Segmentation of Trip Data - Part4

Dave Hurst

Tuesday, December 30, 2014

Build trip profiles

I wrote `tripProfile` to count the number of *straight, accelerating*, and *decelerating* segments along with some characteristics (see at the bottom).

Here's what it comes up with for the driver we've been working with:

```
driver.id <- 2591

trip.prof <- data.frame()
ptime0 <- proc.time()
for(i.trip in 1:200) {
    trip <- getTrip( driver.id, i.trip, v.thresh=1 )    #v.thresh = lowered for slow trips
    tp <- getTripProfile( trip )
    trip.prof <- rbind(trip.prof, tp)
    cat(i.trip, ": length, dist, straights, accels, decels # ", tp$trip.len, round(tp$trip.dist/1000,1)
}
```

```
## 1 : length, dist, straights, accels, decels #  649 11.5 5 5 7 ...
## 2 : length, dist, straights, accels, decels #  290 1.9 1 1 3 ...
## 3 : length, dist, straights, accels, decels #  836 11.7 4 4 5 ...
## 4 : length, dist, straights, accels, decels #  637 7.8 2 3 3 ...
## 5 : length, dist, straights, accels, decels #  923 15.8 9 9 9 ...
## 6 : length, dist, straights, accels, decels #  194 1.4 0 1 3 ...
## 7 : length, dist, straights, accels, decels #  283 3.7 1 0 2 ...
## 8 : length, dist, straights, accels, decels #  765 11 2 5 5 ...
## 9 : length, dist, straights, accels, decels #  604 7.6 3 6 6 ...
## 10 : length, dist, straights, accels, decels #  574 4.2 2 5 5 ...
## 11 : length, dist, straights, accels, decels #  234 3 1 1 2 ...
## 12 : length, dist, straights, accels, decels #  933 14.6 10 14 14 ...
## 13 : length, dist, straights, accels, decels #  583 6.1 1 8 9 ...
## 14 : length, dist, straights, accels, decels #  1319 23 13 9 8 ...
## 15 : length, dist, straights, accels, decels #  752 10.3 6 6 10 ...
## 16 : length, dist, straights, accels, decels #  267 2 1 1 2 ...
## 17 : length, dist, straights, accels, decels #  1107 16.2 7 12 10 ...
## 18 : length, dist, straights, accels, decels #  493 6.4 2 5 5 ...
## 19 : length, dist, straights, accels, decels #  290 4.2 1 1 2 ...
## 20 : length, dist, straights, accels, decels #  1277 19.5 12 10 14 ...
## 21 : length, dist, straights, accels, decels #  233 1.4 1 2 2 ...
## 22 : length, dist, straights, accels, decels #  1050 16.7 8 11 12 ...
## 23 : length, dist, straights, accels, decels #  930 12.5 8 10 12 ...
## 24 : length, dist, straights, accels, decels #  1145 17.8 8 11 13 ...
## 25 : length, dist, straights, accels, decels #  839 8.1 3 7 8 ...
## 26 : length, dist, straights, accels, decels #  253 2.1 1 2 2 ...
## 27 : length, dist, straights, accels, decels #  438 5.6 1 1 2 ...
## 28 : length, dist, straights, accels, decels #  415 6.1 1 2 2 ...
## 29 : length, dist, straights, accels, decels #  937 11 8 5 5 ...
```

```
## 30 : length, dist, straights, accels, decels #  229 4.2 1 0 0 ...
## 31 : length, dist, straights, accels, decels #  1299 17.4 10 6 10 ...
## 32 : length, dist, straights, accels, decels #  378 4 1 1 2 ...
## 33 : length, dist, straights, accels, decels #  671 5.1 3 6 6 ...
## 34 : length, dist, straights, accels, decels #  1374 16.9 7 11 14 ...
## 35 : length, dist, straights, accels, decels #  335 5.7 1 1 1 ...
## 36 : length, dist, straights, accels, decels #  251 1.2 2 1 2 ...
## 37 : length, dist, straights, accels, decels #  245 2.2 1 1 2 ...
## 38 : length, dist, straights, accels, decels #  1455 18.8 12 23 22 ...
## 39 : length, dist, straights, accels, decels #  930 8.8 9 11 11 ...
## 40 : length, dist, straights, accels, decels #  181 0.9 0 0 1 ...
## 41 : length, dist, straights, accels, decels #  189 1.1 2 1 3 ...
## 42 : length, dist, straights, accels, decels #  631 7.3 1 4 5 ...
## 43 : length, dist, straights, accels, decels #  282 2 1 2 3 ...
## 44 : length, dist, straights, accels, decels #  302 2.1 1 2 4 ...
## 45 : length, dist, straights, accels, decels #  251 1.8 0 2 3 ...
## 46 : length, dist, straights, accels, decels #  209 0.7 0 3 5 ...
## 47 : length, dist, straights, accels, decels #  343 4.5 1 3 3 ...
## 48 : length, dist, straights, accels, decels #  441 4.3 3 5 5 ...
## 49 : length, dist, straights, accels, decels #  612 4.2 2 5 6 ...
## 50 : length, dist, straights, accels, decels #  1453 26.8 13 11 12 ...
## 51 : length, dist, straights, accels, decels #  463 6.4 1 2 2 ...
## 52 : length, dist, straights, accels, decels #  269 2.9 1 3 4 ...
## 53 : length, dist, straights, accels, decels #  233 2 1 2 2 ...
## 54 : length, dist, straights, accels, decels #  240 2 1 2 3 ...
## 55 : length, dist, straights, accels, decels #  233 3.2 2 1 1 ...
## 56 : length, dist, straights, accels, decels #  1369 20.2 11 11 12 ...
## 57 : length, dist, straights, accels, decels #  833 5.3 2 9 10 ...
## 58 : length, dist, straights, accels, decels #  751 11.9 3 8 8 ...
## 59 : length, dist, straights, accels, decels #  238 3.6 2 1 1 ...
## 60 : length, dist, straights, accels, decels #  196 1.3 0 1 1 ...
## 61 : length, dist, straights, accels, decels #  1360 19.4 10 8 11 ...
## 62 : length, dist, straights, accels, decels #  478 6.3 2 2 3 ...
