Example of Maximum Likelihood and Bayesian Inference

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Example: Body Temperatures

- It's generally believed that the average body temperature is 98.6 degrees Farenheit (37 degrees Celsius).
- Let's investigate with measurements of the temperatures of 130 adults.

Load libraries

```
require(ggplot2)
require(dplyr)
```

Read in data set

```
bodytemp = read.table('http://www.amstat.org/publications/jse/datasets/normtemp.dat.txt')
head(bodytemp)
```

```
##     V1 V2 V3
## 1 96.3  1 70
## 2 96.7  1 71
## 3 96.9  1 74
## 4 97.0  1 80
## 5 97.1  1 73
## 6 97.1  1 75
```

Set variable names

```
names(bodytemp) <- c('temp','sex','hr')
head(bodytemp)
```

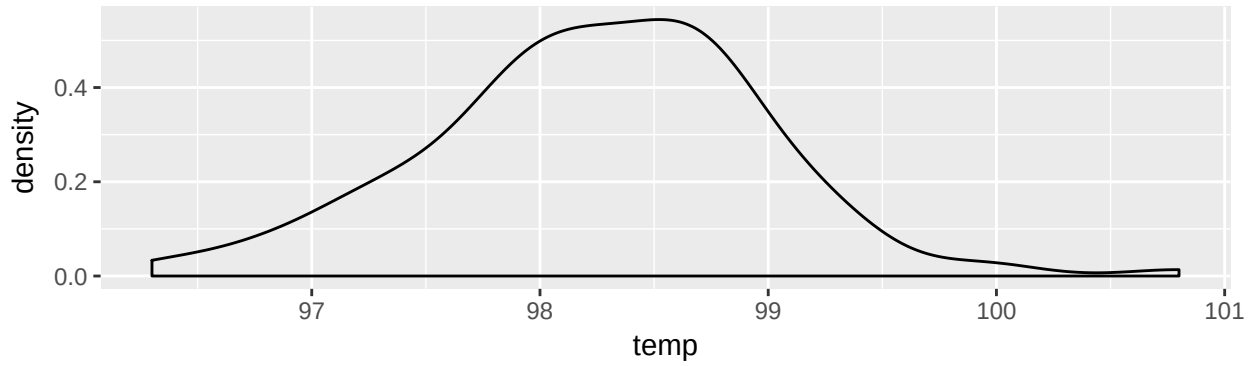
```
##   temp sex hr
## 1 96.3   1 70
## 2 96.7   1 71
## 3 96.9   1 74
## 4 97.0   1 80
## 5 97.1   1 73
## 6 97.1   1 75
```

Set sex to a categorical variable (treated as a variable with 2 levels in this data set)

```
bodytemp <- bodytemp %>%
  mutate(
    sex = factor(sex, levels = c("Male","Female"))
  )
```

Make a plot

```
ggplot(data = bodytemp, mapping = aes(x = temp)) +
  geom_density()
```



Sample Statistics, 3 ways

Approach 1:

```
mean(bodytemp$temp)
```

```
## [1] 98.24923
```

```
sd(bodytemp$temp)
```

```
## [1] 0.7331832
```

Approach 2:

```
summarize(bodytemp,
  mean_temp = mean(temp),
  sd_temp = sd(temp)
)
```

```
##   mean_temp   sd_temp
## 1  98.24923 0.7331832
```

Approach 3:

```
bodytemp %>% summarize(
  mean_temp = mean(temp),
  sd_temp = sd(temp)
)
```

```
##   mean_temp   sd_temp
## 1  98.24923 0.7331832
```