gps data mapping

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```
dat <- readRDS('C:/Users/sympl/Documents/UMass/msthesis/Data/completedata.rds')

to_factors <- c("fuel_bin", "gender", "residence", "wealth", "education", "marital_s", "region")
dat %<>% mutate_at(to_factors, funs(factor(.)))
```

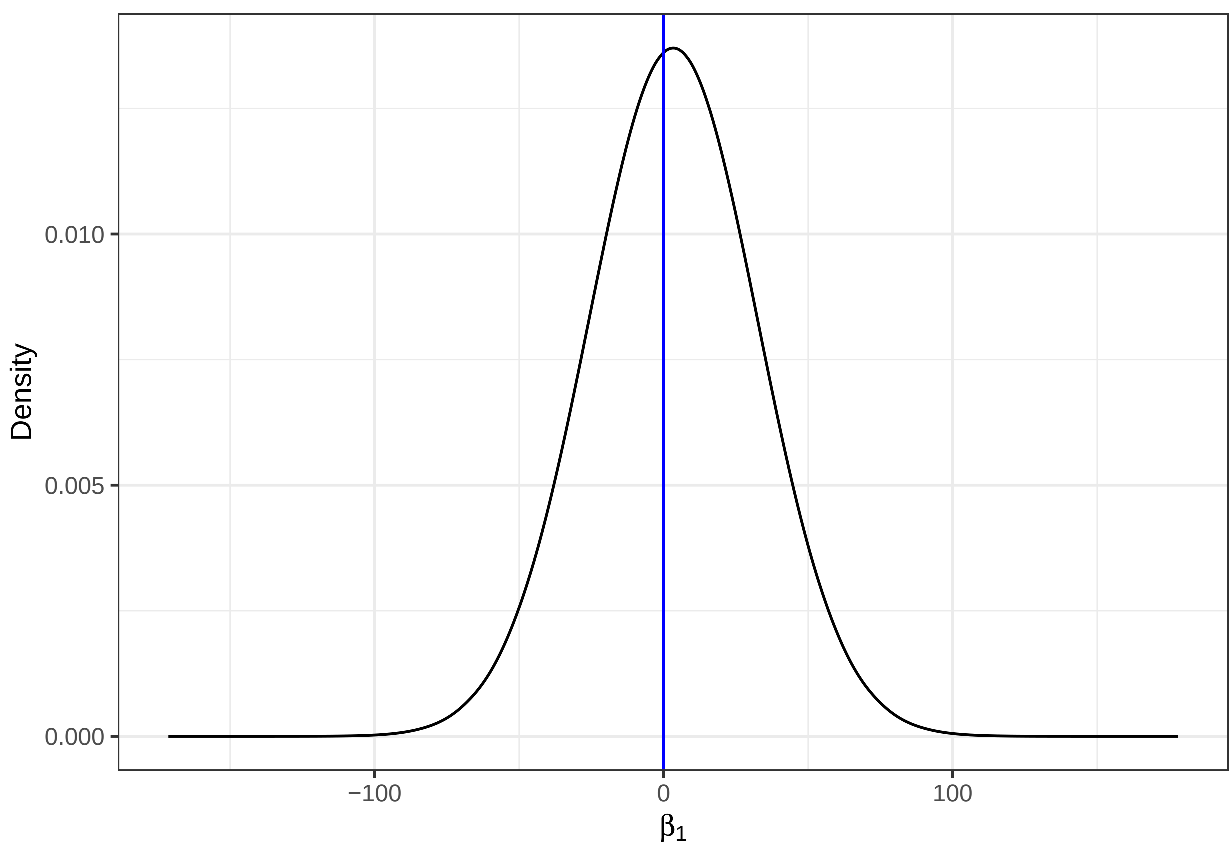
LMER in INLA