## 63 : length, dist, straights, accels, decels #  260 2.5 1 2 2 ...
## 64 : length, dist, straights, accels, decels #  856 11.8 3 5 5 ...
## 65 : length, dist, straights, accels, decels #  1080 16.3 10 9 10 ...
## 66 : length, dist, straights, accels, decels #  789 10.7 4 6 9 ...
## 67 : length, dist, straights, accels, decels #  1115 19.9 8 13 9 ...
## 68 : length, dist, straights, accels, decels #  336 5.7 1 1 2 ...
## 69 : length, dist, straights, accels, decels #  1415 22.6 12 11 10 ...
## 70 : length, dist, straights, accels, decels #  241 2.5 1 2 3 ...
## 71 : length, dist, straights, accels, decels #  165 0.8 1 2 4 ...
## 72 : length, dist, straights, accels, decels #  476 0.1 0 0 0 ...
## 73 : length, dist, straights, accels, decels #  933 14.4 7 11 12 ...
## 74 : length, dist, straights, accels, decels #  1457 23.6 12 13 13 ...
## 75 : length, dist, straights, accels, decels #  415 5.7 2 1 3 ...
## 76 : length, dist, straights, accels, decels #  1321 18.3 9 13 13 ...
## 77 : length, dist, straights, accels, decels #  1215 17.5 9 11 13 ...
## 78 : length, dist, straights, accels, decels #  1187 16.5 7 9 9 ...
## 79 : length, dist, straights, accels, decels #  574 2.3 0 7 8 ...
## 80 : length, dist, straights, accels, decels #  238 2.4 1 2 2 ...
## 81 : length, dist, straights, accels, decels #  744 11.1 4 9 7 ...
## 82 : length, dist, straights, accels, decels #  218 1.6 0 1 2 ...
## 83 : length, dist, straights, accels, decels #  328 2.9 2 5 4 ...
```

```
## 84 : length, dist, straights, accels, decels #  417 5.3 3 3 4 ...
## 85 : length, dist, straights, accels, decels #  171 0.8 1 1 2 ...
## 86 : length, dist, straights, accels, decels #  1249 18.9 8 7 10 ...
## 87 : length, dist, straights, accels, decels #  1311 20.1 10 8 11 ...
## 88 : length, dist, straights, accels, decels #  579 5.4 3 4 6 ...
## 89 : length, dist, straights, accels, decels #  1023 17 9 12 14 ...
## 90 : length, dist, straights, accels, decels #  523 6.5 1 2 4 ...
## 91 : length, dist, straights, accels, decels #  912 12.5 2 9 8 ...
## 92 : length, dist, straights, accels, decels #  242 2.4 2 5 4 ...
## 93 : length, dist, straights, accels, decels #  631 3.9 2 9 10 ...
## 94 : length, dist, straights, accels, decels #  223 1.7 1 2 3 ...
## 95 : length, dist, straights, accels, decels #  632 10.7 5 8 9 ...
## 96 : length, dist, straights, accels, decels #  783 13.4 6 8 8 ...
## 97 : length, dist, straights, accels, decels #  1045 17.3 10 9 12 ...
## 98 : length, dist, straights, accels, decels #  1276 21.4 12 14 15 ...
## 99 : length, dist, straights, accels, decels #  1370 12.4 5 8 11 ...
## 100 : length, dist, straights, accels, decels #  169 1 1 1 1 ...
## 101 : length, dist, straights, accels, decels #  1273 16.8 9 12 12 ...
## 102 : length, dist, straights, accels, decels #  1331 17.6 8 13 12 ...
## 103 : length, dist, straights, accels, decels #  173 1.3 1 1 3 ...
## 104 : length, dist, straights, accels, decels #  183 0.9 0 1 1 ...
## 105 : length, dist, straights, accels, decels #  250 1.5 1 1 2 ...
## 106 : length, dist, straights, accels, decels #  989 15.2 7 9 8 ...
## 107 : length, dist, straights, accels, decels #  255 2 1 2 3 ...
## 108 : length, dist, straights, accels, decels #  937 15.7 7 7 8 ...
## 109 : length, dist, straights, accels, decels #  330 5.2 1 1 1 ...
## 110 : length, dist, straights, accels, decels #  1571 18.7 9 14 19 ...
## 111 : length, dist, straights, accels, decels #  323 2.6 1 2 2 ...
## 112 : length, dist, straights, accels, decels #  324 2.4 1 8 5 ...
## 113 : length, dist, straights, accels, decels #  384 5.2 2 3 6 ...
## 114 : length, dist, straights, accels, decels #  300 3.7 1 1 2 ...
## 115 : length, dist, straights, accels, decels #  175 0.9 0 0 1 ...
## 116 : length, dist, straights, accels, decels #  508 6.9 4 5 5 ...
## 117 : length, dist, straights, accels, decels #  233 2.3 1 1 2 ...
## 118 : length, dist, straights, accels, decels #  1634 15.8 11 20 19 ...
## 119 : length, dist, straights, accels, decels #  1282 19.7 11 15 15 ...
## 120 : length, dist, straights, accels, decels #  502 5.7 2 3 3 ...
## 121 : length, dist, straights, accels, decels #  401 3.5 1 4 3 ...
## 122 : length, dist, straights, accels, decels #  254 1.1 0 4 4 ...
## 123 : length, dist, straights, accels, decels #  241 1.2 0 0 1 ...
## 124 : length, dist, straights, accels, decels #  419 9.2 4 4 4 ...
## 125 : length, dist, straights, accels, decels #  880 11.3 3 4 5 ...
## 126 : length, dist, straights, accels, decels #  631 10.1 6 6 9 ...
## 127 : length, dist, straights, accels, decels #  315 3.9 1 6 7 ...
## 128 : length, dist, straights, accels, decels #  638 7.6 4 6 6 ...
## 129 : length, dist, straights, accels, decels #  1127 18.9 12 15 13 ...
## 130 : length, dist, straights, accels, decels #  419 2.2 1 2 3 ...
## 131 : length, dist, straights, accels, decels #  286 1.3 0 0 1 ...
## 132 : length, dist, straights, accels, decels #  645 6.1 5 7 6 ...
## 133 : length, dist, straights, accels, decels #  273 1.3 1 4 4 ...
## 134 : length, dist, straights, accels, decels #  837 14.6 8 8 9 ...
## 135 : length, dist, straights, accels, decels #  407 6.1 1 2 1 ...
## 136 : length, dist, straights, accels, decels #  504 7.9 3 3 4 ...
## 137 : length, dist, straights, accels, decels #  837 12.3 5 7 10 ...
```

