

# Hyperparameter Tuning

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19/10/2023

## Load Packages

If the libraries are not installed yet, you need to install them using, for example, the command: `install.packages("ggplot2")`. For the Hrate package this is different, since it comes from github. The devtools library needs to be installed, and then the `install_github()` function is used.

```
library(ggplot2)
library(gridExtra)
```

## Load Data

Load data table with values per text file.

```
# load results from folder
mlp.10chars.results <- read.csv("~/Github/NaLaFi/results/MLP/results_MLP_10chars_tanh_sse_rprop+.csv")
mlp.100chars.results <- read.csv("~/Github/NaLaFi/results/MLP/results_MLP_100chars_tanh_sse_rprop+.csv")
mlp.1000chars.results <- read.csv("~/Github/NaLaFi/results/MLP/results_MLP_1000chars_tanh_sse_rprop+.csv")
mlp.all <- rbind(mlp.10chars.results, mlp.100chars.results, mlp.1000chars.results)
# knn
knn.10.chars.results <- read.csv("~/Github/NaLaFi/results/KNN/knn_results_10.csv")
knn.10.chars.results$num.chars <- rep(10, nrow(knn.10.chars.results))
knn.100.chars.results <- read.csv("~/Github/NaLaFi/results/KNN/knn_results_100.csv")
knn.100.chars.results$num.chars <- rep(100, nrow(knn.100.chars.results))
knn.1000.chars.results <- read.csv("~/Github/NaLaFi/results/KNN/knn_results_1000.csv")
knn.1000.chars.results$num.chars <- rep(1000, nrow(knn.1000.chars.results))
# bind all together
knn.all <- rbind(knn.10.chars.results, knn.100.chars.results, knn.1000.chars.results)
#head(knn.results)
```

## Hyperparameter Plots

### knn results

```
knn.plot <- ggplot(knn.all, aes(x = k, y = f1,
                                color = as.factor(num.chars),
                                group = as.factor(num.chars))) +
  #geom_errorbar(aes(ymin=f1-sd(f1), ymax=f1+sd(f1)), width=.1) +
  geom_line() +
```

```

geom_point() +
theme_minimal() +
theme(legend.position = "bottom") +
labs(color = 'Num. Chars.')
#knn.plot

```

## MLP results

Plot depth, i.e. number of hidden layers, versus F1 score.

```

mlp.plot.depth <- ggplot(mlp.all, aes(x = hidden.depth, y = f1,
                                     group = as.factor(num.char),
                                     color = as.factor(num.char))) +

  geom_point() +
  geom_smooth(method = "loess") +
  theme_minimal() +
  theme(legend.position = "bottom") +
  labs(color = 'Num. Chars.')
#mlp.plot.depth

```

Plot number of hidden units versus F1 score.

```

mlp.plot.units <- ggplot(mlp.all, aes(x = hidden.size, y = f1,
                                     group = as.factor(num.char),
                                     color = as.factor(num.char))) +

  geom_point() +
  geom_smooth(method = "loess") +
  theme_minimal() +
  theme(legend.position = "bottom") +
  labs(color = 'Num. Chars.')

```

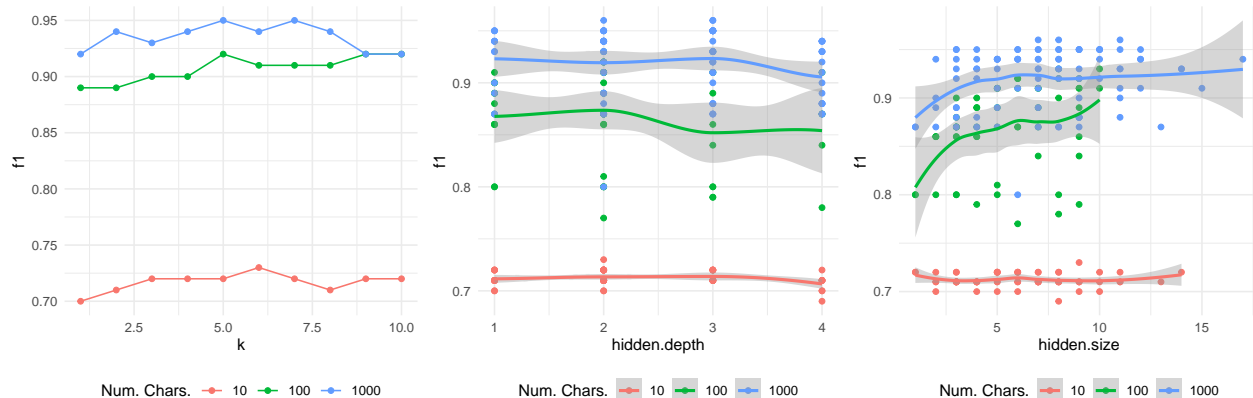
## Combine plots

```
plots.combined <- grid.arrange(knn.plot, mlp.plot.depth, mlp.plot.units, ncol = 3)
```

```

## `geom_smooth()` using formula = 'y ~ x'
## `geom_smooth()` using formula = 'y ~ x'

```



```

print(plots.combined)

## TableGrob (1 x 3) "arrange": 3 grobs
##   z      cells   name      grob
## 1 1 (1-1,1-1) arrange gtable[layout]
## 2 2 (1-1,2-2) arrange gtable[layout]
## 3 3 (1-1,3-3) arrange gtable[layout]

Safe to file.

ggsave("~/Github/NaLaFi/figures/hyperParamPlot.pdf", plots.combined, width = 12,
        height = 4, dpi = 300, scale = 1, device = cairo_pdf)

```