simulation_week8

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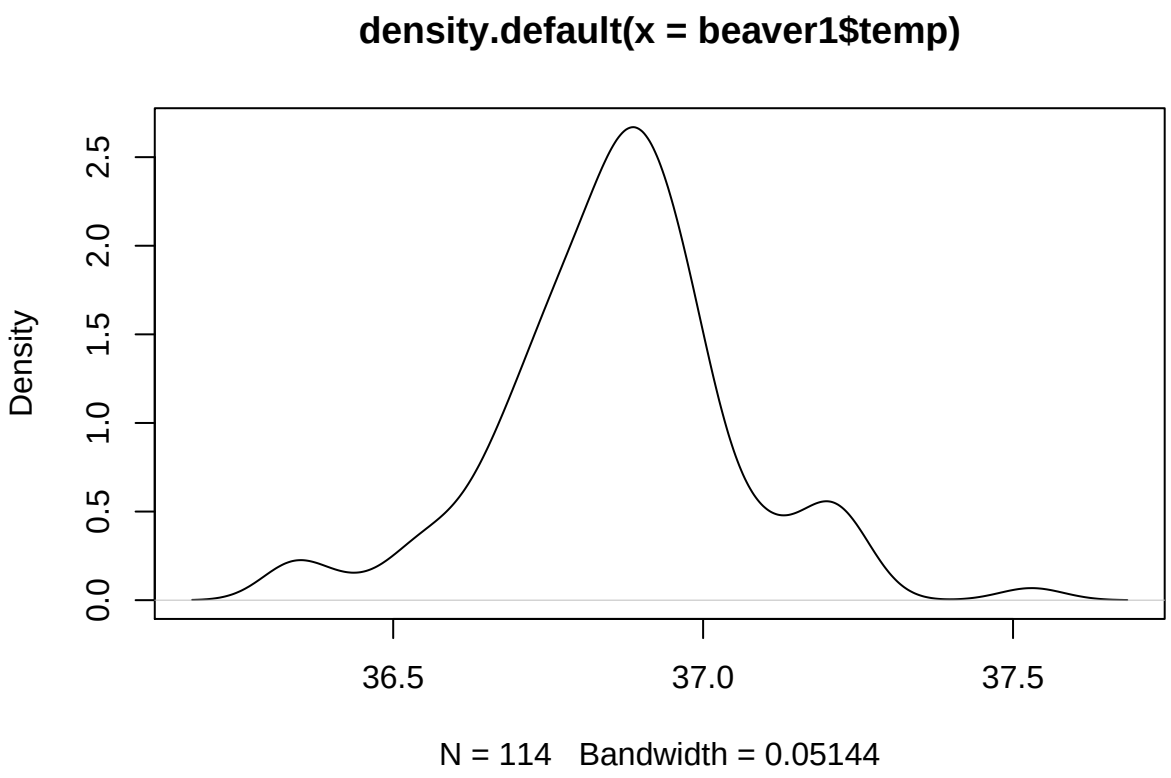
```
library(tidyverse)
library(purrr)
library(ggplot2)
library(here)
library("KernSmooth")
devtools::load_all()
set.seed(1222)
```

Beaver's temprature

Here, we try to apply our KDE method to a real dataset: Beaver1, which records the beaver's body temperature during a day.