```
## 138 : length, dist, straights, accels, decels #  246 2.4 1 2 2 ...
## 139 : length, dist, straights, accels, decels #  1390 19.5 10 11 14 ...
## 140 : length, dist, straights, accels, decels #  654 3.7 2 4 7 ...
## 141 : length, dist, straights, accels, decels #  414 4.8 1 3 4 ...
## 142 : length, dist, straights, accels, decels #  350 2.6 1 3 3 ...
## 143 : length, dist, straights, accels, decels #  403 5.4 1 2 2 ...
## 144 : length, dist, straights, accels, decels #  1100 19.8 10 16 15 ...
## 145 : length, dist, straights, accels, decels #  512 5.6 1 6 8 ...
## 146 : length, dist, straights, accels, decels #  297 2.2 1 2 2 ...
## 147 : length, dist, straights, accels, decels #  163 0.9 0 3 4 ...
## 148 : length, dist, straights, accels, decels #  754 11 4 4 4 ...
## 149 : length, dist, straights, accels, decels #  307 3 1 4 5 ...
## 150 : length, dist, straights, accels, decels #  830 15 7 9 10 ...
## 151 : length, dist, straights, accels, decels #  293 3.7 2 0 1 ...
## 152 : length, dist, straights, accels, decels #  178 1.3 0 1 3 ...
## 153 : length, dist, straights, accels, decels #  239 0.7 0 1 2 ...
## 154 : length, dist, straights, accels, decels #  191 1 0 0 1 ...
## 155 : length, dist, straights, accels, decels #  235 1.4 0 1 2 ...
## 156 : length, dist, straights, accels, decels #  396 4.5 1 1 3 ...
## 157 : length, dist, straights, accels, decels #  156 0.5 0 0 1 ...
## 158 : length, dist, straights, accels, decels #  963 6.3 4 5 9 ...
## 159 : length, dist, straights, accels, decels #  480 6.3 1 3 2 ...
## 160 : length, dist, straights, accels, decels #  330 4.7 1 1 2 ...
## 161 : length, dist, straights, accels, decels #  393 2 2 3 4 ...
## 162 : length, dist, straights, accels, decels #  574 3.7 2 3 5 ...
## 163 : length, dist, straights, accels, decels #  1409 2.2 0 6 2 ...
## 164 : length, dist, straights, accels, decels #  1395 22 10 6 10 ...
## 165 : length, dist, straights, accels, decels #  1620 21.2 11 16 14 ...
## 166 : length, dist, straights, accels, decels #  386 5.3 1 1 3 ...
## 167 : length, dist, straights, accels, decels #  1257 17.9 7 9 9 ...
## 168 : length, dist, straights, accels, decels #  981 13.2 5 7 10 ...
## 169 : length, dist, straights, accels, decels #  423 5.3 1 2 3 ...
## 170 : length, dist, straights, accels, decels #  481 5.6 1 4 4 ...
## 171 : length, dist, straights, accels, decels #  667 7.6 5 8 11 ...
## 172 : length, dist, straights, accels, decels #  1424 17.9 9 10 12 ...
## 173 : length, dist, straights, accels, decels #  193 0.9 1 2 3 ...
## 174 : length, dist, straights, accels, decels #  665 9.4 5 9 12 ...
## 175 : length, dist, straights, accels, decels #  1114 18.8 10 12 11 ...
## 176 : length, dist, straights, accels, decels #  500 4.8 3 4 5 ...
## 177 : length, dist, straights, accels, decels #  530 9.1 4 6 8 ...
## 178 : length, dist, straights, accels, decels #  349 2.1 1 3 3 ...
## 179 : length, dist, straights, accels, decels #  615 9.4 3 2 2 ...
## 180 : length, dist, straights, accels, decels #  301 2.5 1 1 2 ...
## 181 : length, dist, straights, accels, decels #  1245 20.8 14 10 10 ...
## 182 : length, dist, straights, accels, decels #  1225 21.7 13 10 12 ...
## 183 : length, dist, straights, accels, decels #  1178 8.4 4 15 16 ...
## 184 : length, dist, straights, accels, decels #  194 1.5 1 1 3 ...
## 185 : length, dist, straights, accels, decels #  191 1.4 1 1 2 ...
## 186 : length, dist, straights, accels, decels #  300 1.2 1 1 1 ...
## 187 : length, dist, straights, accels, decels #  351 0.9 0 1 2 ...
## 188 : length, dist, straights, accels, decels #  331 4.9 4 1 1 ...
## 189 : length, dist, straights, accels, decels #  526 6 1 2 5 ...
## 190 : length, dist, straights, accels, decels #  748 5.4 5 11 13 ...
## 191 : length, dist, straights, accels, decels #  1357 23 14 13 13 ...
```

```
## 192 : length, dist, straights, accels, decels #  249 2.4 1 1 2 ...
## 193 : length, dist, straights, accels, decels #  1247 22.8 12 10 10 ...
## 194 : length, dist, straights, accels, decels #  431 5.4 1 1 2 ...
## 195 : length, dist, straights, accels, decels #  442 6.6 3 3 5 ...
## 196 : length, dist, straights, accels, decels #  657 0.4 0 1 1 ...
## 197 : length, dist, straights, accels, decels #  1074 3.6 5 9 9 ...
## 198 : length, dist, straights, accels, decels #  246 1.7 0 2 2 ...
## 199 : length, dist, straights, accels, decels #  980 16.4 11 8 9 ...
## 200 : length, dist, straights, accels, decels #  234 2 1 2 1 ...
```

```
rownames(trip.prof) <- 1:200
ptime1 <- proc.time()
print (ptime1 - ptime0)
```

```
##    user  system elapsed
##   64.43    0.10   65.72
```

