Local Poisson regression

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1. Bandwidth choice for the local Poisson regression

```r
h.cv.sm.poisson <- function(x, y, rg.h = NULL, l.h = 10) {
  cv.h <- numeric(l.h)

  if (is.null(rg.h)) {
    hh <- c(h.select(x, y, method = "cv"), h.select(x, y, method = "aicc"))
    rg.h <- range(hh) * c(1/1.1, 1.5)
  }

  gr.h <- exp(seq(log(rg.h[1]), log(rg.h[2]), length.out = l.h))

  for (i in 1:length(gr.h)) {
    cv.h[i] <- loglik.CV(x, y, gr.h[i])
  }

  return(list(h = gr.h, cv.h = cv.h, h.cv = gr.h[which.min(cv.h)]))
}
```

```r
loglik.CV <- function(x, y, h) {
    n <- length(x)

    lambda <- sapply(1:n,
                function(i, x, y, h) {
       sm.poisson(x = x[-i], y = y[-i], h = h, eval.points = x[i], display = "none")$estimate
    }, x, y, h)

    return(-sum( exp(-lambda)*((lambda^y)/factorial(y))))

  #return(-sum( y*exp(-lambda)*((lambda^y)/factorial(y)))) ?
}
```

## 2. Local Poisson regression for Country Development Data

```r
# Load required library
library(sm)
```

```
## Package 'sm', version 2.2-5.7: type help(sm) for summary information
```