```
formula = c_weight~1+fuel_bin+w_age+bmi+gender+residence+wealth+education+marital_s+ f(region, model =
result<-inla(formula, family = "gaussian", data=dat, control.predictor = list(compute = TRUE))

summary(result)
```

```
##
## Call:
##    "inla(formula = formula, family = \"gaussian\", data = dat,
##    control.predictor = list(compute = TRUE))"
## Time used:
##     Pre = 4.7, Running = 3.08, Post = 1.96, Total = 9.74
## Fixed effects:
##                 mean      sd 0.025quant 0.5quant 0.975quant     mode kld
## (Intercept) 3022.195 139.400   2748.505 3022.191   3295.657 3022.195   0
## fuel_bin1      3.325  29.115    -53.836    3.325     60.439    3.325   0
## w_age          4.644   3.968     -3.148    4.644     12.429    4.644   0
## bmi            1.512   2.237     -2.880    1.512      5.899    1.512   0
## gender2      -41.312  27.077    -94.474  -41.312     11.806  -41.312   0
## residence2    14.553  27.455    -39.351   14.552     68.411   14.553   0
## wealth2        5.296  29.059    -51.756    5.295     62.300    5.296   0
## wealth3       11.417  28.611    -44.756   11.417     67.544   11.417   0
## wealth4       -8.900  28.446    -64.748   -8.901     46.902   -8.900   0
## wealth5        1.335  28.569    -54.755    1.334     57.378    1.335   0
## education1    -9.125  28.749    -65.568   -9.125     47.272   -9.125   0
## education2    -0.927  27.388    -54.698   -0.927     52.800   -0.927   0
## education3     1.081  30.673    -59.141    1.080     61.253    1.081   0
## marital_s1    10.293  29.477    -47.581   10.292     68.119   10.293   0
##
## Random effects:
##   Name     Model
##     region IID model
##
```

```
## Model hyperparameters:
##                                              mean      sd 0.025quant  0.5quant
## Precision for the Gaussian observations      0.00    0.00       0.00      0.00
## Precision for region                    852364.70 1327.62  850056.28 852192.26
##                                         0.975quant      mode
## Precision for the Gaussian observations       0.00      0.00
## Precision for region                     855440.41 851593.50
##
## Expected number of effective parameters(stdev): 5.01(0.00)
## Number of equivalent replicates : 591.08
##
## Marginal log-Likelihood:  -24438.84
## Posterior marginals for the linear predictor and
##  the fitted values are computed
```

```
## plot of posterior distribution for b1
marginal <- inla.smarginal(result$marginals.fixed$fuel_bin1) #posterior distn of b1 is stored here
marginal <- data.frame(marginal)
ggplot(marginal, aes(x = x, y = y)) + geom_line() + labs(x = expression(beta[1]), y = "Density") +
  geom_vline(xintercept = 0, col = "blue") + theme_bw()
```




```
#2014 contains 1310 entries
d <- dat %>% filter(year_cmc=="2014") %>% group_by( cluster.no) %>%
  summarize(meanbw = mean(c_weight)) #394 unique clusters
```

```
## `summarise()` ungrouping output (override with `.groups` argument)
```

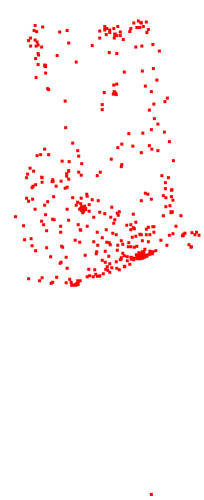
```r
#head(d)
#newdata %>% filter(year_cmc=="2014") %>% group_by(cluster.no) %>% summarise(meanbw = mean(c_weight)) #
#unique(d$cluster.no)

#table(dat$fuel_bin[dat$fuel_bin == 0])
```

##GPS coordinates

```r
#gc<-read.csv("GPS/GHGC72FL.csv")


ge.shp<-readOGR("C:/Users/sympl/Documents/UMass/msthesis/GPS/GHGE71FL/GHGE71FL.shp")
```

```
## OGR data source with driver: ESRI Shapefile
## Source: "C:\Users\sympl\Documents\UMass\msthesis\GPS\GHGE71FL\GHGE71FL.shp", layer: "GHGE71FL"
## with 427 features
## It has 20 fields
```

```r
gt<-ge.shp@data

#summary(gt$ALT_GPS)

plot(ge.shp, pch=".", col="red")
```



#merge with geo data

```
#ge.shp@data$meanbw <- extract(d, ge.shp@data[, c("DHSCLUST")])
```