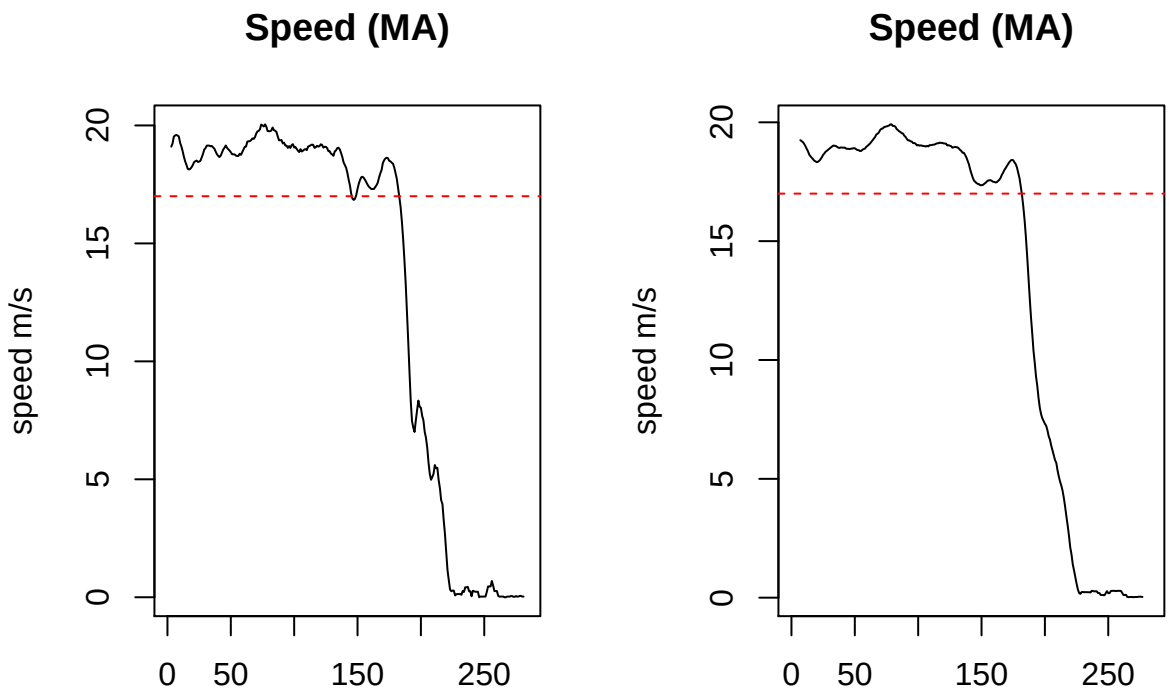
Notes / Observations

Trip 7

Trip 7 shows a break in the deceleration (downshift?). This can be smoothed out by increasing the MA value (I added a parameter for `segment.parse.XXcel`), but do we want to? Notice the value for *a.mid* (the midpoint deceleration value changes significantly).

One idea (for parse.decel) would be to pre-process the segment with a very high MA to get the boundaries of the segment, but process it with better resolution. It's interesting for this graph that both segments are steeper than the smoothed segment, but the fact that there is a "stutter" could be predictive, so we probably don't want lose that (but will for now).

```
i.trip=7
trip <- getTrip( driver.id, i.trip, v.thresh=1 )
#tp <- getTripProfile( trip )  #this originally had a warning message which lead me to look at this tri
par.orig <- par(mfrow=c(1,2))
plotTripSegment.speed(trip,1,999)
plotTripSegment.speed(trip,1,999, ma=13)
```




```
par(par.orig)
segment.parse.decel(trip) #default ma=5
```

```
##    t0  tn        v0        vn      a.mid
## 1 173 195 18.634334 7.0068556 -0.6109059
## 2 213 224  5.483521 0.2532381 -0.6088018
```

```
segment.parse.decel(trip, ma=13)
```

```
##    t0  tn       v0        vn      a.mid
## 1 174 228 18.42091 0.1594338 -0.1868061
```

Trip 72

```
#with(trip.prof, print(trip.prof[ss.n * acc.n * dec.n == 0,  c("ss.n", "acc.n", "dec.n")]))
miss.1   <- with(trip.prof, print(which(ss.n * acc.n * dec.n == 0 )))
```

```
##  [1]   6   7  30  40  45  46  60  72  79  82 104 115 122 123 131 147 151
## [18] 152 153 154 155 157 163 187 196 198
```

```
miss.all <- with(trip.prof, print(which(ss.n + acc.n + dec.n == 0 )))
```

```
## [1] 72
```

```
cat ("Trips missing at least one segment type:\n", miss.1, "\n")
```

```
## Trips missing at least one segment type:
##  6 7 30 40 45 46 60 72 79 82 104 115 122 123 131 147 151 152 153 154 155 157 163 187 196 198
```

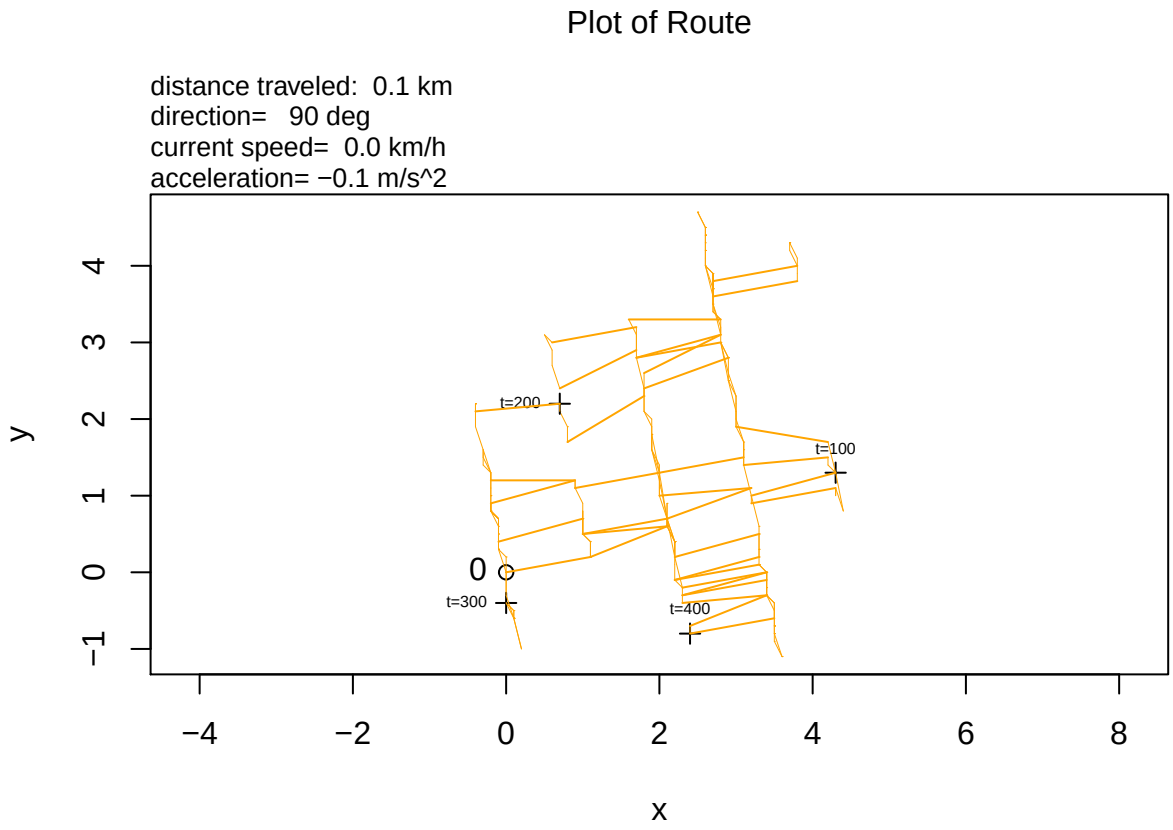
```
cat ("Trips with no segment type:\n"             , miss.all, "\n")
```

```
## Trips with no segment type:
##  72
```

```
i.trip <- 72
tp <- trip.prof[i.trip, ]
cat(i.trip, ": length, dist, straights, accels, decels # ", tp$trip.len, round(tp$trip.dist/1000,1), tp$
```

```
## 72 : length, dist, straights, accels, decels #  476 0.1 0 0 0 ...
```

```
trip <- getTrip( driver.id, i.trip, v.thresh=1 )
plotTrip(trip)
```



