Project 3: Decision Tree Classifier

Applied Machine Learning

February 23, 2022

1 DTC Function

Write your own decision tree classifier function in `R`. This function should be called `DTC` and it should take two inputs: 1. *formula* describing the model that learning should be performed on 2. *data* denoting the data-frame in which the data reside on. This function should output a decision tree calculated based on the data and the formula. Please note that the main function in your program that builds the tree needs to be *recursive*. This is a hard requirement. You can follow the pseudo-code provided in the lecture notes. Your program can *only* rely on the following external functions:
`is.formula, is.data.frame, is.vector, is.na, as.vector, is.null, length, match, levels, nlevels, unique, table, sum, matrix`, in addition to functions from the `igraph` library.

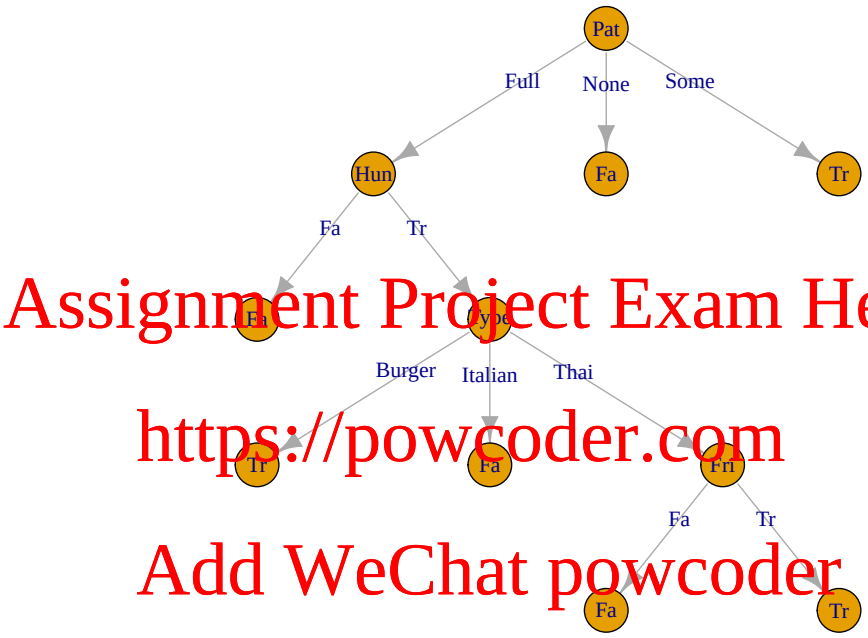
Please note that you should reuse your code from Project 2 on parsing and parsing formulas.

Hint: similar to Project 2, start by implementing how the *Resturant* example discussed during class can be implemented in `R`.

1.1 Examples:

```
## Warning:  package 'igraph' was built under R version 3.4.4
##
## Attaching package:  'igraph'
## The following objects are masked from 'package:stats':
##
##    decompose, spectrum
## The following object is masked from 'package:base':
##
##    union
```

```
data <- read.csv("Resturant.csv")
formula <- WillWait ~ Alt + Bar + Fri + Hun + Pat + Price + Rain + Res + Type + Est
DTC(formula,data)
```



```
data <- read.csv("Tennis.csv")
formula <- Play ~ Outlook + Temperature + Humidity + Wind
DTC(formula,data)
```