```r
countries <- read.csv2(file="HDI.2017.subset.csv",row.names = 1)

life.expec <- countries$Life.expec
le.fm.r <- round(countries$le.fm)

cv_result <- h.cv.sm.poisson(life.expec, le.fm.r)
plot(cv_result$h, cv_result$cv.h)
selected_bandwidth <- cv_result$h.cv
abline(v = selected_bandwidth, col="8", lty=2)
text(selected_bandwidth, -26, round(selected_bandwidth*100)/100,cex=0.65, pos=4,col=1)
lines(cv_result$h, cv_result$cv.h)
```
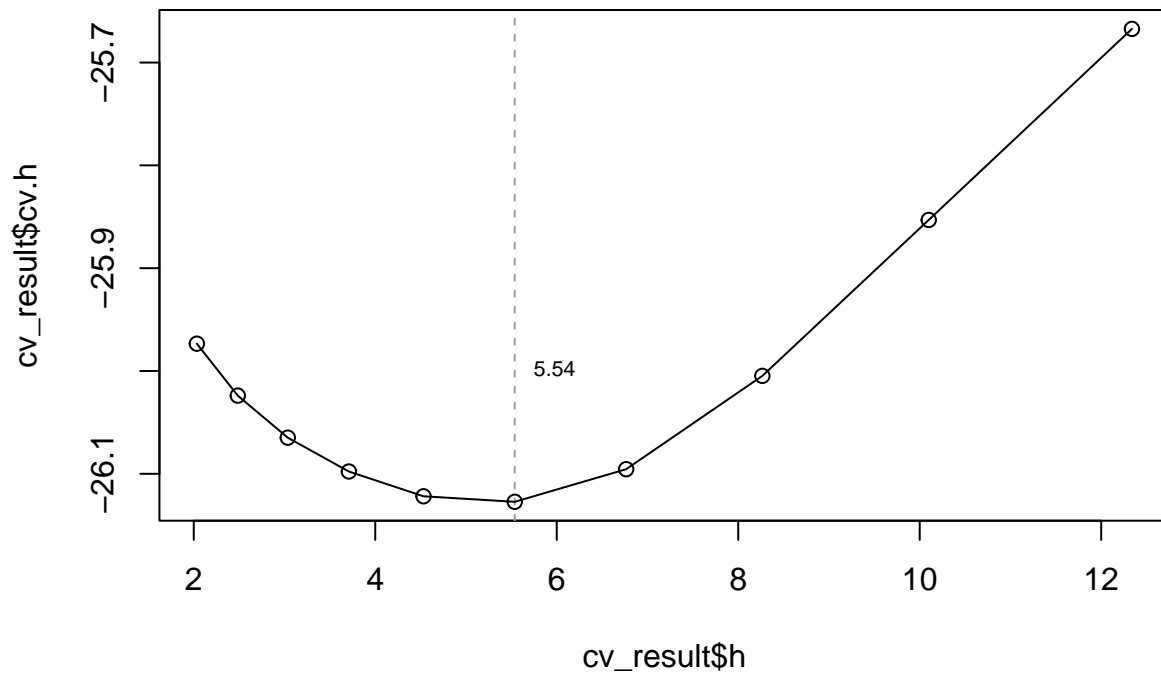


```r
model <- sm.poisson(x = life.expec, y = le.fm.r, h = selected_bandwidth, col=1)
```
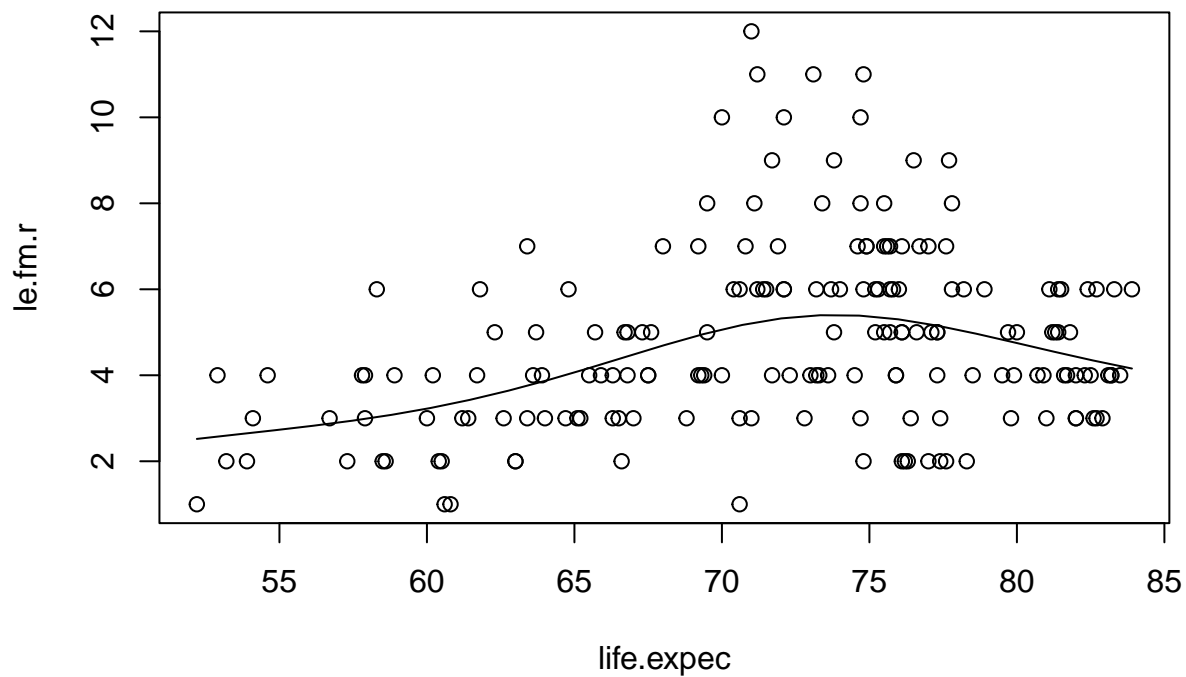
```
summary(model)
```

```
##                     Length Class  Mode
## call                 5     -none- call
## eval.points         25     -none- numeric
## estimate            25     -none- numeric
## lower               25     -none- numeric
## upper               25     -none- numeric
## linear.predictor    25     -none- numeric
## se                  25     -none- numeric
## deviance            25     -none- numeric
## data                 4     -none- list
```