This looks like a parked car, and is probably all noise. We should filter trips like these out.

```
trip.prof <- trip.prof[-miss.all, ]
print(summary( trip.prof ))
```

```
##     trip.len        trip.dist         speed.avg         speed.max
##  Min.   : 156.0   Min.   :  389.7   Min.   : 0.5932   Min.   :11.70
##  1st Qu.: 282.5   1st Qu.: 2337.5   1st Qu.: 7.4073   1st Qu.:19.42
##  Median : 502.0   Median : 5574.0   Median :12.3856   Median :22.64
##  Mean   : 637.4   Mean   : 8091.0   Mean   :11.2906   Mean   :22.81
##  3rd Qu.: 935.0   3rd Qu.:12821.6   3rd Qu.:14.7602   3rd Qu.:25.11
##  Max.   :1634.0   Max.   :26772.4   Max.   :21.9898   Max.   :73.72
##
##       ss.n          ss.len.min       ss.len.max      ss.len.avg
##  Min.   : 0.000   Min.   : 30.00   Min.   : 31.0   Min.   : 31.00
##  1st Qu.: 1.000   1st Qu.: 34.00   1st Qu.: 65.0   1st Qu.: 55.60
##  Median : 2.000   Median : 41.00   Median :109.0   Median : 72.50
##  Mean   : 3.819   Mean   : 72.44   Mean   :128.4   Mean   : 95.17
##  3rd Qu.: 7.000   3rd Qu.: 68.00   3rd Qu.:202.0   3rd Qu.:111.57
##  Max.   :14.000   Max.   :276.00   Max.   :324.0   Max.   :276.00
##                   NA's   :22       NA's   :22      NA's   :22
##    ss.len.sd       ss.range.avg     ss.range.sd       ss.vmid.avg
##  Min.   :  0.00   Min.   : 4.004   Min.   : 0.2023   Min.   : 7.594
##  1st Qu.: 18.52   1st Qu.: 7.746   1st Qu.: 2.0483   1st Qu.:16.707
##  Median : 27.20   Median : 9.291   Median : 3.2904   Median :18.991
##  Mean   : 38.59   Mean   : 9.760   Mean   : 3.5570   Mean   :18.281
##  3rd Qu.: 52.93   3rd Qu.:11.350   3rd Qu.: 4.2197   3rd Qu.:20.389
##  Max.   :164.05   Max.   :23.666   Max.   :23.3281   Max.   :26.635
##  NA's   :89       NA's   :22       NA's   :89        NA's   :22
##    ss.vmid.sd         acc.n          acc.len.min     acc.len.max
##  Min.   :0.1554   Min.   : 0.000   Min.   : 5.00   Min.   : 7.00
##  1st Qu.:2.3346   1st Qu.: 2.000   1st Qu.: 9.00   1st Qu.:20.00
##  Median :3.7986   Median : 4.000   Median :12.00   Median :27.00
##  Mean   :3.6302   Mean   : 5.271   Mean   :13.38   Mean   :27.35
##  3rd Qu.:4.8894   3rd Qu.: 8.500   3rd Qu.:15.00   3rd Qu.:34.00
##  Max.   :8.8473   Max.   :23.000   Max.   :46.00   Max.   :55.00
##  NA's   :89                        NA's   :9       NA's   :9
##   acc.len.avg      acc.len.sd     acc.range.avg     acc.range.sd
##  Min.   : 7.00   Min.   : 0.000   Min.   : 5.149   Min.   :0.4921
##  1st Qu.:15.83   1st Qu.: 4.523   1st Qu.: 9.069   1st Qu.:2.6310
##  Median :18.71   Median : 7.112   Median :10.798   Median :3.6057
##  Mean   :19.49   Mean   : 7.098   Mean   :11.389   Mean   :3.8499
##  3rd Qu.:22.90   3rd Qu.: 9.589   3rd Qu.:13.098   3rd Qu.:5.0019
##  Max.   :46.00   Max.   :21.920   Max.   :23.098   Max.   :8.4599
##  NA's   :9       NA's   :49       NA's   :9        NA's   :49
##    acc.v0.avg       acc.v0.sd         acc.vn.avg       acc.vn.sd
##  Min.   : 0.000   Min.   :0.01414   Min.   : 6.583   Min.   :0.1929
##  1st Qu.: 2.350   1st Qu.:2.36407   1st Qu.:14.009   1st Qu.:2.7724
##  Median : 4.942   Median :3.60151   Median :16.653   Median :3.6925
##  Mean   : 4.824   Mean   :3.43816   Mean   :16.213   Mean   :3.8324
##  3rd Qu.: 7.008   3rd Qu.:4.33463   3rd Qu.:18.406   3rd Qu.:5.0088
##  Max.   :13.094   Max.   :9.56709   Max.   :26.189   Max.   :7.9544
##  NA's   :9        NA's   :49        NA's   :9        NA's   :49
##   acc.amid.avg      acc.amid.sd          dec.n         dec.len.min
##  Min.   :0.02706   Min.   :0.00285   Min.   : 0.000   Min.   : 5.00
```

```
##  1st Qu.:0.55567   1st Qu.:0.24402   1st Qu.: 2.000   1st Qu.: 8.00
##  Median :0.68179   Median :0.31557   Median : 5.000   Median :10.00
##  Mean   :0.71278   Mean   :0.33097   Mean   : 6.075   Mean   :11.11
##  3rd Qu.:0.89195   3rd Qu.:0.41778   3rd Qu.:10.000   3rd Qu.:13.00
##  Max.   :1.38494   Max.   :1.00197   Max.   :22.000   Max.   :37.00
##  NA's   :9         NA's   :49                         NA's   :1
##   dec.len.max     dec.len.avg      dec.len.sd     dec.range.avg
##  Min.   : 6.00   Min.   : 6.00   Min.   : 0.000   Min.   :-19.433
##  1st Qu.:18.00   1st Qu.:13.67   1st Qu.: 3.654   1st Qu.:-12.908
##  Median :23.50   Median :16.33   Median : 5.627   Median :-11.338
##  Mean   :24.37   Mean   :16.69   Mean   : 5.702   Mean   :-11.206
##  3rd Qu.:31.00   3rd Qu.:19.42   3rd Qu.: 7.544   3rd Qu.: -8.991
##  Max.   :48.00   Max.   :37.00   Max.   :17.786   Max.   : -6.029
##  NA's   :1       NA's   :1       NA's   :20       NA's   :1
##   dec.range.sd      dec.v0.avg       dec.v0.sd        dec.vn.avg
##  Min.   :0.1146   Min.   : 8.846   Min.   :0.5461   Min.   : 0.2223
##  1st Qu.:2.5001   1st Qu.:13.499   1st Qu.:3.2721   1st Qu.: 2.9215
##  Median :3.4471   Median :15.922   Median :4.4426   Median : 4.5580
##  Mean   :3.6195   Mean   :15.887   Mean   :4.3469   Mean   : 4.6805
##  3rd Qu.:4.7001   3rd Qu.:18.391   3rd Qu.:5.2062   3rd Qu.: 6.4360
##  Max.   :8.1558   Max.   :26.435   Max.   :9.2990   Max.   :12.0680
##  NA's   :20       NA's   :1        NA's   :20       NA's   :1
##    dec.vn.sd        dec.amid.avg      dec.amid.sd
##  Min.   :0.03015   Min.   :-2.2991   Min.   :0.001488
##  1st Qu.:2.67381   1st Qu.:-1.1420   1st Qu.:0.368631
##  Median :3.52872   Median :-0.9692   Median :0.474980
##  Mean   :3.52662   Mean   :-0.9932   Mean   :0.481462
##  3rd Qu.:4.36449   3rd Qu.:-0.7718   3rd Qu.:0.596342
##  Max.   :8.21409   Max.   :-0.1206   Max.   :1.224189
##  NA's   :20        NA's   :1         NA's   :20
```

```
trip.id <- rownames(trip.prof[which.max(trip.prof$trip.len), ])
```

