

RSTAN - Normal Distribution

Load the packages

```
library(dplyr)
library(rstan)
```

Model

$$y \sim \text{Normal}(\mu, \sigma^2)$$

Data

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출처: http://topis.seoul.go.kr/refRoom/openRefRoom_1.do

```
data <- read.csv('./data/velocity.csv', header = T)
colnames(data)[13] <- 'speed'

#강남대로만 추출
kang <- data[data$도로명 == '강남대로',]
hist(kang$speed, breaks=20)

#list data
data1 <- list(N = nrow(kang), y = kang$speed)
```

STAN Code

```
data {
  int<lower=0> N; // # obs.
  real y[N];
}

parameters {
  real mu;
  real<lower=0> sigma;
}

model {
  y ~ normal(mu, sigma); //likelihood
}

//예측 분포를 생성하고 싶을 때 주로 사용
generated quantities{
  real y_pred;
```

```
y_pred = normal_rng(mu, sigma); //rng = random number generate  
}
```

Fitting

```
fit1 <- stan(file = 'normal.stan', data = data1)  
fit1
```

Trace Plot

```
traceplot(fit1, inc_warmup = TRUE)
```

Estimated Parameter

```
plot(fit1, pars = 'mu', show_density=TRUE)  
plot(fit1, pars = 'sigma', show_density = TRUE)
```

Extract Posterior Draws

```
res <- extract(fit1)
```

Save y_pred Posterior Draws

```
y_pred <- res$y_pred  
hist(y_pred, nclass=20)
```