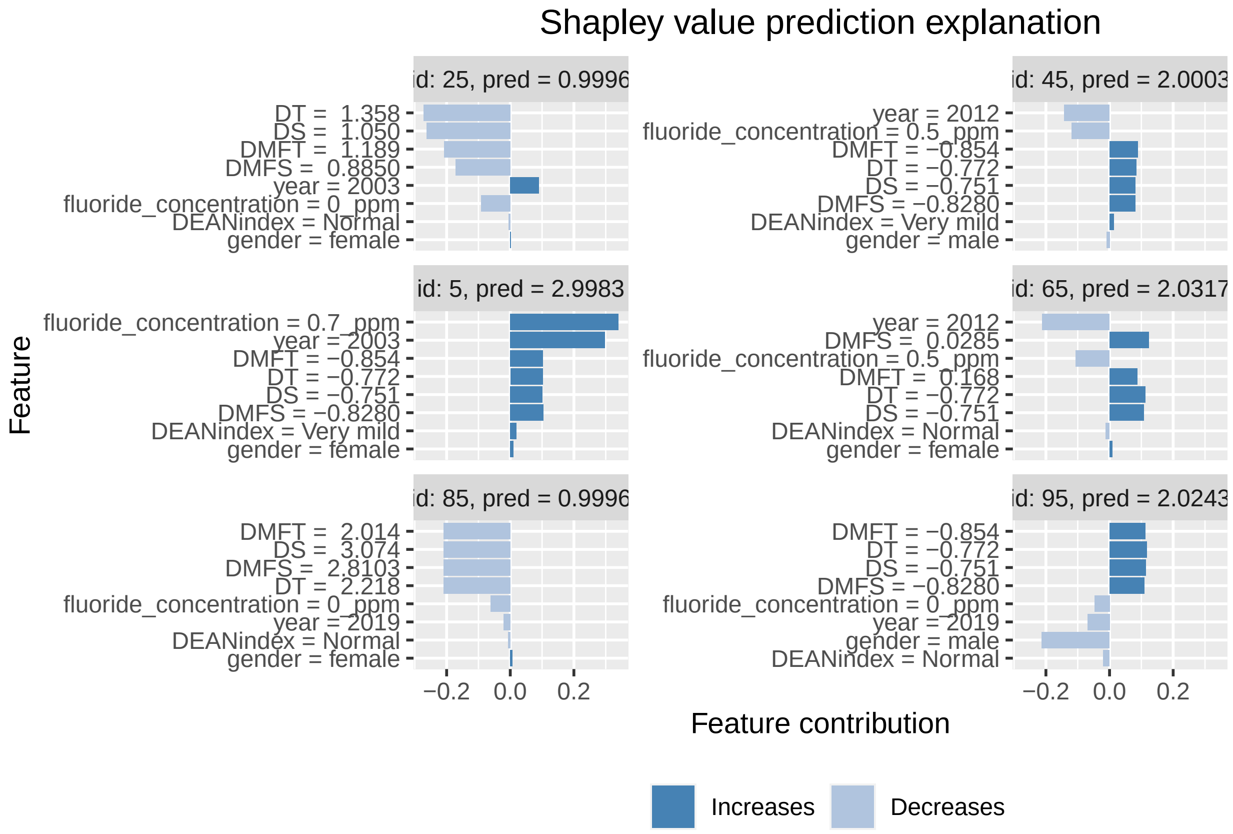
```
kpres <- readRDS("~/OneDrive - UMP/RHM/2021-2022/Bài báo 30 years of water fluoridation/Results/Try6/kp

dataset2 <- cbind(kpres[["data"]],kpres[["cluster"]])
colnames(dataset2)[9] <- "cluster"


x_var_cat <- c("gender", "DT", "DMFT", "DS", "DMFS", "DEANindex","year", "fluoride_concentration")
y_var <- "cluster"


x <- split(dataset2, sample(rep(1:2, times=c(100,4094))))

x_test_cat <- x$`1`
x_test_cat <- x_test_cat[,-9]
x_train_cat <- x$`2`
y_train <- x_train_cat[,-1:-8]
x_train_cat <- x_train_cat[,-9]

# -- special function when using categorical data + xgboost
dummylist <- make_dummies(traindata = x_train_cat, testdata = x_test_cat)

x_train_dummy <- dummylist$train_dummies
x_test_dummy <- dummylist$test_dummies

# Fitting a basic xgboost model to the training data
model_cat <- xgboost::xgboost(
  data = x_train_dummy,
  label = y_train,
  nround = 20,
  verbose = FALSE
)
model_cat$feature_list <- dummylist$feature_list

explainer_cat <- shapr(dummylist$traindata_new, model_cat)

p <- mean(y_train)

explanation_cat <- explain(
  dummylist$testdata_new,
  approach = "ctree",
  explainer = explainer_cat,
  prediction_zero = p
)

# Plot the resulting explanations for observations 1 and 6, excluding
# the no-covariate effect
plot(explanation_cat, plot_phi0 = FALSE, index_x_test = c(5, 25, 45, 65, 85, 95))
```


Shapley value prediction explanation
id: 25, pred = 0.9996
DT = 1.358
DS = 1.050
DMFT = 1.189
DMFS = 0.8850
year = 2003
fluoride_concentration = 0_ppm
DEANindex = Normal
gender = female
id: 45, pred = 2.0003
year = 2012
fluoride_concentration = 0.5_ppm
DMFT = −0.854
DT = −0.772
DS = −0.751
DMFS = −0.8280
DEANindex = Very mild
gender = male
id: 5, pred = 2.9983
fluoride_concentration = 0.7_ppm
year = 2003
DMFT = −0.854
DT = −0.772
DS = −0.751
DMFS = −0.8280
DEANindex = Very mild
gender = female
id: 65, pred = 2.0317
year = 2012
DMFS = 0.0285
fluoride_concentration = 0.5_ppm
DMFT = 0.168
DT = −0.772
DS = −0.751
DEANindex = Normal
gender = female
id: 85, pred = 0.9996
DMFT = 2.014
DS = 3.074
DMFS = 2.8103
DT = 2.218
fluoride_concentration = 0_ppm
year = 2019
DEANindex = Normal
gender = female
id: 95, pred = 2.0243
DMFT = −0.854
DT = −0.772
DS = −0.751
DMFS = −0.8280
fluoride_concentration = 0_ppm
year = 2019
gender = male
DEANindex = Normal
Feature
Feature contribution
Increases
Decreases