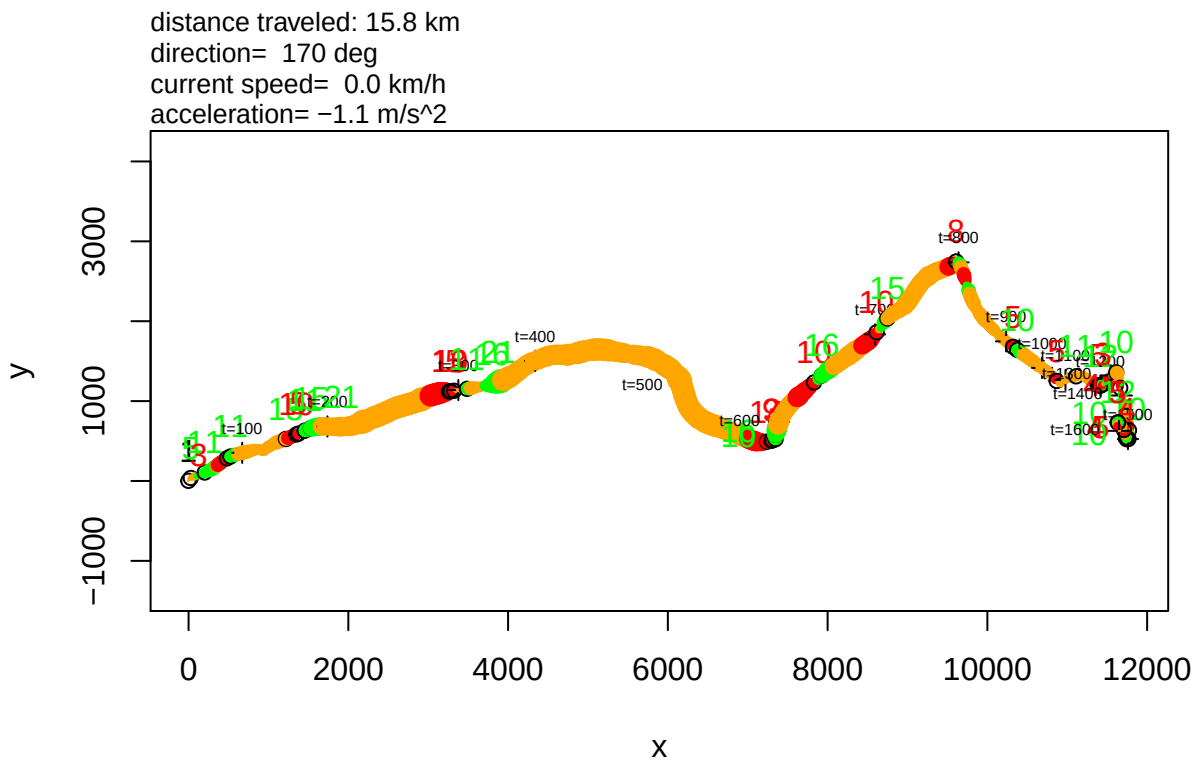
Longest Trip = 118

Just for grins, let's take a look at the trip with the max length

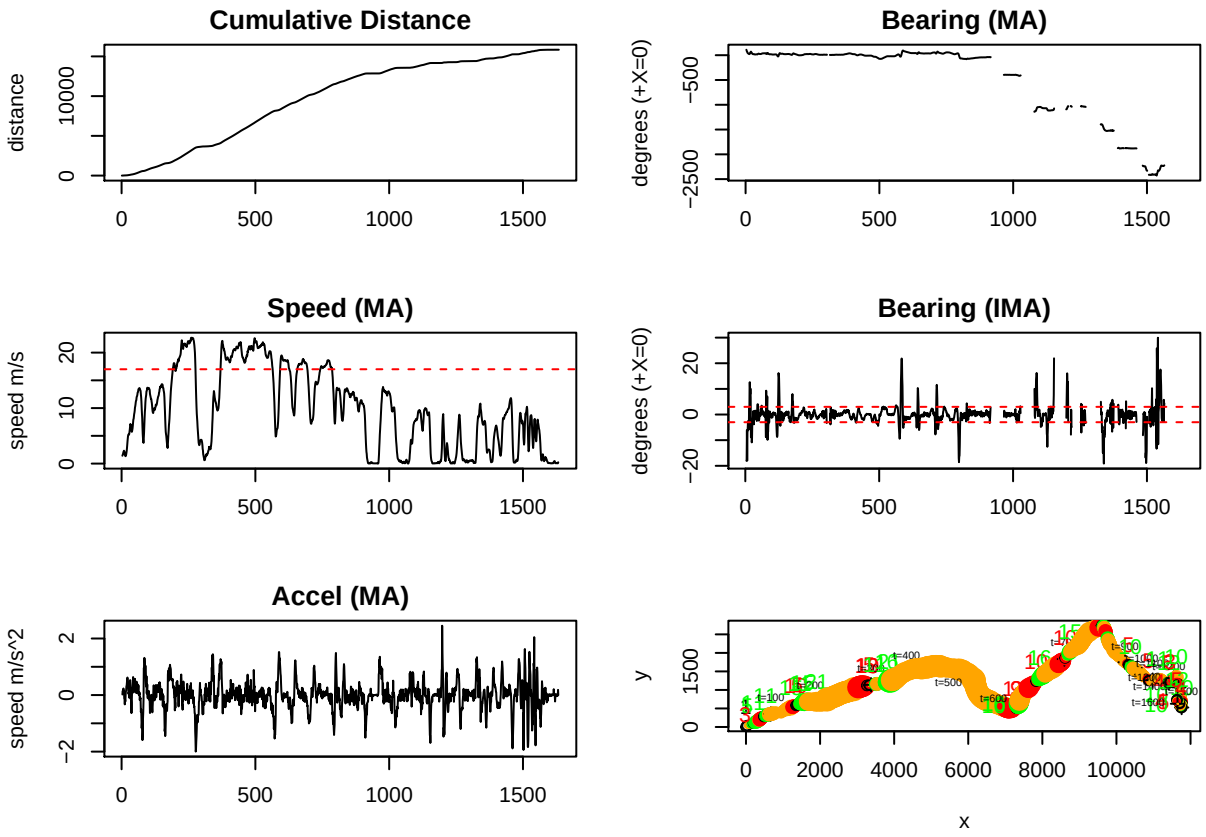
```
tp <- trip.prof[trip.id, ]
cat(trip.id, ": length, dist, straights, accels, decels # ", tp$trip.len, round(tp$trip.dist/1000,1), tp
```

```
## 118 : length, dist, straights, accels, decels #  1634 15.8 11 20 19 ...
```