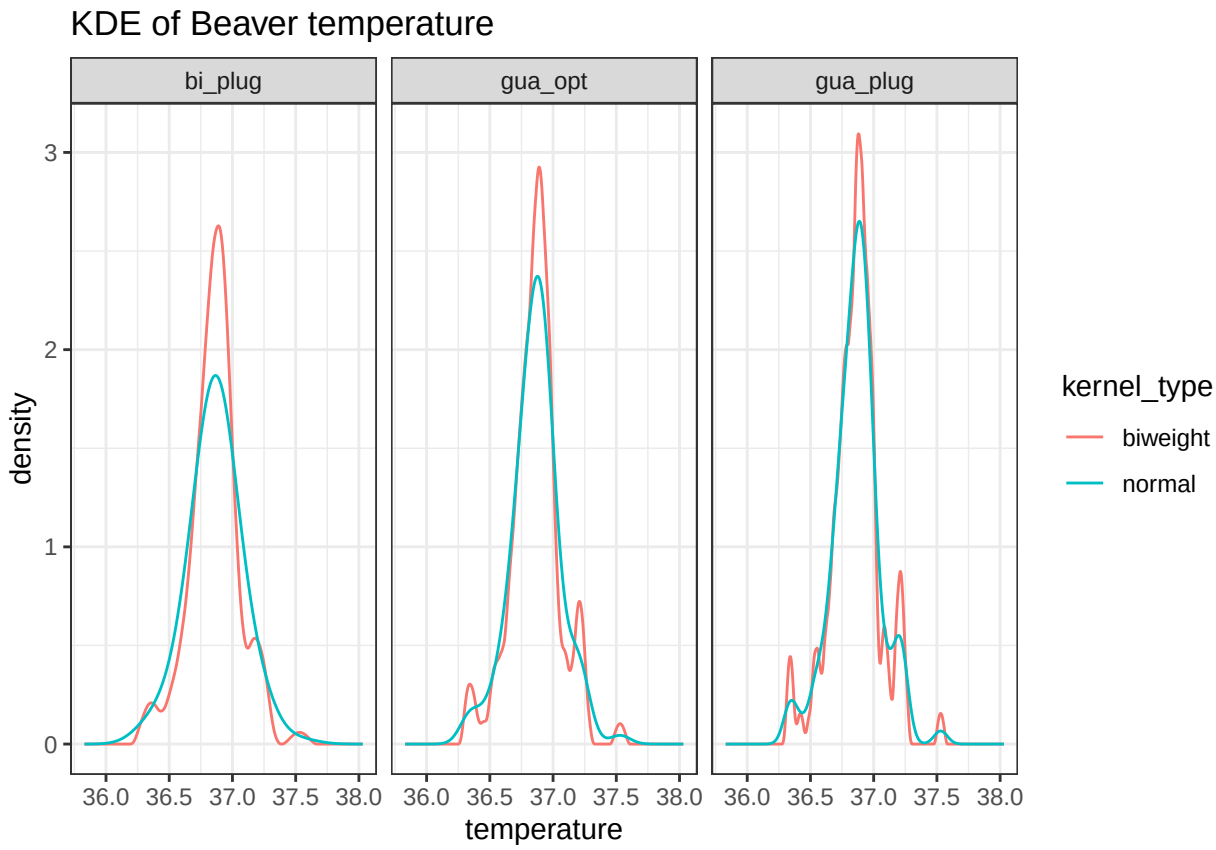
```
plot(density(beaver1$temp))
```



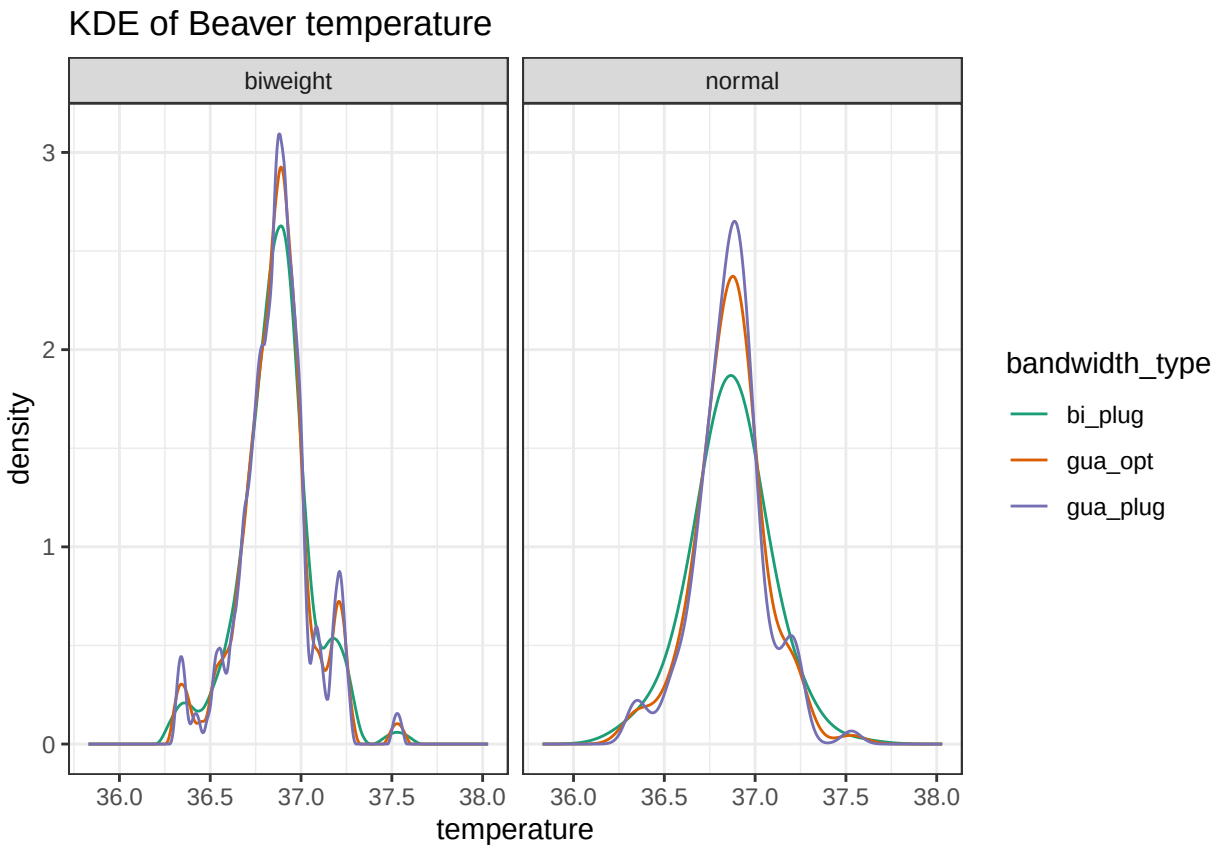
```r
# ?beaver1

h_plug_gua <- dpik(beaver1$temp,kernel = "normal")
h_plug_bi <- dpik(beaver1$temp,kernel = "biweight")
h_opt <- 1.06*sd(beaver1$temp)*length(beaver1$temp)^(-0.2)


params_big <- list(
  kernel_type = c("normal","biweight"),
  bandwidth_type = c("gua_piug"=h_plug_gua,"bi_plug"=h_plug_bi,"gua_opt"=h_opt)
  )

est_big <- cross_df(params_big)

grid = seq(min(beaver1$temp)-0.5, max(beaver1$temp)+0.5, length.out=512)

est_big <- est_big %>%
  mutate(
    f_ests = map2(.x=kernel_type, .y=bandwidth_type,
                  ~KDE_est(beaver1$temp,ker=.x,h=.y,grid=grid)$f_est),
    grid =  map2(.x=kernel_type, .y=bandwidth_type,
                  ~KDE_est(beaver1$temp,ker=.x,h=.y,grid=grid)$grid)
  )


est_big$bandwidth_type <- ifelse(abs(est_big$bandwidth_type - 0.053)<0.001, "gua_plug",
                                 ifelse(abs(est_big$bandwidth_type - 0.138)<0.001,
                                 "bi_plug", "gua_opt"))

est_big_df <- unnest(est_big)
```

```
## Warning: `cols` is now required.
## Please use `cols = c(f_ests, grid)`
```

```r
est_big_df %>%
  ggplot()+
  geom_line(aes(x = grid,y = f_ests,color = kernel_type))+
  facet_wrap(~bandwidth_type)+
  xlab("temperature")+
  ylab("density")+
  theme_bw() +ggtitle("KDE of Beaver temperature")
```




```
est_big_df %>%
  ggplot()+
  geom_line(aes(x = grid,y = f_ests,color = bandwidth_type))+
  facet_wrap(~kernel_type)+
  scale_color_brewer(palette="Dark2") +
   xlab("temperature")+
  ylab("density")+
  theme_bw() +ggtitle("KDE of Beaver temperature")
```


KDE of Beaver temperature
biweight
normal
density
temperature
0
1
2
3
36.0
36.5
37.0
37.5
38.0
bandwidth_type
bi_plug
gua_opt
gua_plug