```
trip <- getTrip( driver.id, trip.id, v.thresh=1 )
plotTrip(trip)
```




```
plotTripSegment6(trip,1,9999)
```



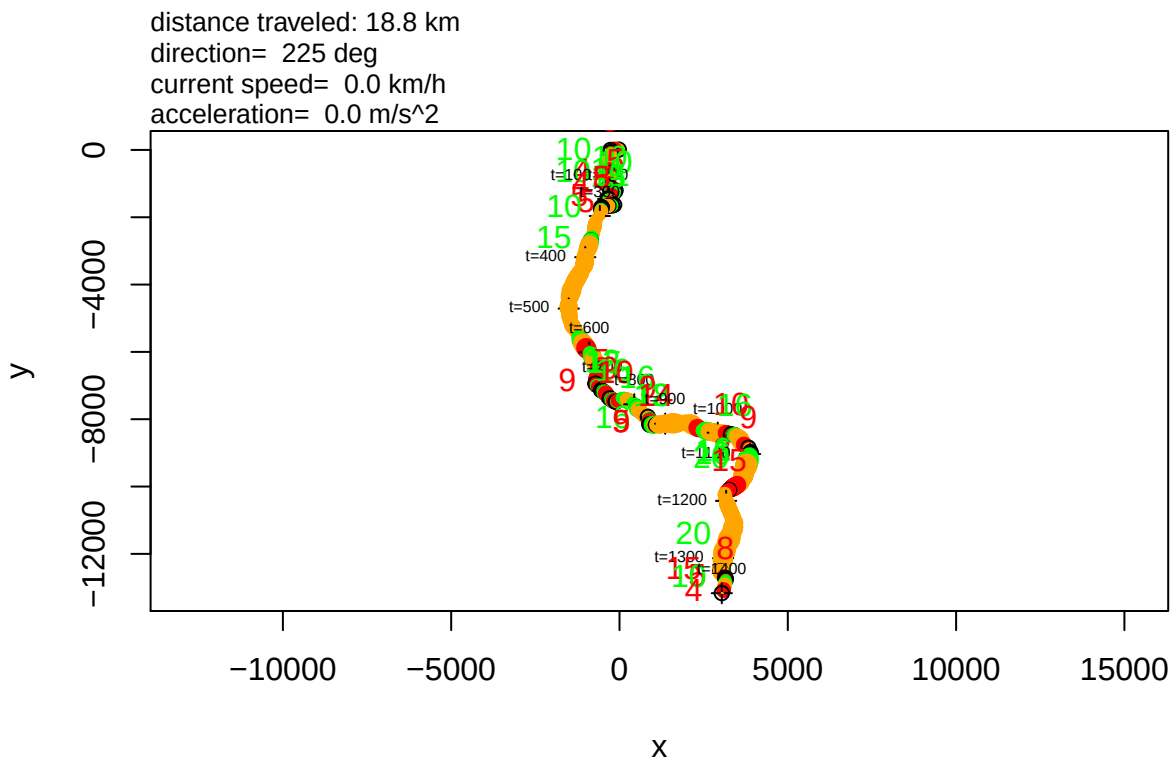

```
nfeat <- with(trip.prof, ss.n + acc.n + dec.n  )
trip.id <- rownames(trip.prof[which.max(nfeat), ])
```

; and again for ## Trip with most features = 38 Just for grins, let's take a look at the trip with the max length

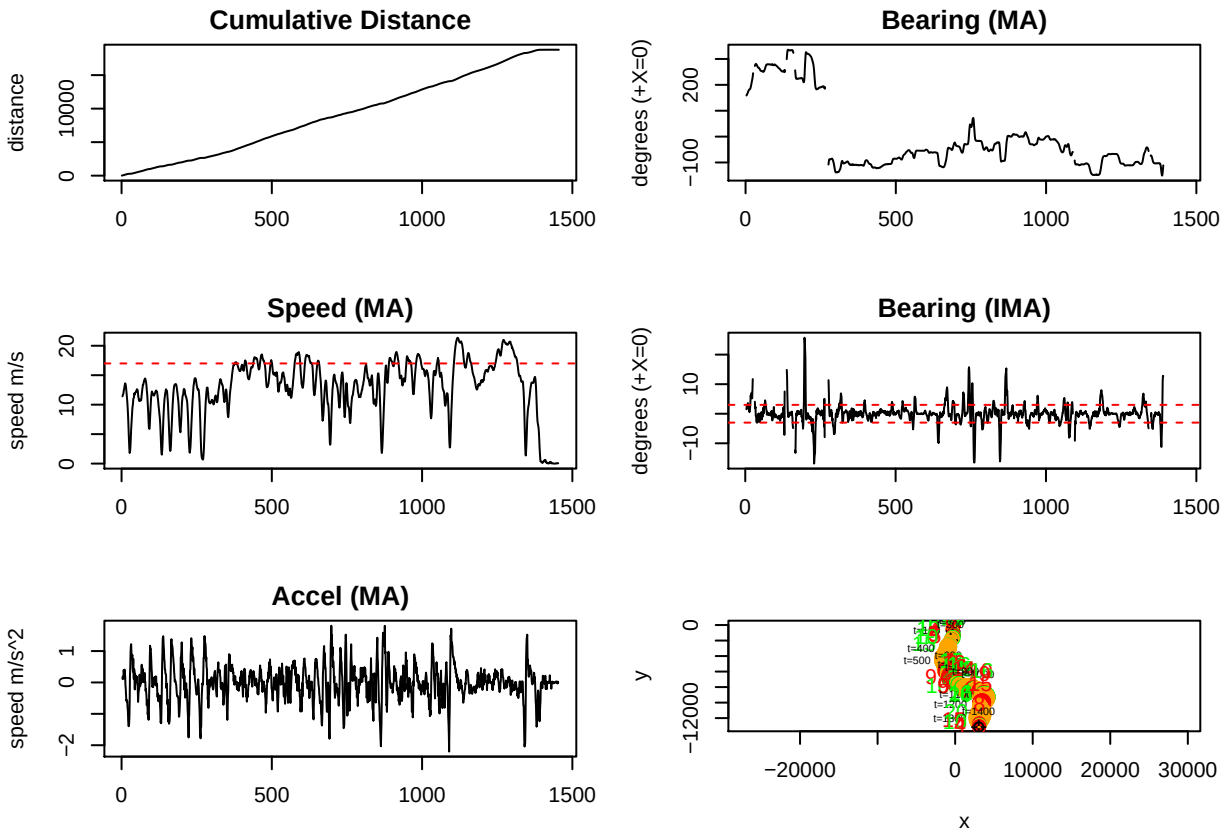
```
tp <- trip.prof[trip.id, ]
cat(trip.id, ": length, dist, straights, accels, decels # ", tp$trip.len, round(tp$trip.dist/1000,1), tp
```

```
## 38 : length, dist, straights, accels, decels #  1455 18.8 12 23 22 ...
```

```
trip <- getTrip( driver.id, trip.id, v.thresh=1 )
plotTrip(trip)
```




```
plotTripSegment6(trip,1,9999)
```




```
prof.fn <- sprintf("driver_%d_prof.RData", driver.id);
save(file=prof.fn, trip.prof)
```

```
getTripProfile
```

```
## function (trip)
## {
##     prof <- data.frame(trip.len = nrow(trip))
##     prof$trip.dist <- sum(trip$v)
##     prof$speed.avg <- mean(trip$v)
##     prof$speed.max <- max(trip$v)
##     straights <- segment.parse.bearing(trip)
##     prof$ss.n <- nrow(straights)
##     if (nrow(straights) > 0) {
##         prof$ss.len.min <- min(straights$tlen)
##         prof$ss.len.max <- max(straights$tlen)
##         prof$ss.len.avg <- mean(straights$tlen)
##         prof$ss.len.sd <- sd(straights$tlen)
##         range <- (straights$v.max - straights$v.min)
##         prof$ss.range.avg <- mean(range)
##         prof$ss.range.sd <- sd(range)
##         prof$ss.vmid.avg <- mean(straights$v.mid)
##         prof$ss.vmid.sd <- sd(straights$v.mid)
##     }
##     else {
```

```
##         prof$ss.len.min <- prof$ss.len.max <- prof$ss.len.avg <- prof$ss.len.sd <- NA
##         prof$ss.range.avg <- prof$ss.range.sd <- prof$ss.vmid.avg <- prof$ss.vmid.sd <- NA
##     }
##     acc <- segment.parse.accel(trip)
##     prof$acc.n <- nrow(acc)
##     if (nrow(acc) > 0) {
##         len <- acc$tn - acc$t0
##         prof$acc.len.min <- min(len)
##         prof$acc.len.max <- max(len)
##         prof$acc.len.avg <- mean(len)
##         prof$acc.len.sd <- sd(len)
##         range <- (acc$vn - acc$v0)
##         prof$acc.range.avg <- mean(range)
##         prof$acc.range.sd <- sd(range)
##         prof$acc.v0.avg <- mean(acc$v0)
##         prof$acc.v0.sd <- sd(acc$v0)
##         prof$acc.vn.avg <- mean(acc$vn)
##         prof$acc.vn.sd <- sd(acc$vn)
##         prof$acc.amid.avg <- mean(acc$a.mid)
##         prof$acc.amid.sd <- sd(acc$a.mid)
##     }
##     else {
##         prof$acc.len.min <- prof$acc.len.max <- prof$acc.len.avg <- prof$acc.len.sd <- NA
##         prof$acc.range.avg <- prof$acc.range.sd <- prof$acc.v0.avg <- prof$acc.v0.sd <- NA
##         prof$acc.vn.avg <- prof$acc.vn.sd <- prof$acc.amid.avg <- prof$acc.amid.sd <- NA
##     }
##     dec <- segment.parse.decel(trip)
##     prof$dec.n <- nrow(dec)
##     if (nrow(dec) > 0) {
##         len <- dec$tn - dec$t0
##         prof$dec.len.min <- min(len)
##         prof$dec.len.max <- max(len)
##         prof$dec.len.avg <- mean(len)
##         prof$dec.len.sd <- sd(len)
##         range <- (dec$vn - dec$v0)
##         prof$dec.range.avg <- mean(range)
##         prof$dec.range.sd <- sd(range)
##         prof$dec.v0.avg <- mean(dec$v0)
##         prof$dec.v0.sd <- sd(dec$v0)
##         prof$dec.vn.avg <- mean(dec$vn)
##         prof$dec.vn.sd <- sd(dec$vn)
##         prof$dec.amid.avg <- mean(dec$a.mid)
##         prof$dec.amid.sd <- sd(dec$a.mid)
##     }
##     else {
##         prof$dec.len.min <- prof$dec.len.max <- prof$dec.len.avg <- prof$dec.len.sd <- NA
##         prof$dec.range.avg <- prof$dec.range.sd <- prof$dec.v0.avg <- prof$dec.v0.sd <- NA
##         prof$dec.vn.avg <- prof$dec.vn.sd <- prof$dec.amid.avg <- prof$dec.amid.sd <- NA
##     }
##     return(prof)
## }
```